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THE UTILISATION OF AMBULATORY HEALTH CARE SERVICES IN SAUDI ARABIA: A QUANTITATIVE ANALYSIS

A thesis submitted for the degree

of Doctor of Philosophy

By

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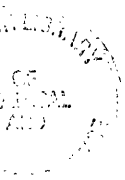

Dedication

To my mother and father

Acknowledgment

In the process of doing any serious research, moral support and academic guidance are essential factors that help the researcher to reach his or her goal.

On the academic level I have to express my deep appreciation to my supervisor Professor Julian Le Grand. He was always generous with his time, unlimited support and insightful ideas. I also express my gratitude to Dr. Amani Siyam for her advice on the statistical analysis performed in the thesis and, I appretiate the suggestions made by Maria Evandrou and Dr. Philip Cheung which led to many important improvements on this work.

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Abstract

The thesis aims to investigate whether need is the major determinant of ambulatory health care utilisation for Saudi nationals in Saudi Arabia. This is done by applying multivariate analysis on the utilisation of both curative and preventive services on the data provided by the 1996 Saudi Arabia Family Health Survey. The analysis is applied within the framework of Andersen's sociobehavioural model, categorizing the factors that affect health services utilisation into predisposing, enabling and need factors.
It can be concluded from the results that although need seems to be an important determinant of ambulatory health care utilisation, some of the predisposing and enabling factors were also found to affect health services utilisation, although the degree of their effect differs according to the health condition and type of services tested for. Need is dominant with regards to the utilisation of health services in response to children's diarrhoea, infants' full immunisation and attending at least one prenatal care session. But since some of the predisposing and enabling factors were found to affect health services utilisation, this highlights the importance of addressing the factors that were found to impede the utilisation at the health care system level as well as at the society level in order to achieve a more equitable health care system.

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Chapter 1
Introduction

{"Health is a crown on the heads of the healthy, seen only by the ill."

Arabic proverb.

After life, there is certainly nothing more worthy than health to protect and maintain. To provide it every country in the World spends fortunes, and to preserve it every sensitive nation allocates a large percentage of its budget. However, since funds are limited and needs are not, it is incumbent on every government, institution and individual to use those funds wisely in order to make the most of them for the benefit of the greatest number of people that need health care. It is only through efficient utilisation of resources that we can best serve any community.}

This study aims at examining whether need is the principal determinant of the utilisation of ambulatory health care for Saudi nationals in Saudi Arabia. This includes the utilisation of some aspects of both the curative and preventive services, with the inclusion of primary and secondary health services as the ambulatory sources of care. It applies multivariate analysis to data from the 1996 Saudi Arabia Family Health Survey, the only comprehensive health survey conducted in Saudi Arabia covering all its regions. To my knowledge, this is the first study that assesses this aspect of health services in Saudi Arabia on a country wide level, using multivariate analysis.

Since the establishment of the Ministry of Health in Saudi Arabia in the 1950s and especially after the issuing of the First Development Plan in the country in 1971, vast developments in health care have occurred. Starting from very scarce services and resources, provided only in major cities, the health care system witnessed continuous and vigorous efforts throughout the years to establish a modern and competent health care system. The effects of these efforts are visible in improvements in health indicators such as the improvement in life expectancy, the decrease in mortality rates and in the incidence of infectious diseases.

During this early period of development the issue of health service utilisation was relatively neglected. It came to attention in the late 1980s, when the country started to witness an increased demand on health services with rising public expectations (Ministry of Planning, 1991). But only a few studies on the utilisation of health services were conducted. The majority of the studies were localised to certain cities or specific areas in Saudi Arabia; they also lacked multivariate analysis.

When assessing the significance of this issue, it is clear that understanding health service utilisation is essential for proper planning and budgeting of health services, since knowing the factors that affect service use sheds light on some of the deficiencies of the health care system, in addition to reflecting the need of the population, their demands and expectations. It also shows their compliance with the provided health programmes, thus providing an indication of the success or failure of these programmes.

It has been stated in the Ministry of Health objectives that free and equal medical attention should be provided to all Saudi nationals. Although not stated explicitly, it is clear that the principal aim underlying this objective is that need should be the principal determinant of health service utilisation. Factors such as age, gender, socioeconomic status and place of residence and so on should not affect utilisation, except in so far as they are associated with need. In this, Saudi Arabia is following one of the aims of most of the health care systems, especially those that involve a substantial amount of public funding. Thus, identifying the factors that lead to utilisation differences other than need is a prerequisite for designing adequate corrective policies, ensuring that the positive gain from health service contact is not confined to certain privileged groups of the population.

In this study testing whether need is the principal determinant of ambulatory health care utilisation is undertaken by the application of the Andersen sociobehavioural model. In this model factors that affect the utilisation of health services at the individual level are categorized into predisposing, enabling and need factors. In the thesis predisposing factors, the factors that predispose the use of health services, are primarily demographic and social characteristics. Enabling factors are the factors that enable or impede the use

of health services. They reflect the available means and ability to use the health services, and they include economic factors, factors related to the characteristics of the health care system and area of residence. Need variables relate to the nature of an individual's health status. For curative services these include the presence of a medical condition, its severity and duration. For the utilisation of preventive services, being pregnant, is the need factor that should lead to having received timely prenatal care. In addition to having a medical condition, which can lead to an increase in the number of prenatal care visits. Being an infant is considered to be an indicator of the need of being immunised as scheduled. Need is the major determinant of health care service utilisation if the predisposing and enabling factors have minimal or no effect.

The specific types of curative services investigated in the thesis are the utilisation of doctors' services, public and private, for the care of acute sickness for adults and children, and the utilisation of public and private services by children under five with diarrhoea and acute respiratory infections. By public doctors' and public services is meant -for most of cases- GPs in public primary health care centres, while private doctors' and private services are most likely to be specialists working in the private sector. Preventive services investigated include the utilisation versus non utilisation of prenatal care –which is considered to be preventive since it is a form of a scheduled monitoring without the need for the presence of complications or abnormalities and it is useful for screening for possible future complications- the early initiation of prenatal care, the number of prenatal care sessions attended, the choice of a public versus a private source of prenatal care for the last prenatal care checkup, and infants' full immunisation. In each case as already indicated the different roles of the predisposing, enabling and need factors -as specified for each type of the utilisation of health services- will be tested to determine whether need is the major factor in determining utilisation.

The utilisation of heath services in response to acute sickness is investigated because it includes the utilisation of health services in response to all possible acute health problems. There was no data set before the 1996 Saudi Arabia Family Health Survey that provided such information; this survey also provided data on of a wide range of

background variables such as sociodemographic variables and some economic indicators. Thus the results of the analysis are likely to be reflective of the level of demand on curative services in Saudi Arabia. In turn, these results can be utilised in health care planning. Utilisation of health services for children's diarrhoea and acute respiratory infections was included since diarrhoea and acute respiratory infections are two of the five main causes of children's death around the world, especially in developing countries (WHO, 1995), and a large proportion of the death causes by these two categories of illness, as well as further suffering from them, could be avoided by the application of existing technology and established medical practice (Douglas, 1984).

Prenatal care utilisation is investigated since receiving timely and adequate prenatal care is effective in reducing adverse pregnancy outcomes such as maternal mortality, perinatal mortality, low birth weight and premature delivery. Thus the identification of subgroups of women who do not utilise prenatal care services, or utilise it inadequately, is important for policy intervention strategies. The non utilisation or inadequate utilisation of prenatal care services may reflect social and cultural constraints as well as poor organizational policies and practices. Information on the determinants of the utilisation of prenatal care services can be used by health planners to work towards eliminating these barriers and encouraging women to utilise the available services more effectively. Childhood full immunisation is included in the analysis as it leads to a decrease in infants and children under five mortality rates, adult morbidity and mortality and the incidence of vaccine preventable diseases (Gyorkos et al., 1994), and it has been reported to be cost-effective (Koplan & Preblud, 1982; Hinman & Koplan, 1984). Besides, it has been mentioned by the WHO as part of the WHO/SIDA equity initiative that prenatal care coverage and infants' full immunisation can be used as part of the assessment of equity in health care (WHO, 1996).

In the following part of this introductory chapter an outline of the thesis chapters' content is presented. In the second chapter a description of the development of the Saudi health care system as specified in the development plans and as indicated by the development of health care resources is presented, with a brief review of the studies carried out to

evaluate primary health care centres across the years and an outline of the current structure of the health care system. In addition, an overview of the epidemiological profile of the Saudi population is provided, including mortality rates, the incidence of notifiable infectious diseases, the prevalence of selected chronic conditions and the health problems profile of the attendants of the Ministry of Health primary health care centres and public hospitals' outpatient departments. At the end of the chapter, based on the information provided, Saudi Arabia is placed in the corresponding stage of the epidemiological transition.

The third chapter includes a literature review of the studies carried out in the field of ambulatory services utilisation. These include studies in both developed and developing countries. The findings of these studies are arranged according to the classification provided by the Andersen's sociobehavioural model, on which the organization of the thesis analysis is based. The review of the studies is preceded by a brief introduction to the main models applied in research on ambulatory health care service utilisation.

The fourth chapter of the thesis is the methodology chapter. This chapter outlines the research questions to be answered and their related hypotheses. It also includes a brief description of the sample design, the questionnaires, data collection and data analysis procedures. This is followed by a description of the independent and dependent variables and a comparison between the main sample characteristics and the characteristics of the Saudi population as provided in the 1992 Saudi demographic survey.

The fifth chapter displays the results of the bivariate associations between the independent and the dependent variable and the results of the multinomial logistic regression, testing the effects of the predisposing, enabling and need related factors on the utilisation of doctors' services, public and private, and the utilisation of services from both the public and the private sectors. This is done both for adults fifteen years and older and for children younger than fifteen. In each case, a discussion of the effects of the tested variables is included together with a comparison with the findings from the international literature.

The sixth chapter of the thesis displays the results of the bivariate associations between the independent and the the dependent variables and the results of the multinomial logistic regression testing for the effects of the predisposing, enabling and need factors on children's utilisation of the public and the private services in response to diarrhoea and acute respiratory infections, each modeled separately. This is followed by a discussion of the effects of these factors and a comparison of the research results with the research findings in developing countries in which these two health problems are major contributors to children under five mortality and morbidity.

The seventh chapter of the thesis displays the results of the bivariate associations between the independent and the dependent variables and the results of the logistic regression for the use of prenatal care services versus non use, the initiation of prenatal care, public versus private care as the place of the last prenatal care checkup and, for the infants, full immunisation status is included, in addition, to the results of the Poisson regression model for the number of prenatal care sessions attended. A discussion of the effects of the predisposing, enabling factors and medical problems on prenatal care utilisation is provided, as well as the discussion of the effects of the predisposing and enabling factors on infants' full immunisation status. The findings of this chapter are also placed within the context of the findings from the international literature.

The final chapter of the thesis includes a summary of research findings, a brief discussion of these findings, related policy implications and a description of the limitations of the study. There is also a brief conclusion section.

Chapter 2

The Saudi Health Care System and Population Health

2.1. INTRODUCTION

This chapter has two parts. The first part discusses the development of the Saudi health care system, starting with health care in the development plans, followed by the development of health care resources and the current distribution of these resources. Studies conducted in primary health care to assess its problems across the years are also discussed. The current sources of health care in Saudi Arabia are then briefly discussed.

The second part of the chapter includes an assessment of the Saudi population health status. It considers mortality rates across the years and its determinants, followed by the incidence of notifiable diseases, the prevalence of some chronic conditions and the types of health problems reported for primary health care visitors and visitors of Ministry of Health hospitals' outpatient departments. Before the end of the chapter a brief discussion of the Saudi position according to the epidemiological transition theory is provided, followed by a brief summary of the chapter.

2.2. SAUDI ARABIA THE COUNTRY

Saudi Arabia is a Middle Eastern country bordering the Arabian Gulf and the Red Sea, north of Yemen (refer to the map in the appendix). It covers 1,960,582 sq km, which is slightly more than one-fifth the size of the United States. It is constituted of 13 provinces. Constitutionally the King rules in accordance to the Shari'a, the sacred law of Islam. A consultative council called Majlis ash-shura is constituted of 90 members is the official body at which policies, legislations and laws are formulated before they are authorized by the King and the Council of Ministers.

The economy is an oil-based economy, since Saudi Arabia has the largest reserves of petroleum in the world. The petroleum sector accounts for approximately 75% of the budget revenues, 40% of GDP and 90% of export earnings. According to the World Bank

(2003) the GNI per capita is 8460 US$, which makes Saudi Arabia a high middle income country. The GDP composition by sector is: from industry 47%, from services 47% and from agriculture 12%. The labour force composition by sector is: 63% in the services sector, 25% in the industry sector and 12% in the agriculture sector.

According to the Central Department of Statistics at the Ministry of Planning, it is estimated that in July 2000 the total population of Saudi Arabia was 22,023,506, including non-Saudi nationals who are estimated to be 5,360,526. 43% of the population are under 15 years of age, 55% are 15-64 years of age, while only 2% are 65 years and older . The crude birth rate is 28/1000 of the population, the total fertility rate is 4.5 and the annual population growth is 3.47%, which is considered to be high comparing to other countries, as reported by the World Bank (2003). The population composition and its rapid growth imply the need to implement development policies in order to accommodate the growing population. Due to increased modernization, and according to the World Bank (2000) it was reported that the population growth in 1980-1990 was 7.9% while in 1990-1998 the population growth fell to 3.9%, showing a decrease by half in the rate of population growth in a one decade time.

2.3. THE DEVELOPMENT OF THE SAUDI HEALTH CARE SYSTEM

2.3.1. Health care in the development plans

Health services from the start of their organization in the 1950's until the late 1960's were progressing slowly in its development (Sebai, 1981), and planning was done in the Ministry of Health alone. But during the 1970's the country experienced a rapid rate of development along the socioeconomic advancement of the country. Health planning was coordinated between the Ministry of Planning and the Ministry of Health.

The first development plan which was published in 1971 was constituted of two phases. In the first two years the focus was on the development of the standard of health services. This included upgrading of health centres, preventive health programmes, health culture and nutrition, as well as the opening of fully-furnished hospitals and health centres. Existing buildings were renovated and the standard of education at training centres

improved. Simultaneously, data and preliminary studies were completed in preparation for the second stage. In the remaining three years efforts focused on further development of health care facilities and on increasing the number of doctors, nurses, technical and other staff, with an eye toward Saudization. Besides, the field of studies and research was also expanded.

In the second development plan (1975-1980) the objectives included expanding geographical coverage to all parts of the country, developing preventive services, establishing a network of maternity centres and standardizing the designs of hospitals in the various provinces. It also included the development of mobile health services to cater for desert inhabitants and small communities, increasing the number of health care centres and establishing clinics for dentistry, chest diseases and general medicine. The plan's objectives also mentioned setting up blood banks, introducing health cards and opening medical files for all, increasing human resources in all fields of specialization and implementing the decision of the Council of Ministers in providing the private sector with loans to set up hospitals and private clinics.

The third development plan (1980-1985) included the same objectives as the second plan with regards to increasing the coverage of the health care system as well as the development of health care centres, support services and the expansion of activities.

The fourth development plan (1985-1990) concentrated on strengthening the role of primary care, being the basis for the provision of health care. Further development of all aspects of health services, with the increased coordination between health care providers, was considered to be some of this plan's objectives, in addition to encouraging the expansion of private services.

The fifth development plan (1990-1995) emphasised the importance of primary health care development with the advancement in its coverage. It specified that for cities with more than 200,000 residents they would be served by one primary health care centre per 10,000 persons, cities with less than 200,000 residents will have one primary health

centre per 5000-6000 persons, and villages and remote populations will be served by one primary health care centre per 500 to 2000 persons. In addition, this plan emphasised the importance of the development of health information systems, increase in the efficiency and effectiveness of the services and the development of national manpower.

The sixth development plan 1995-2000 emphasised the strengthening of primary care and the referral processes, and improving the quality of health services. It also focused on the eradication or the reduction of the incidence of infectious diseases to the lowest possible levels.

The most recent development plan, published in 2001, addressed the issues of the management of the health care system, ensuring optimal utilisation of health services and the available resources. It also addressed the financing of health services, encouraging the private sector to undertake a greater role in financing the construction and management of health facilities. Health manpower development and increasing the capacity of medical and allied medical colleges were also addressed. The objectives of this plan emphasised the role of primary health care in the provision of preventive and curative health services. It also emphasised the development of information systems and upgrading the quality of health services, in addition to ensuring the coordination and integration of health services and enhancing the role of the private sector in the finance, construction and the management of health services.

2.3.2. Health care expenditure

Government expenditure on health services through the Ministry of Health increased throughout the years with an increasing demand on health services and rising public expectations. The following table provides health care expenditure across the years at the starting year of each development plan.

Table 2.1. Ministry of Health budget across the years

Year	Ministry o Health budget (in thousands of SR)	Percentage of government budget
1970	177,000	2.8
1975	3,197,000	2.9
1980	5,656,000	2.3
1985	8,815,000	4.4
1990	8,597,000	6
1995	7,364,772	4.9
2000	11,939,430	6.5

Source: Ministry of Finance and National Economy (M.O.F.N.E), Central Department of Statistics

It can be observed from the table that the proportion of the Ministry of Health budget is considered to be small compared to the total government budget. It can also be observed that its proportion has significantly increased from the start of the 1990's, reaching 6.5% of the total government spending in 2000. Detailed information of how the budget is allocated is not available, neither is information about other than Ministry of Health expenditure on health services, nor private expenditure on health. Thus calculation of the GDP spent on health for the corresponding years as mentioned in the table can not be done.

In order to compare the Saudi Arabian health care expenditure to other countries within different income groups, averages were calculated for each group of countries categorized as having a specific income level -according to the World Bank- including information regarding the percentage of GDP spent on health and the percentage of government expenditure on health in the year 2000. Health expenditure information was taken from the World Health Report 2002.

Table 2.2. Health care expenditure in Saudi Arabia, the Middle East and North Africa and other countries, grouped by income level in the year 2000

Country/countries	Total expenditure on health as % GDP	General government expenditure on health as % of total expenditure on health
Saudi Arabia	6.5	79.1
Middle East & North Africa	5.0	56.4

Low income	4.3	52.8
Lower middle income	5.5	62.2
Higher middle income	6.3	63.7
High income	7.8	71.8

Source: Calculations based on the World health report 2002 and on the World Bank data base

It can be observed from the table above that the Saudi Arabian percentage of GDP spent on health is similar to what has been reported for the average of the %GDP spent on health in the same income category and is better than other Middle East and North African countries, which is the health region that Saudi Arabia belongs to. Looking at the percentage of government expenditure on health, Saudi Arabia holds a very advantaged position which is comparable to high income countries that are more likely to be welfare states. This is due to the fact that Saudi Arabia provides the majority of health care for the population which is free of charge for all types of health services as an obligation on the Ministry of Health and other governmental bodies. This ensures more equitable access and the increase of the probability of the success of public health programmes. It was reported in the World Health Report 2000 that Saudi Arabia holds the 37th position in the World with respect to the fairness in the financial contribution.

2.3.3. The development of health care resources

When assessing the achievements of the development plans, it is worth mentioning that major evaluation studies were undertaken by governmental bodies, in which the results were analysed and the information brought by them was utilised internally within governmental organizations. The only available published information is information about the development of health care resources. There were some published studies carried out regarding the problems faced by primary care centres, which will be mentioned later on in the chapter. The effects of the total socioeconomic development of Saudi Arabia, including the development of the health care system on the health status of the population will also be discussed.

According to the World Health Report 2000, the Saudi Arabian health care system was ranked the 10th world wide in terms of how efficiently the health system had translated

expenditure into health, thus pointing to the great positive influence of the health care system. The Saudi health care system was ranked the 26th world wide, in terms of overall performance; that is, the overall health system achievement to the health system's expenditure.

In accordance with the development plans, the Saudi health care resources have expanded in the last decades. The following table will show the expansion of the Ministry of Health health care resources over the years, excluding private care and health services provided by other governmental sectors. A graphic representation of the percentage annual growth of health resources is displayed in the appendix.

Table 2.3. The development of the Ministry of Health care resources across the years in numbers and percentages of annual growth

Year	Number of PHC centres (% annual growth)	Number of hospital beds (% annual growth)	Number of doctors (% annual growth)	Number of nurses (% annual growth)	Number of allied health personnel (% annual growth)
1970	519	7165	789	2253	1396
1974	609 (4.1)	9070 (6.1)	1900 (24.6)	4234 (17.1)	2670 (17.6)
1979	824 (6.2)	10978 (3.9)	3408 (12.4)	6166 (7.8)	4090 (8.9)
1984	1119 (6.3)	17961 (10.3)	7490 (17.1)	14919 (19.3)	7963 (14.3)
1985	1306 (16.7)	20796 (15.8)	9257 (23.6)	20707 (38.8)	10086 (26.7)
1986	1431 (9.6)	23862 (14.7)	10359 (11.9)	24528 (18.5)	11513 (14.1)
1987	1438 (0.5)	25902 (8.5)	11326 (9.3)	25986 (5.9)	12793 (11.1)
1988	1477 (2.7)	26315 (1.6)	11940 (5.4)	27169 (4.6)	14013 (9.5)
1989	1639 (11)	25918 (-1.5)	12617 (5.7)	28266 (4.0)	15125 (7.9)
1990	1668 (1.8)	25835 (-0.3)	12959 (2.7)	29124 (3.0)	15329 (1.3)
1991	1692 (1.4)	26866 (4.0)	14082 (8.7)	30799 (5.8)	16832 (9.8)
1992	1702	26878	13900	32229	17195

	(0.6)	(0.0)	(-1.3)	(4.6)	(2.2)
1993	1707	26974	14554	33373	18528
	(0.3)	(0.4)	(4.7)	(3.5)	(7.8)
1994	1719	26878	15125	35687	19325
	(0.7)	(-0.4)	(3.9)	(6.9)	(4.3)
1995	1725	26737	15476	35219	19973
	(0.3)	(-0.5)	(2.3)	(-1.3)	(3.4)
1996	1731	26955	15266	34947	20250
	(0.3)	(0.8)	(-1.4)	(-0.8)	(1.4)
1997	1737	27058	14717	34739	20131
	(0.3)	(0.4)	(-3.6)	(-0.6)	(-0.6)
1998	1751	27428	14407	36101	20615
	(0.8)	(1.4)	(-2.1)	(3.9)	(2.4)
1999	1756	27794	14786	36340	22188
	(0.3)	(1.3)	(2.6)	(0.7)	(7.6)
2000	1766	27864	14970	37126	23073
	(0.6)	(0.3)	(1.2)	(2.2)	(4.0)

Source: The achievements of the development plans: facts and figures 2001

Looking at the table above it can be observed that the mid 1980's was the best time in terms of development of health care resources. Coinciding with the third development plan (1985-1990) with its emphasis on primary health care as the major vehicle for the provision of health care, 1985 displayed the highest percentage in the growth of primary health care centres, followed by 1989. In the 1990's the expansion of primary health care centres was slowed down, which maybe the result of the achievement of higher coverage levels compared to the 1980's, where it was indicated that by the year 1995 the Ministry of Health coverage alone was 98% (Al-Mazrou et al., 1995).

Regarding hospital beds, the highest increase was in the 1980's, except for 1989 where there was a slight cut in the number of hospital beds. For human health care resources in general, the highest recruitment was in the early 1970's and in the 1980's. A decline in the percentage of doctors is shown after 1995 to a level below what was reported that year, which has risen after 1997, but this is still expected to lead to a shortage in the number of doctors, probably affecting the accessibility and the quality of health services in the light of the fact that Saudi Arabia still has a high population growth. It is worth noting that population growth was halved in the 1990's compared to the 1980's. For nurses, the mid 1980's showed the greatest developments in number, after which their

numbers have increased almost steadily except for the small decrease in the mid 1990's. For other allied health care personnel, the mid 1980's also displayed the highest rates of percentage increase in numbers for all human health care resources, indicating that this period was an important period for the development of the Saudi health care system. In the 1990's the number of allied health care personnel has grown steadily at a higher rate than doctors' number, which may probably indicate the increased reliance on allied health care personnel, in an attempt to increase the efficiency of the health care system.

Regarding the distribution of health care resources, both public and private, the following table displays the available health care resources for each 100,000 of the population, including foreign residents in the different provinces of the country.

Table 2.4. The health care resources available for every 100,000 of residents in the different provinces in Saudi Arabia

Province	Public services			Private services		Total hospital beds	Total physicians
	Primary care centres	Hospital beds	Physicians	Hospital beds	Physicians		
Riyadh	5.9	95.0	34.6	23.2	12.0	118.2	46.7
Makkah	5.0	130.0	50.0	73.1	30.0	202.4	81.7
Al-Medinah	9.3	178.0	70.0	36.2	11.8	214.4	81.2
Al-Qaseem	13.7	30.0	84.8	7.5	2.4	37.0	87.2
Eastern Province	5.1	94.3	38.4	78.8	40.0	173.1	78.6
Aseer	17.2	149.0	42.5	29.0	9.7	174.9	52.2
Tabuk	7.2	196.3	86.9	14.8	3.4	210.0	90.3
Hail	16.8	120.0	46.0	16.8	4.2	137.1	50.0
Northern Boundaries	15.0	207.0	40.0	0	0	207.0	40.0
Gizan	12.5	130.0	34.0	2.7	1.3	133.3	35.5
Najran	17.2	210.0	87.0	13.6	4.6	214.7	91.7
Al-Baha	18.6	243.0	82.0	23.0	4.9	266.2	87.0
Al-Jouf	11.6	219.0	66.6	0	0	219.0	66.6
Total	8.5	123.0	48.5	43.0	19.1	166.0	67.6

Source: Calculations based on the Ministry of Planning services survey: Manual 12, 2001 and the Ministry of Planning regional population estimates

At the first glance at the table, it can be observed that there is an inequitable distribution of health care resources in the various provinces in the Kingdom. Unexpectedly the Riyadh Province, where the capital is situated, shows one of the lowest physician to population ratios and one of the lowest primary health care centres to population ratios. This is probably due to the rapid population growth in the capital for which the health care services capacity can not accommodate. In contrast, provinces with a comparably higher proportion of rural populations, such as Al-Qaseem, Najran and Al-Baha Provinces, showed higher public physicians to population ratios and comparably high primary health care to population ratios. This maybe due to the need for more geographically distributed services, where smaller scattered populations exist, in order to have a more equitable service coverage. In addition to Najran, Al-Baha, Aseer, Hail and the Northern Boundaries, which also have a high proportion of small towns and cities and to some extent a large proportion of rural populations, the first three Southern Region provinces show a greater number of primary health care centres to the population ratios. This is compared to more developed urbanized areas where major cities are located such as Makkah, the Eastern Province and Al-Medina, where there are lower primary health care centre to population ratios and lower public physician to population ratios in the Eastern Province and in Makkah.

In contrast, provinces where major cities are located there are higher private physicians to population ratios, especially in Makkah and the Eastern Province. This is probably due in part to the higher demand for private care in these provinces. This is also reflected in the proportion of private hospital beds, where greater proportions are found in provinces where major cities are located, especially in Makkah and the Eastern Province where the highest proportion of private hospital beds to the population is found. The Southern Aseer and Al-Baha Provinces, have a high rural constituency but have relatively high private hospital beds to population ratios, although not comparable to Makkah and the Eastern Province. This maybe due to the increased demand for hospitalization in these provinces.

Regarding the total physicians to population ratios it is obvious that being a less socioenomically developed province, where there are no major large cities, is not

necessarily associated with lower physician to population ratios. Al-Qaseem, Tabuk, Najran and Al-Baha Provinces, which do not have any major cities situated in them, have a high rural constituency and have a comparably high physician to population ratios. It can be observed that Riyadh Province where the capital is situated holds a disadvantaged position in terms of doctors to population ratios, which is probably due to the rapid population growth with which the service growth is not coping. The Gizan Province also displays a problem in the physicians' distribution, since it has a high proportion of scattered populations but a low physician to population ratio, indicating possible problems in health service delivery and, possibly, the quality of care provided.

Regarding the total hospital beds to population ratios, the highest rate is found in the Southern Al-Baha Province, which is mainly constituted of a high proportion of scattered populations. The province with the third highest hospital beds to population ratio is Najran which is located in the Southern region of the country and has a similar population composition to Al-Baha Province. This maybe partly due to a higher demand on hospital beds and to increase in geographical accessibility for the scattered populations. Makkah and Al-Medinah Provinces have a high proportion of hospital beds to the population. This is partly due to the high number of foreign visitors to the holy mosques in these provinces which increases the demand for health services, especially where there is a high constituency of older visitors to the holy mosques. The Riyadh Province, like for physicians numbers, also displays a low proportion of total hospital beds to the population, which indicates the need for a rapid expansion in health services in this area. The province that showed the lowest total hospital beds to population ratios is the Central Al-Qaseem Province which is closely situated to the capital. This probably indicates a high reliance on the capital's public hospitals, since it is within a geographically short distance, and public care is the major source of health care in Saudi Arabia. It is worth noting that the capital has the highest number of public hospitals (33), next to the Makkah Province's (34) public hospitals, indicating the need for the expansion of these hospitals' capacities in Riyadh to accommodate population growth.

2.3.4. The development of primary health care in Saudi Arabia

In response to the Alma-Ata Declaration on primary health care, the Saudi Ministry of Planning declared the primary health care concept as the main objective of the health services, which would be provided free of charge (MOP, 1981). This was followed by the issue of the Ministry of Health Decree No. 257/1459/50 in 1980 leading to the establishment of primary health care centres. These were administratively integrating the existing dispensaries, health offices and maternal and child health care centres into one unit as a first step in the initiation of primary health care centres (Al Mazrou et al., 1990). In 1984, a Primary Health Care project was initiated with an objective of developing a culturally and socially acceptable primary health care system. The primary health care delivery instruments that were tested included elements such as family files and community surveys. It also tested some of the primary health care principles like community participation, inter-sectoral coordination with the defined contents of primary health care as specified in the Alma Ata declaration. In the same year evaluation took place and it was found that the planned activities were suitable, and thus standardized guidelines were formed and adopted in primary health care centres (Al Mazrou et al., 1990).

During this establishment period a number of surveys were carried out in order to study the organization and the performance of primary health care centres in Saudi Arabia. In general, it was found that the health centres were in rented buildings that were not designed to meet the needs of health services. Most of the staff were non-Arabic speakers with little understanding of the local culture. The emphasis was still on curative medicine; maternity and child health services were at a minimum; home visits were not permitted and the concept of the team approach to prevent disease and promote health was not adopted, and there were no attempts to include community participation (Sebai et al., 1980; Sebai, 1981; Banoub, 1982; Sebai, 1982), although it was reported that people are always ready to participate if they are well informed of the objectives and possible outcomes of their involvement (Sebai et al., 1980).

The primary health care approach was also supported in the following fourth development plan (1985-1990) which stated its objectives as following:
"-to strengthen primary health care as the basis of a comprehensive health services network provided integrating health services of high quality for the people of the Kingdom"
"- To continue the development of preventive, public health and environmental health programmes including health education, maternal and child health care, improved public immunisation and occupational health programs." (MOP, 1986).

During this period, Sebai (1988) conducted a study of the primary health care delivery system, which indicated that primary health care centres suffered from low quality in general, with problems such as long waiting times, problems in communication between doctors and patients, due to language barriers and cultural barriers since most of the workers are expatriates, shortage in health care manpower, shortage of medical equipment and lack of a holistic approach to health. A positive reporting regarding primary health care was its coverage, since 51% of health care centres served small communities of 10000 people or less and they usually functioned independently. Problems facing the implementation of primary health care were also listed in a Ministry of Health document (MOH, 1990a) reporting unavailability of adequate resources to primary health care centres such as laboratories, x-ray units, ambulances and so on. 82% of the primary health care centres were in rented buildings designed originally for housing. In addition there was a shortage and maldistribution of health professionals, increasing demand and range of services without proportional budget increase.

The fifth development plan (1990-1995) aimed at achieving better primary health care coverage according to specific centre to population ratios (MOP, 1991), sustaining the commitment to primary health care and refining its policies. It mentioned:
"Providing appropriate and essential primary and preventive health care services, delivering curative and preventive health services in an efficient manner, establishing uniform standards for primary health care services, encouraging adequate distribution, appropriate utilisation, and resource based enhancement for health services, expanding

manpower training programs and incentives for entering the health profession." (MOP, 1991). This was succeeded by the sixth development plan which also stressed the role of primary health care as the main instrument through which improved levels of health will be promoted, with the expansion of mother and child care activities and disease prevention programmes.

Some small scale studies were carried out in primary health care centres during this period. It was reported that in some primary health care centres human resource numbers did not measure up to the ideal set up standards and that clinical support areas were under-equipped (Al-Osimy, 1994). The concentration of primary health care doctors on acute health problems was also reported (Al-Shammari, 1991). Other problems that were mentioned still included the communication problems between non-Arabic speaking doctors, nurses and patients (El-Shabrawy Ali & Eisa, 1993; Al-Faris et al., 1996). Overcrowding, with its associated long waiting times, was also reported to be associated with the dissatisfaction with primary health care services (Al-Faris et al., 1996).

In the most recent plan (2000-2005) the role of primary care was also stressed by mentioning that it is the basic channel for the provision of preventive and curative services, with the continuing implementation of primary health care programmes. In a study carried out by Al-Khaldi et al. (2002) they still reported the existence of the language barriers between primary health care staff and patients, inadequate staffing in rural areas and the shortage in laboratory facilities.

2.4. THE STRUCTURE OF THE CURRENT HEALTH CARE SYSTEM

The Saudi health care services are provided by a wide range of institutions. In broad terms, the provision of health care is organized through a referral system which consists of a country-wide network of primary health care centres, and general and specialist hospitals. These services are provided mainly by the Ministry of Health and some other governmental bodies. The private sector also plays a role in the provision of health services, and remnants of traditional and folk medicine still exist.

2.4.1. The Ministry of Health

The Ministry of Health is the government agency responsible for health care in Saudi Arabia. It is organized centrally and provides its main services through primary health care centres and hospitals.

Primary health care centres are responsible for the provision of mother and child health care with its objectives being the reduction in maternal, infant and childhood mortality and morbidity, the promotion of reproductive health and the promotion of the physical and the psychological development of children and adolescents within their families. These objectives are achieved through the provision of a comprehensive maternal health care programme, a children's monitoring programme and a contribution to the expanded programme of immunisation. In addition, the health care centres provide care during illness.

Other important activities include endemic disease control, mainly through disease surveillance, the treatment of common diseases and injuries, the provision of essential drugs and vaccines and the monitoring of chronic diseases, with special clinics being established for hypertension and diabetes within primary health care centres, in addition to responsibilities with respect to environmental health, health education and the promotion of food supply and proper nutrition.

Besides primary health care centres, secondary and tertiary specialist hospitals are distributed widely within the different regions in Saudi Arabia. They are linked to primary health care centres through a referral system for which medical cases that are untreatable in primary health care centres are referred to specialist care in the Ministry of Health hospitals and are jointly monitored by the hospital specialists and GPs in primary care.

In addition to primary health care and hospital services, the Ministry of Health provides psychological health services through its 40 independent psychiatric health clinics and hospital departments in co-operation with other governmental agencies to alleviate and

solve social problems, providing financial aid for some cases. It also provides occupational health services, focusing mainly on protecting workers from vocational risks, and oral health, focusing mainly on treating children's teeth and establishing mobile dental clinics. The Ministry of Health is also responsible for the prevention of endemic and contagious diseases with its epidemic control system. It is also responsible for environmental health, supervising and arranging continuous inspections of water resources, dwellings, working sites and restaurants, in addition to poison control and management. The Ministry of Health has also established rehabilitation centres providing comprehensive care for the disabled and accident victims, optoplasty centres for the care of the partially or totally blind and smoking cessation clinics in major cities in addition to the organization of many anti-smoking campaigns (Ministry of information, 1990; Al-Mufti, 1999).

2.4.2. Other sources of medical care

Other agencies which provide services alongside with the Ministry of Health are as following:

The Red Crescent Society:
This was established in 1963. It provides emergency services for victims of accidents and calamities as well as transportation of the wounded and participation in their treatment. It works to prevent epidemics as well as participate in health education programmes. It also provides health services for pilgrims to the two Holy Mosques (in Makkah and Al-Medinah) in cooperation with other authorities. It works in coordination with the Red Cross on the international level.

Health care provided by the Military Sector:
This is provided by the National Guard, the Ministry of Defense and Aviation and the Ministry of Interior. It provides high quality primary, secondary and advanced levels of health care for their staff and segments of the population. They have their health care centres and hospitals, scattered mainly in the main cities in Saudi Arabia.

School Health Units:

These were first established in 1957. Their main responsibility is to provide primary care for students in schools. They provide both preventive and immediate curative services. Their activities include inspecting the sanitary environments in schools, conducting health checkups for students, providing first aid and primary care when needed, and conducting immunisation programmes under the supervision of the Ministry of Health.

The General Organisation of Social Insurance:

This provides complete health services for its clients under the social insurance. It concentrates especially on the provision of services for the permanently injured or handicapped. It provides its services through its two hospitals and other contracted hospitals and specialty centres.

The General Organization of Youth Welfare:

This provides health services for athletes and the employees in the General Organization of Youth Welfare and their families. This is done through its four health units and its specialist hospital, which is considered the first athletic specialist hospital in the Arabian Gulf region.

The Private sector:

This plays an increasingly significant role in Saudi Arabia, providing both outpatient and inpatient care. It applies the health laws and regulatory requirements as specified by the Ministry of Health, although the private sector functions independently in terms of fiscal and organizational arrangements. The private sector provides high quality services equipped with state of the art technology, and the private hospitals –especially in major cities- provide hotel like services. Visitors to private sector hospitals or clinics are generally seen by specialists without the need for a GP's referral, as in the public sector, thus forming a two tier health care system in Saudi Arabia with higher quality specialist care provided privately for the ones who have the ability and willingness to pay for the services. This is in contrast with receiving GP care in primary health care that can refer to specialists if needed in the public sector. According to the Saudi Medical Directory

(1999) in 1997 there were 84 private hospitals serving 12 health districts, with a total capacity of 8185 beds. There were also 611 medical centres and 775 private practices or clinics. Private support services included 43 medical laboratories, 11 physiotherapy centres, 749 optical centres, 273 pharmaceutical warehouses and 3178 pharmacies. The regional distribution of private physicians and hospital beds for the year 2001 is as mentioned above.

2.4.3. Traditional medicine

Traditional medicine practice is mainly divided into healers by herbs, healers by cauterising, healers who use air cups and bone plasterers (Rukn, 1997), although they are not widely referred to for the provision of health services, as reported in the 1996 Saudi Arabia Family Health Survey.

Using herbs for the alleviation of some signs and symptoms is widely practiced such as the use of special herbs for gastrointestinal diseases, renal system disorders, liver disease and infertility.

Cauterising, which is the process of heating the edge of a broad headed nail with a flame and placing it for one or two seconds on the site of treatment, is used or the treatment of various problems especially the ones related to the musculoskeletal or the neural systems, such as joint pain, displacement of joints especially the vertebrae and to cure some types of paralysis. It is also used, but to a lesser extent, to treat some symptoms such as headaches, throat aches and liver tumors (Rukn, 1997).

Air cups are used to alleviate back pain and help cure respiratory diseases, as it is thought to suck out "bad blood" and thus help in curing from disease.

Bone plasterers are skilled mainly in correcting bone displacements, and they put special herbs on broken bones and displaced joints for fast healing. They are generally sought for musculoskeletal problems.

2.5. THE EPIDEMIOLOGICAL PROFILE OF THE SAUDI POPULATION

2.5.1. Life expectancy and mortality indicators

2.5.1.1. Life expectancy

The mortality experience of a population is best expressed in terms of life expectancy at birth, since it makes possible comparisons unbiased by age structure. This is compared to crude death rates which may lead to misleading results when comparing two populations one with a larger proportion of young people and the other with a larger proportion of older people, while life expectancy reflects both childhood and adult mortality (Gray, 1993). In the early years of the development of Saudi Arabia, life expectancy was fairly short and the chance of reaching fifty years of age was low (Al-Mufti, 1999). In 1960, it was reported that life expectancy was 44 years (Al-Mazrou et al., 1995), but as a result of the socioeconomic development of the country, including the development of the health services, it was reported in the World Bank development indicators data base that life expectancy in Saudi Arabia has reached 73 years, which is slightly higher than the 70 years reported for other upper middle income countries.

2.5.1.2. Infant and childhood mortality:

Infant mortality rate is a key indicator of the socioeconomic development of the community (Gray, 1993), and infant mortality is a major component of mortality especially in developing countries (WHO, 1992). It is relatively easy to measure and is quite strongly related to adult mortality. It is also a useful measure of the success of health programmes and policies and is a very sensitive indicator of inequity in the quality of life within a population (WHO, 1992). In the following table the infant mortality rate in Saudi Arabia during different time periods is displayed, showing the continuous decline of infant mortality rate in the country.

Table 2.5. Infant mortality rates in Saudi Arabia across the years

Year	Infant mortality rate per 1000 live births	Source
1960	180	UNICEF
1970	120	UNICEF
1980	75	UNICEF
1983	65	UNICEF

1985	52	National Child Health Survey
2000	21	United Nations Statistics

Source: Al-Mufti, 1999

According to the World Bank data base the infant mortality rates in Saudi Arabia and other countries grouped according to income level and the Middle East and North African region in 2001 is as follows.

Table 2.6. Infant mortality rates in Saudi Arabia, the Middle East and North Africa and other countries, grouped by income level in the year 2001

Country/countries	Infant mortality rate per 1000 live births
Saudi Arabia	23
Middle East & North Africa	44
Low income	80
Lower middle income	33
Upper middle income	31
High income	5

Source: World Bank development indicators data base

It can be seen from the table that the infant mortality rate in Saudi Arabia is almost half of that in other Middle Eastern and North African countries and is also better than the average of other counties within the same category of income, upper middle income countries.

Another important indicator of the health status of the population reflecting environmental factors, nutrition and the effect of infectious diseases is the under five mortality rate. It was reported in Al-Mufti (1999) that according to the UNICEF under five mortality rate in 1980 was 41 per 1000 live births, and in 1984 it was 39 per 1000 live births. According to Al-Mazrou et al. (1997) child mortality rate has dropped from 155 in 1973 to 63 in 1985. In the following table the under five mortality rates is reported for Saudi Arabia, the Middle East and North African countries and other countries grouped by income for the year 2001.

Table 2.7. Under five mortality rates in Saudi Arabia, the Middle East and North Africa and other countries, grouped by income level in the year 2001

Country/countries	Under five mortality rate per 1000 live births
Saudi Arabia	28
Middle East & North Africa	54
Low income	121
Lower middle income	41
Upper middle income	38
High income	7

Source: World Bank development indicators data base

It can be observed that the under five mortality rate in Saudi Arabia is much better than in other Middle East and North African countries. It is also better than the average of the countries within the same income category.

In Saudi Arabia, two country wide surveys were conducted covering infant and under five child mortality rates. The first was the Saudi National Child Health Survey conducted in 1987 by Al-Mazou et al. as a household survey covering 9000 Saudi households and interviewing 8400 ever married women. It was reported that for 1985 the infant mortality rate and child mortality rate were 55 and 63 for males and 50 and 58 for females. This lower female mortality rate is the same as reported in developed countries. Regional differentials were reported. Lower rates were reported in the Eastern and the Western regions, compared to the Central region where the capital is situated. This was explained by the long and more frequent exposure of the Eastern and Western regions to other developed countries through trade and commerce, which might have affected lifestyle and behaviour. While the Southern region, which has the largest proportion of the rural population, has experienced the highest rate of infant and child mortality, since the rural population has a significantly higher rates of both infant and childhood mortality with its lower standards of living and lower educational levels.

Table 2.8. Infant and child mortality rates per 1000 live births per year by region of residence, 1985

Residence/region	IMR (<1year)	CMR (<5years)
Urban	47	53
Rural	68	91
Central	52	63
North	52	63
South	74	95
East	44	51
West	45	60
Average	52	63

Source: Al-Mazrou et al., 1997

It was also found that the mean number of deceased children increased with an increase in mother's age, the number of children previously born and increased parity, which are themselves related to each other. Reproductive behaviour, including higher rates of consanguineous marriage, lower rates of maternal care, and non institutional delivery and diarrhoea care were associated with both higher infant and child mortality rates. According to Al-Mazrou et al. (1997), multivariate analysis illiteracy of the mother and father and a lower grade of father's occupation were found to be associated with higher rates of infant and childhood mortality. In addition to living in houses with an 'earth floor', drinking water from wells or ponds and using an open field for defecation, were related to an increase in the infant and child mortality rates. This indicates that better living conditions can contribute to the reduction of infant and under five mortality in Saudi Arabia as well as the improvements in education.

In the 1996 Saudi Arabia Family Health Survey, it was reported that for the Saudi population the infant mortality rate for the calendar period 1992-1996 was 21.4 and the under five mortality rate was 29 per 1000 live births. Analysing this into greater detail, it was found that the neonatal mortality rate was 11.7, the post-neonatal mortality was 9.7 and the child mortality rate excluding infants was 7.7 per 1000 live births. It was also reported that when around 97% of babies were expected to survive to their fifth birthday, neonatal mortality accounted for 40% and infant mortality for 74% of all childhood deaths. At this level of mortality, one in forty-seven children would die within the first year of life, and one in thirty-four children would die before reaching the age of five.

Urban infant mortality (18.3 per 1000) was about 36% lower than rural infant mortality (27.9 per 1000). Urban advantage extended to a lower under-five mortality rates (26.0 per 1000) compared to the rural under-five mortality (35.2/1000). This was explained by the modern urban environmental effect and possibly the effect of better parental education.

Regional differentials were also reported. Children living in the Eastern region were reported to have the best prospects of survival, with an infant mortality of 15 deaths per 1000 live births and under five mortality rate of 18 deaths per 1000 births in the period 1992-1996. The Southern region was reported to have the highest infant mortality and under five mortality rates. The rates and regional differentials are different from the 1985 Al-Mazrou et al. findings and it indicates lower infant and under five mortality rates for all the regions in Saudi Arabia with the narrowing of the gap between urban and rural areas.

Table 2.9. Infant and child mortality rates per 1000 live births per year by region of residence, 1992-1996

Residence/region	IMR (<1 year)	CMR (<5 years)
Urban	18.3	26.0
Rural	27.9	35.2
Central	21.8	27.5
North	24.8	27.8
South	27.1	36.2
East	14.8	17.6
West	19.3	31.2
Average	21.4	29.0

Source: Khoja et al., 2000

There are small differences in the reported infant mortality rates between the Central and the Western regions, but the Western region seems to have higher childhood mortality. The Southern region, as reported in 1985, seems to have the highest mortality rates. It was also found that there is a positive association between mother's literacy status and the survival of her child, with children born to mothers with little or no education having the lowest chances of survival. Infant mortality rate was reported to be 21.1 for males and 21.8 for females, while under five mortality rate was reported to be 30.1 for males and 26.8 for females.

Regarding maternal age, children born to women under 20 years of age and to women ages 40-49 were reported to be at an excess risk of dying than are those born to women in their twenties or early thirties. The lowest chances for survival for these children were reported to be during the neonatal and post-neonatal period, which reflects the high risks and poorer outcomes of these women's pregnancies. The pattern of high mortality among children born to women at the extremes of the reproductive ages is common in developing societies. It is thought to be associated with selectivity in respect of socio-economic factors, though it is directly affected by physiological determinants. It was also found that first order births and order sevens or higher births have an excess risk of dying at all ages of childhood. This may be affected by physiological factors. It is exacerbated by the effect of socioeconomic status for higher ordered births, since women with a lower education are more likely to be of a lower socioeconomic status, and rural women are more likely to have more children (Khoja et al., 2000). Infant mortality was found to be three times more among live births that occurred after an interval of less than two years, compared to intervals of two to three years. This suggests that mortality risks for Saudi children can be substantially reduced when the interval between births increases to more than two years. This maybe explained by physiological factors, including maternal deprivation of natural resources.

2.5.1.3. Maternal mortality

The maternal mortality rate has long been used as an indicator of the level of the maternal services and of the health status of populations. In Saudi Arabia maternal mortality reports have been done mainly through hospital reports. Tracing the levels of mortality rates in Saudi Arabia across the years, Al-Mufti et al. (1999) have mentioned the reports of maternal mortality in some maternity hospitals in different cities in the country in the 1970's and the start of the 1980's. This information is presented in the following table.

Table 2.10. Maternal mortality rates in selected hospitals in the 1970's and early 1980's

The hospital	Year	Maternal mortality for 100,000 live births
Maternity hospital in Al-Medinah	1971	1153
	1976	207
	1977	123
	1978	114
Maternity hospital in Riyadh	1978	78
	1979	32
	1980	51
	1981	20
	1982	22
	1983	25
Maternity hospital in Dammam	1983/1984	5

Source: Al-Mufti, 1999

It can be observed from the table that there was a decrease in maternal mortality rate in Al-Medinah city maternity hospital, in the Western region, and a decrease in maternal mortality in Riyadh's maternity hospital, in the Central region, until 1981. The maternal mortality in Dammam's maternity hospital is very low, similar to maternal mortality rates in developed countries. This is probably due to the early establishment of modern health care facilities and health programmes by the oil-producing company ARAMCO decades before the development of the health care facilities in other regions of the country. Riyadh's maternity hospital has probably displayed lower maternal mortality rates compared to Al-Medinah because it is the capital, and resource availability and socioeconomic development would be expected to be more advanced in the capital compared to other cities.

In a longitudinal study carried out by Chattopadkhyay and Edrees (1988) in the Maternity and Children's Hospital in Riyadh –where most of the institutional deliveries in Riyadh took place- maternal mortality was reported to be for the years 1978-1980, 1981-1983, 1984-1986 to be 52, 21 and 29 per 100,000 live births. The increase in maternal mortality in the period 1984-1986 was not explainable, since it was reported that there were significant improvements in maternal care at this time period. The main cause of death was hemorrhage (20%) and associated diseases (25%) out of which 75% were reported to

be preventable. Factors that were considered to be closely associated with death due to hemorrhage were maternal age being over forty years old, having five or more children, previous cesarean section, road journey and a delay in blood transfusion.

According to the information provided in the World Development Report (2000) the average of maternal mortality rate in countries of different income levels and in the Middle East and North Africa in the time period 1990-1997, as calculated by the writer, is as presented in the following table.

Table 2.11. Maternal mortality rates in Saudi Arabia, the Middle East and North Africa and other countries, grouped by income level in the period 1990-1997

Countries	Maternal mortality per 100,000 live births
Saudi Arabia	18
Middle East and North Africa	301.8
Low income	617.1
Lower middle income	148
Higher middle income	90.7
High income	11.5

Source: Calculations based on information provided in the World development report, 2000

It can be observed from the table that the maternal mortality rate in Saudi Arabia is closer to high income countries and is much lower than what was reported in higher middle income countries, which are considered to be in the same income category as Saudi Arabia.

In the first country wide study of maternal mortality in Saudi Arabia Al-Meshari et al. (1996) have applied a prospective national survey using a multistage sample of all hospitals in Saudi Arabia. The subjects were women who died or who were dead on arrival at the hospital, during pregnancy or within 6 weeks of the end of the pregnancy, during the period from August 1989 to June 1992. Over 90% of deliveries in Saudi Arabia are institutional deliveries mainly at hospitals (Khoja et al, 2000). Women who suffer from critical conditions are more likely to be taken to hospitals, and death of pregnant women at home during delivery is likely to invite legal investigation to dispel

foul play, which makes hospitals the best place for conducting this type of study. It was found that maternal mortality rate was 18 per 100,000 live births (155/880, 248).
The majority of maternal deaths occurred in unbooked mothers of low socioeconomic status and low educational level. This indicates the importance of the assessment of the factors that affect prenatal care utilisation, to identify the characteristics that lead to the non attendance of prenatal care sessions and devise the corresponding corrective policies.
The incidence of maternal deaths was lowest in women under 20 years and rose gradually with age, which is partly due to the increased incidence of health problems. Women over 35 years constituted 20% of deliveries but contributed to 43% of the maternal deaths.
The pattern of maternal mortality with parity was J shaped, being lowest for women in their second to sixth parity, and since parity increases with age the group of older women of high parity form a high risk group, needing careful monitoring since birth control is considered to be socially undesirable due to the preference of large families. The major causes of maternal deaths were akin to developed and developing countries. The major causes of maternal deaths were reported to be hemorrhage (27%), pulmonary embolism (17%), ruptured uterus (14%), hypertensive disorders (12%) and abortion and hydatidiform mole (11%). Each of the other causes of death contributed to less than 10% of the total deaths.

It can be observed that in the last decades maternal mortality has decreased in Saudi Arabia, with the rapid improvements in the socioeconomic status and the infrastructure of Saudi Arabia including the provision of public sanitation and free public health care services. Certain obstacles still remain, including the relatively high level of female illiteracy and the preference of large families, putting women at a higher risk of having medical complications with the increased age and higher parity. Higher parity was reported by Khoja et al. (2000) to be associated with rural residence, Southern region residence and lower educational levels. Thus, women with these characteristics can be considered at a higher risk for which the maternity health care programmes should try to pay extra attention to, especially where it is expected to have a lower rate of attendance to prenatal care clinics.

2.5.1.4. Reasons for the mortality decline

Many theories have been proposed for explaining mortality decline. The most prominent are those that attribute the decrease in mortality rates to the rising levels of income and better nutrition, modern health technologies and sociocultural developments.

McKeown and his colleagues (1955, 1962, 1975) argued that in the nineteenth century in England and Wales mortality rates declined before the introduction of modern medical technologies, attributing mortality changes to the improved economic and social conditions. Through the provision of clean water and an efficient sewage disposal system, sanitary reforms controlled many of the diseases that caused a high mortality rate. It was noted that in the twentieth century in England and Wales 45.3% of the decline in mortality was due to the reduction of air borne diseases. They argued that the reduction was brought about by higher per capita income, better food intake and improved nutritional status. This theory can be applied to the Saudi Arabian context with the increased levels of income and the accompanying improvements in living conditions and higher availability of food after oil production, in addition to the vast developments in the infrastructure of the country, including sanitary facilities, which could have contributed to the mortality decline.

Other writers have attributed improvements in modern health technology as the causative factor for the mortality decline. They argued that even where income levels are lower advanced medical technology can reduce mortality rates (Davis, 1956; Preston, 1975, 1980, 1985; Da Vanzo & Habicht, 1986; Da Vanzo, 1988). Preston (1975) analysed the relationship between income and health across countries in 1930 and 1960. He found that at any given income, life expectancy in 1960 was higher than life expectancy at the same income level in 1930. He postulated that this change could be best explained by the improvements in technology, explaining 80% of the mortality decline. Latter regression by Preston (1980), including data from a large sample of countries for the years 1940-1970 with per capita income, calorie consumption and literacy as independent variables, showed that 50% of the mortality decline could be attributed to a structural shift.

Alternatively a number of writers have stressed the importance of access to health services (Cleland & van Ginneken, 1989; Fosu, 1989; Basu, 1990). The important factors were specified to be the availability of the services, especially their distribution and affordability, and practices of the health care providers. This can be applied clearly to the Saudi Arabian context especially after the 1970's when the infrastructure of the health care system and its programmes had developed dramatically, coinciding with mortality decline.

There has recently been an increasing emphasis on the role of culture and personal behaviour (Caldwell, 1986; Caldwell et al., 1990; Szreter, 1988; Woods et al., 1988). These authors emphasised the key roles of cultural attitudes and beliefs, and personal behaviour as critical factors in mortality decline. According to Szreter, the 19th century mortality decline in England and Wales have been misinterpreted by McKeown. He proposed that public health campaigns and changing personal hygiene were more important determinants of mortality decline. Caldwell (1986) has argued that, using evidence from Sri Lanka, Costa Rica and Kerala, the key sociocultural factors, such as the autonomy of women, political awareness, which demanded the right to services, equality of intra-household food distribution, and social policies to provide a minimum level of nutrition to the whole population, have - in combination with strong governmental support through expenditure on health and education, easily accessible health services, universal immunisation and widespread of prenatal medical care- led to the mortality decline. In the United States, Ewbank and Preston (1990) have found that simple preventive measures, such as breastfeeding of babies, washing hands before preparing meals, isolating the sick, boiling milk and water, cleaning baby bottles, and keeping flies away from milk and other food, were major factors in mortality decline. Though this theory cannot be fully applied to the Saudi context, several of its elements can be said to be applicable, since there has been vast developments in the cultural attitudes, beliefs and the health behaviour of the population, with the provision of free education, medical services and social support services.

Recently, all the three theories described above have been criticized for being incomplete and insufficient. Murray and Chen (1993) have argued that the existing theories ignore the contribution of other theories; thus, from their point of view, they fail to explain mortality decline in full. Their view is that all the aspects of different theories should be taken into account, and that the interactive role of income, technology and behaviour are responsible for the mortality decline. They argue that this allows for the consideration of the accumulated effect of health and social assets on the long-term mortality changes. This in turn allows for the accommodation of all the possible effects of different factors in mortality decline that are expected to have taken place in a country like Saudi Arabia.

2.5.2. Morbidity in Saudi Arabia

2.5.2.1. The incidence of notifiable infectious diseases

Across the years the incidence of immunisable infectious diseases has dropped. This is mainly due to the high coverage of the EPI programme in Saudi Arabia. The incidence of immunisable diseases in three different decades and recent infants' immunisation coverage is displayed in the following table.

Table 2.12. The incidence of immunisable infectious diseases across the years and 1999 infants' immunisation coverage

Disease	Year			1999 infant's immunisation coverage
	1976	1987	1999	
Diphteria	4.4	0.2	0	93%
Pertussis	131.8	2.5	0.04	93%
Neonatal tetanus*	1.6	0.5	0.02	93%
Poliomeyelitis	2.5	0.4	0	93%
Measles	391.3	294	14.03	91.3%
Mumps	_	96.17	11.41	91.1%
Rubella	_	11.19	1.49	91.1%
Hepatitis B	_	33.4	15.32	91.6%

* Incidence per 1000 live birth

Source: Ministry of Health annual health reports 1983, 1998, 2001

It can be observed from the table that the incidence of the immunisable diseases has fallen dramatically in the last decades, and it can also be observed that infants' immunisation rates were considerably high, with their values exceeding 90%.
The incidence of notifiable diseases in Saudi Arabia for the year 1999 is displayed in the appendix, including the nationality and the sex distribution of these diseases. It can be observed that these diseases do not form a major public health problem in the country. In general, the incidence of notifiable diseases for Saudis and non-Saudis is considered to be very close except for some diseases where the incidence is considerably higher among Saudis. These diseases include childhood diseases such as measles, rubella and chicken pox. This is probably due to the fact that the non-Saudi population is constituted mainly of adults. In addition to that incidence of brucellosis is higher among the Saudi population. On the other hand, some diseases have higher incidence among non Saudis. These include neonatal tetanus where most of the cases reported for non Saudis are for children of illegal immigrants. Meningococcal meningitis incidence is also higher among non Saudis, which is due to the fact that most of the cases were reported for visitors of the holy sites in Makkah and Al-Medinah. Added to that is hepatitis C which has a higher incidence among non Saudis, due to the fact of carrying out a compulsory medical checkup for foreign workers at their first entry to Saudi Arabia thus detecting the disease. Regarding sex differences, in general terms, males tend to have a higher incidence of notifiable diseases, which maybe due to their higher exposure to infectious agents.

2.5.2.2. The prevalence of chronic diseases

Since the prevalence of infectious diseases has fallen dramatically in the last decades, accompanied with the longer longevity of the population, chronic diseases are gaining more importance in Saudi Arabia. In this section the prevalence of some commonly reported chronic conditions and associated factors are briefly described.

Hypertension:

The prevalence of hypertension in Saudi Arabia is low, compared to many other countries around the world, which ranged from slightly under 15% to as high as 50%

(Sonkodi et al., 1989; Weiller et al., 1989; Young, 1991; King et al., 1994; Giles et al., 1994; Giles et al., 1994; Burt et al.A, 1995; Burt et al.B, 1995).

It was reported, in the country wide household survey carried out by Al-Hazmi et al. (1998) where blood pressure measures were taken, that the overall prevalence of hypertension in males in different geographical areas ranged from 1.4 to 18.71%, and in females it ranged between 0.9-14%. The highest prevalence of hypertension was in the Eastern Province and the lowest was in the Central and South-Western Provinces. These differences, as indicated by the authors, might have occurred due to the genetic makeup, since dietary habits, life style and other environmental factors do not appear to differ significantly, at least to the extent that would lead to such large differences in prevalence, leading to the wide range observed in the study (Al-Hazmi et al., 1998).

In another country wide household survey where the prevalence of arterial hypertension was measured, whose results were reported by Al-Nozha & Osman (1998), it was found that among the adult population the prevalence of hypertension was 5.3% for systolic hypertension and 7.3% for diastolic hypertension. The highest prevalence of systolic hypertension was reported in the Farsan island (8.9%) and the lowest was reported in Aseer (2.2%) situated in the South-Western region of the country. It was found that the prevalence of systolic hypertension increased with age, with its highest prevalence seen among 40-75 years old participants. The highest diastolic hypertension was reported in Al-Qaseem (10.6%) in the Central region and the lowest in Makkah (4.2%) in the Western region.

Diabetes mellitus:

A total of 25,337 Saudis were screened for diabetes mellitus in the different regions of Saudi Arabia in order to measure its prevalence by El-Hazmi et al. (1998). The prevalence of insulin-dependent diabetes mellitus, non-insulin-dependent diabetes mellitus and impaired glucose tolerance in the male population was found to be 0.23%, 5.63% and 0.5% respectively, and in the female population the prevalence was 0.3%, 4.53% and 0.72% respectively; thus the prevalence of non-insulin-dependent diabetes

mellitus was higher among males, which is contrary to the developed countries findings. The highest prevalence of insulin-dependent diabetes mellitus occurred in the Eastern Province, and the highest prevalence of non-insulin dependent diabetes mellitus was reported in the North-Western Province. A significant increase in the prevalence of diabetes mellitus was reported with increased age. The overall prevalence of non-insulin-dependent diabetes mellitus in the Saudi population was 0.12% and 0.79% in those below the age of 14 years and those aged 14-29 years, respectively, and it increased to 28.82% and 24.92% in males and females, respectively, in those over 60 years of age. The prevalence of non-insulin-dependent diabetes mellitus in various regions for those aged 45-60 years range was between 16.69% and 23.45% and for those aged 60 and above the prevalence range was between 19.73%-37.64%, which places Saudi Arabia among the countries of the world which are classified as high prevalence countries (King & Rewers, 1993). The possible etiological factors involved in the high prevalence may include the high prevalence of obesity, the Saudi diet being rich in carbohydrates, a sedentary life style and possibly genetic factors.

In another household survey conducted earlier in the various regions of Saudi Arabia by El-Hazmi et al. (1996), in order to determine the prevalence of diabetes mellitus and impaired glucose intolerance, it was found that in the overall group (two to 70 years) the prevalence of insulin-dependent diabetes mellitus, non-insulin-dependent diabetes mellitus and impaired glucose tolerance was 0.19%, 5.5% and 0.5% in Saudi males and 0.24%, 4.56% and 0.9% in Saudi females. The results show that in the age group 30 years and above diabetes mellitus is deemed to be a bad problem, where 17.32% and 0.18% of males suffer from non-insulin-dependent diabetes mellitus and insulin-dependent diabetes mellitus, respectively, and 12.18% of females were reported to have non-insulin-dependent diabetes mellitus, while 0.18% had insulin-dependent diabetes mellitus.

Compared to the other country wide survey, males were also reported to have a higher prevalence of non-insulin dependent diabetes mellitus. Compared to other countries, it was also found that Saudi Arabia has a considerably high prevalence of diabetes mellitus,

which indicates the need to improve the public awareness about diabetes mellitus and to try to reduce its risk factors.

Coronary heart disease:

Regarding the prevalence of coronary heart disease, there has not been a country wide survey conducted in order to assess the distribution of this health problem except for what was reported in the 1996 Saudi Arabia Family Health Survey. But some studies have been conducted for the assessment of its risk factors. In a Saudi population representative survey assessing the prevalence in Saudi Arabia of hypercholesterolemia, which is an important factor in the development of coronary heart disease, it was found that the prevalence of hypercholesterolemia was higher for rural male and urban female subjects. Female subjects had also a higher rate of obesity. The prevalence of hypercholesterolemia was found to rise with increasing age (Al-Nuaim, 1997).

In another epidemiological household survey it was found that the mean total cholesterol level was significantly higher for females, compared to males, and that it was progressively increasing with age, reaching a maximum at the fifth and sixth decades for males and females, respectively (Al-Nuaim et al., 1996). Higher total cholesterol levels were reported to increase with increasing BMI values, indicating that an increase in weight is a significant factor in raising cholesterol levels (Al-Nuaim et al., 1996). In an attempt to compare white collar to blue collar workers in Jeddah in their risk of developing coronary heart disease in the coming five year period it was found that there were 33.9% of white collar workers classified as at highest risk to develop coronary heart disease compared to 13.4% blue collar workers, while blue collar workers were more represented in the lowest risk group. These differences were accompanied by the reports of higher mean ages, increased working hours and a tendency for an increased fat consumption for white collar workers (Abalkhail, 1998).

Obesity:

As obesity is considered a major contributor to either precipitating or aggravating chronic illnesses such as hypertension, diabetes mellitus and cardiovascular diseases, the

prevalence of overweight and obesity of the Saudi population was measured by applying a cross-sectional national epidemiological household survey by Al-Nuaim et al. in the time period 1990-1993. It was found that the mean body mass index for females was significantly higher than for males. There was a progressive increase of body mass index for male and female subjects with age, reaching its maximum at the start of the fifth decade. The prevalence of overweight among males was 29% compared to 27% for females, while the prevalence of obesity among females was 24%, which was significantly higher among females in all regions, compared to males who had an obesity prevalence of 16%. The prevalence of overweight among Saudis was similar to the reported prevalence from developed countries, but the prevalence of obesity especially among females was several times higher than what was reported previously in the developed countries, as shown in the following table.

Table 2.13. Comparison of the prevalence of overweight and obesity in different countries*

Country	Age range (years)	Overweight (%)		Obesity (%)	
		Males	Females	Males	Females
Saudi Arabia	15-90	29	27	16	24
USA	20-74	34	24	12	12
Sweden	16-84	35	24	7	8
Italy	15-90	39	25	7	6
Australia	25-64	34	24	7	7

*WHO criteria were used for defining overweight and obesity
Source: Al-Nuaim et al., 1996

Overweight was found to be highest among residents of the Central region, while the prevalence of obesity was highest in the Eastern and Northern regions, respectively. The highest prevalence of obesity in the Eastern region was explained by the fact that this region had the earliest exposure to Western life style and processed fatty foods, which may have contributed to the high prevalence of obesity.

In a further analysis of the survey data Al-Nuaim et al. (1997) have applied multiple logistic regression analysis testing for the effect of the sociodemographic variables as predictors of obesity. They found that the prevalence of obesity was significantly higher among females compared to males, which is partly due to the less physical activities

carried out by Saudi women coupled with the biological factors such as multiple pregnancies. It showed a gradual increase with age, reaching its maximum at the age group 40-49 years old. This increase with age is probably in part due to the decline in physical activities and slowing metabolism. It was lower in rural residents compared to urban residents, which is mainly due to the higher physical activities carried out by rural residents. The prevalence of obesity was significantly higher in the Eastern and Northern regions, as indicated by the previous analysis. It was also higher in literate persons who probably have higher incomes and a more sedentary life style.

Cancer:

The prevalence of cancer has not been reported previously by researchers nor by the Ministry of Health in Saudi Arabia. But information regarding types of cancer cases being referred to the King Faisal Specialist Hospital, the main source for cancer treatment in Saudi Arabia, has been reported in the annual health reports by the Ministry of Health. The latest health report (2001) showed that the highest prevalence of cancer for males was Leukemia which was reported for 10.4%, followed by brain tumors which was reported for 7.1% of the cases and for females breast cancer was the major type of cancer reported constituting 24.6% of the female cancer cases, this was followed by thyroid gland tumors reported for 11.5% of female cancer cases. Regarding children who were referred to the KFSH 30.5% of the cancer cases were leukemia, 21.3% of the cases were brain cancer, 13.6% were lymph nodes cancer and 10.5% were soft tissue cancer while other forms of cancers formed less than 10% of the cases. According to the Saudi Arabia Family Health Survey the prevalence of cancer is only 0.1% for Saudi Nationals, which may indicate that cancer is not a major health problem in Saudi Arabia.

Bronchial asthma:

Regarding the prevalence of bronchial asthma –aside from the Saudi Arabia Family Health Survey, 1996- there was no country wide study carried out investigating its prevalence. In an attempt to measure the prevalence of asthma among school children aged 7-12 Al-Frayh et al. (1992) have found that the prevalence of children with a chest wheeze was the highest in Jeddah city in the Western region (12.6%), followed by

Riyadh in the Central region (11.9%) and with the lowest prevalence in Damman in the Eastern region (6.6%). A family history of bronchial asthma was found to be associated with a higher prevalence of asthma in children. In children, bronchial asthma prevalence was reported by El-Gamal et al. (1993) to be higher among males, while for adults bronchial asthma was found to be more prevalent among females. In addition, a higher prevalence of asthma was reported for individuals with a family history of bronchial asthma which was reported previously by Al-Fray et al. (1989). Repeated episodes of asthma attacks were reported to be observed to increase with age and were more severe in males, compared to females in an accident and emergency department in Riyadh city (Ibrahim et al., 1993).

Chronic conditions' prevalence in the Saudi Arabia Family Health Survey:
The reported prevalence of selected chronic diseases is displayed in the following table by age and sex. It was found that the most frequently reported chronic condition for both males and females were high blood pressure, diabetes and joint disease whose prevalence has risen steadily with age. Among those under 15 years of age, asthma was the most frequently reported chronic condition. Among males aged 50 and over, the most frequently long standing illness was diabetes, with a prevalence rate of 20%, followed by high blood pressure, with a prevalence rate of 15%, and joint disease by 13%. For females ages 50 and over, joint disease was the most commonly reported illness, with a prevalence rate of 29%, followed by high blood pressure, with a prevalence rate of 24%, and diabetes, with a prevalence rate of 20%. The reported prevalence for heart disease for those aged 50 years and older was 4% for males and 3% for females.

Table 2.14. The percentage of Saudi patients aged 15 years and older reported to have ever had specific chronic conditions confirmed by a doctor, by age and sex in Saudi Arabia, 1996

Condition		Age							Total
		15-19	20-29	30-39	40-49	50-59	60-69	70+	
Hypertension	Males	0.0	0.5	2.4	6.1	11.5	16.9	16.3	4.4
	Females	0.3	1.1	4.4	11.6	21.7	24.3	23.8	6.5
	All	0.1	0.8	3.5	8.6	17.1	19.7	19.3	5.4
Heart disease	Males	0.2	0.3	0.8	1.4	2.3	4.7	5.4	1.3
	Females	0.4	0.6	0.8	2.0	2.7	3.3	5.3	1.2

	All	0.3	0.5	0.8	1.7	2.5	4.1	5.3	1.2
Diabetes	Males	0.2	0.4	3.5	10.4	18.7	23.0	19.3	6.3
	Females	0.3	0.5	3.0	9.1	20.9	20.9	17.0	5.4
	All	0.3	0.5	3.0	9.8	19.9	22.2	18.4	5.8
Joint disease	Males	0.4	0.7	1.7	3.4	7.9	11.3	17.4	3.5
	Females	0.9	2.5	8.0	15.7	24.8	27.1	26.8	8.7
	All	0.7	1.7	5.2	9.1	17.1	17.2	21.2	6.1
Asthma	Males	3.7	2.4	2.8	3.8	4.4	6.2	5.1	4.2
	Females	2.7	3.4	5.6	7.0	6.8	10.3	7.9	4.0
	All	3.2	2.9	4.4	5.3	5.7	7.7	6.2	4.1
Gastric ulcer	Males	0.1	1.1	3.2	3.5	4.1	3.0	3.5	2.0
	Females	0.6	1.5	3.0	4.0	4.8	5.3	4.2	2.4
	All	0.4	1.3	3.1	3.7	4.5	3.9	3.7	2.2
Kidney disease	Males	0.3	0.5	1.2	2.2	2.7	2.3	2.4	1.2
	Females	0.9	1.8	2.9	3.3	2.7	2.5	1.9	2.1
	All	0.6	1.2	2.2	2.7	2.7	2.4	2.2	1.7
Persistent headache	Males	1.2	1.5	4.7	4.3	4.2	5.2	4.8	3.0
	Females	3.0	6.3	9.9	10.3	9.9	7.7	8.3	7.1
	All	2.1	4.1	7.6	7.1	7.3	6.2	6.2	5.0
Bases	Males	4841	4996	3102	2239	1660	1488	1093	19419
	Females	4934	5604	3767	1904	2005	884	750	19848
	All	9775	10600	6869	4143	3665	2372	1843	39267

Source: Khoja et al., 2000

Regarding high blood pressure for those aged 15 years and older, the prevalence was 4.4% for males and nearly 6.5% for females. For both sexes the prevalence of high blood pressure rose with age. The Saudi Arabia Family Health Survey showed that the prevalence rate of diabetes mellitus was about 3% for the total population and about 6% in those aged 15 years and older. The prevalence is about equal in males and females. For both sexes the prevalence rate increased from less than 1% in those aged 20-29, to 10% in those aged 40-49 and to about 20% in those aged 50 years and over. According to the 1996 Saudi Arabia Family Health Survey, arthritis is one of the leading causes of disability. Among those aged 15 and over the prevalence of joint disease was 3.5% for males and 8.7% for females. For both sexes the prevalence rose with age, and the prevalence at all ages was higher for females than males. The prevalence of asthma was

reported to be 4% of the total population, and it is higher for females, compared to males from the age of 20 years and over. The prevalence of gastric ulcer was 2.2%, with a higher prevalence for females than for males. Regarding kidney disease the overall prevalence was 1.7%, with females having a higher prevalence of 2.1% compared to men who had a prevalence of 1.2%, while the prevalence of a persistent headache was 5% for the total population, which was also higher in females than in males with a prevalence of 7.1% compared to 3.0%.

Regarding cardiovascular disorders several diseases were included under this categorization. These were cardiac disease, other heart trouble, stroke and high blood pressure. High blood pressure was included because it is a well known risk factor of coronary heart disease. The following table includes the prevalence of cardiovascular disease for males and females in different age groups.

Table 2.15. The percentage among persons 15 years and older reported to have ever had a doctor diagnosed a cardiovascular disorder by age and sex in Saudi Arabia, 1996

Sex	Age							Total
	15-19	20-29	30-39	40-49	50-59	60-69	70+	
Males	0.2	0.8	3.2	7.2	13.3	19.6	20.6	5.4
Females	0.6	1.7	5.0	12.8	23.3	25.9	27.2	7.3
Total	0.4	1.2	4.2	9.7	18.8	22.0	23.3	6.4

Source: Khoja et al., 2000

Among those aged 15 and over the prevalence of cardiovascular disorders was 5.4% for males and 7.3% for females. At all ages women were more likely to have reported a cardiovascular disorder. Among males the prevalence showed an increase with age from about 1% in those aged 20-29 to about 7% in those aged 40-49 and 20% in those aged 60 and over. Among females the prevalence increased from about 2% in those aged 20-29 to about 13% in those aged 40-49 and about 26% in those aged 60 and over.

It is clear from the data above that the most prevalent chronic conditions in the Saudi population are cardiovascular disorders, joint disease, diabetes, high blood pressure and persistent headaches. Females seem to suffer from more chronic conditions than men, which may partly be attributable to the more sedentary life style of women, and a higher

rate of obesity, which are contributory factors to the occurrence of some chronic conditions. Chronic conditions were also generally found to increase with older age.

2.5.2.3. The distribution of diseases among primary health care centres visitors and visitors of outpatient hospital departments

In order to have an idea about the health problems that lead to the general practitioners' visits in primary care centres, the following table shows the distribution of primary health care visits according to disease conditions in the year 2000.

Table 2.16. The distribution of primary care visits according to disease conditions in the year 2000

Disease	Number of visits	Percentage
Infectious and parasitic diseases	165809	0.58
Intestinal helminthiasis	212897	0.75
Diabetes mellitus	857457	3.02
Anemia	322113	1.13
Eye disease	1066455	3.75
Ear & mastoid disease	474653	1.67
Hypertension	558120	1.96
Anal and perianal diseases	107273	0.38
Upper respiratory tract infections	10093610	35.52
Pulmonary infections	180803	0.64
Chronic obstructive pulmonary diseases	720623	2.54
Foreign body in eye, ear & nose	43064	0.15
Dental and gum diseases	1353823	4.76
Diseases of the stomach, oesophagus and intestine	2555947	9
Urinary tract infections	571857	2.01
Diseases of female breasts	62400	0.22
Inflammations of female pelvic organs	173728	0.61
Disorders of menstruation and bleeding	231571	0.82
Diseases of the skin and subcutaneous tissue	1670958	5.88
Diseases of the musculoskeletal system	2508686	8.83

Fractures, dislocation of bones and joints	241677	0.85
Burns	87884	0.31
Complications of pregnancy	536531	1.89
Open wounds	553331	1.95
Others	3061533	10.78
Total	28412803	100

Source: Ministry of Health Statistical Year Book, 2001

It can be noted from the table above that the most common health problem reported for visitors of primary health care centres by far is acute upper respiratory tract infections (35.52%), followed by visits due to diseases of the stomach, esophagus and intestine (9%). This indicates the relatively high prevalence of acute respiratory infections and possibly diarrhoea if some of the diarrhoea cases were categorized as diseases of the intestine. This emphasises the importance of investigating the factors that lead to the utilisation of health services in response to acute respiratory infections and diarrhoea. Close to them are diseases of the musculoskeletal system (8.83%). The lowest reported health problem among primary health care visitors is the presence of foreign bodies in eyes, ears and nose (0.15%) and diseases of female breasts (0.22%).

In addition to primary health care centres, which are the first point of entry to the public health care system, secondary specialists care in public hospitals' outpatient departments can be referred to through primary health care GPs. In the appendix the distribution of the Ministry of Health visits according to disease conditions and area of residence for the year 2000 is given, along with their percentages in each of the mentioned areas.

Looking at the tables, the most common cause of visit to the public hospital outpatient departments is for obstetrics and gynecology, being the most common cause for visiting outpatient departments in Qaseem (19%) in the Central region, in Al-Ahsa (21.9%) in the Eastern region, in Aseer (25.6%) in Bisha (20%) in Najran (17.3%) and in Al-Baha (21.3%), all of which are in the Southern region. The higher percentage of outpatient department visitors due to obstetrical and gynecological reasons in several parts in the Southern region may indicate a higher prevalence of high risk pregnancies and a higher prevalence of gynecological disorders in the region. This highest percentage of visit due

to obstetrical and gynecological problems was also reported for Hafr Al-Baten in the Northern region (40%), representing the highest percentage in Saudi Arabia. In the city of Makkah in the Western region diseases of the digestive system predominate the visits to outpatient departments, forming 48.25% of the reasons for outpatient department visits, which indicates a high prevalence of this group of disorders. On the other hand, diseases of the genitourinary system is by far the most common cause for visiting outpatient departments in Hail in the Northern region, representing 48.4% of the reasons for visiting outpatient departments. Chest disease is the major cause for visiting public hospitals' outpatient departments in Al-Taif (21.1%) and Medinah (19.1%), in the Western region, as well as in Tabouk (18.8%) and Al-Quarayyat (21.3%) in the Northern region. Heart and blood vessels disorders form a small percentage of the reason for visit to hospitals' outpatient departments, ranging between 0.4% in Makkah to 5.6% in Gizan, South of Saudi Arabia. Eye disease as a reason for hospital visits represent the highest percentage of all causes in Jeddah city (21.8%) in the Western region and it represents a high percentage in Hafr Al-Baten (16.1%) in the Northern region. ENT diseases represent the highest percentage of the causes for hospitals' outpatient department visits in the Northern Boundaries (18.2%) and form the second percentage of the diseases reported in Riyadh (14.4%) and in Medinah (14.4%). Oral and dental diseases are the main reasons for outpatient visits in Riyadh city (17.7%) and in Al-Sharkiah, in the Eastern region, and the second highest cause for visits in Jeddah (18.8%). This may reflect a high referral rate in the major cities in Saudi Arabia, due to higher levels of concern regarding this group of diseases. Reports of injuries, fractures and burns are found to be highest among residents in Al-Qurayyat (12.8%), forming the second cause for visit to outpatient departments, and mental disorders are reported highest for residents in Al-Ahsa (15.4%).

Regarding diarrhoea, it has been reported for the year 2000 that 242161 cases of children's diarrhoea have been registered at the Ministry of Health facilities. 75% of the cases were children under five years; 52.4% were males and 47.6% were females. Only 2.9% needed hospitalization, and zero deaths due to diarrhoea were reported (MOH, 2001).

2.6. THE EPIDEMIOLOGICAL TRANSITION IN SAUDI ARABIA

The theory of epidemiological transition focuses on the complex change patterns of health and disease and on the interaction between these patterns and the demographic, economic and sociological determinants and their consequences. As different stages of the epidemiologic transition are not clear cut and they might overlap, this makes it difficult to place a country like Saudi Arabia in a distinct epidemiologic transition phase. In this section I will try to briefly describe the Saudi population characteristics in terms of the outlines and the major components of the epidemiologic transition theory.

In the epidemiologic transition theory four successive stages are recognized. The first stage is the age of pestilence and famine, where mortality is high and the average life expectancy at birth is low, vacillating between twenty and forty years. The second stage is the age of receding pandemics when mortality declines progressively, epidemic peaks become less frequent, and the average life expectancy at birth increases from about thirty to fifty years. The third stage is the age of degenerative and man-made diseases, when mortality continues to decline and approaches a relatively low level. The average life expectancy at birth rises until it exceeds fifty years, and fertility becomes a crucial factor in population growth. The final stage of the epidemiologic transition is the age of delayed degenerative diseases where a postponement of the ages at which degenerative diseases kill and life expectancy is long.

Regarding mortality and population dynamics, the life expectancy of the Saudi population has increased from 44 years old in 1960 (Al-Mazrou et al., 1995) to 73 years old (Ministry of Health, 2001; World Bank, 2003). The total fertility rate is high in Saudi Arabia, reaching a value of 5.7 as reported by the WHO (2002), which is mainly due to cultural and religious reasons favouring a large number of children. Without a governmental policy to encourage family planning the levels of fertility are not expected to reach low levels in a foreseeable time period. This high fertility rate is combined with a continuously decreasing mortality rate. Infant mortality rates have fallen from 170/1000 live births in 1960 (Al-Mazrou et al., 1995) to 23/1000 live births in 2001 (World Bank, 2003). Under-five mortality rates have fallen from 85/1000 live births at 1980 (Al-

Mazrou et al., 1995) to 28/1000 live births in 2001 (World Bank, 2003) and maternal mortality rates have fallen to a value of 18/100,000 live births for the period 1990-1997, closer to the average maternal rates for developed countries. Thus, with the falling mortality rates and a high fertility rate, population growth in Saudi Arabia is high, compared to other countries around the world. It is, however, falling since it was reported that in the 1980s the annual population growth was 7.9% (World Bank, 2000) while in the 1990s the annual population growth fell to 3% (Ministry of Health, 2001; World Bank, 2003). This decrease in population growth indicates lower fertility rates in the 1990s compared to the 1980s, since mortality declined in the 1990s, compared to the 1980s. But still a high proportion of the very young population to the older population is expected to be maintained for quite a while before the population age distribution is expected to take a distribution similar to developed countries, due to religious and cultural reasons which favour large families. Like countries which completed the epidemiologic transition, the urban population constitutes the 85% majority of the population in 1998, while in 1980 only 66% of the population was reported to be urban (World Bank, 2000).

Regarding the disease patterns in the country, the incidence of infectious diseases has fallen dramatically within the last decades. This is in part due to the socioeconomic development of the country, with the improvements in the standards of living for the Saudi population and the development of the infrastructure of the country. This included the provision of basic sanitary facilities, as compared to the time period before oil export, after which the Saudi Arabian GDP has risen dramatically. Along with the rise in income the educational level of the Saudi population has risen continuously. In the year 1960 male literacy rate was 15% and female literacy rate was 2% (Al-Mazrou et al., 1995). In 1997 male literacy rate was 85% and female literacy rate was 62% (World Bank, 2000). This raised educational level is expected to have raised the health awareness levels and improved the level of hygiene, thus contributing to the decrease in the incidence of infectious diseases, in addition to the improvements in the nutritional status of the population due to the high availability of highly nutritious food imported from all parts of the World at affordable prices to all segments of the population. As mentioned above

overweight and obesity -indicating a high calorie intake- are reported to be a health problem in Saudi Arabia, in contrast to nutritional deficiencies and protein-energy malnutrition which reported to be of high prevalence in less developed countries. These reasons for the decrease in infectious diseases resemble the reasons for the decrease in infectious diseases in the countries which fit the classical model of the epidemiological transition. But the effects of socioeconomic development are not the only factors that contributed to the decreases in infectious diseases and the accompanying mortality decline. Medical and public health measures, including the major developments in the health care system in the last three decades as mentioned previously, especially the concentration on the role of basic primary health care and its distribution within the country are expected to have played an important role in the control of infectious diseases. Medical technology and massive health care campaigns, such as the EPI programme and the maternal and child health care programme, are expected to have contributed to the decrease in the incidence of infectious diseases and have contributed to the decrease in maternal and childhood mortality. The important role of medical technology and its effect on the health of the population and the mortality decline resembles the effect of medical technology as specified in the delayed model of health transition characteristic of developing countries in general. Medical technology, in contrast, played its role later on in the Western traditional model of the epidemiological transition.

Regarding chronic diseases, their levels are not as high as in countries which have completed the epidemiologic transition, since the Saudi population is predominantly young. But with the decrease in the incidence of infectious diseases, chronic diseases are seemingly gaining more attention and concern by the health professionals, and with the increase in life expectancy chronic diseases are expected to present a major health challenge in the next few decades.

Applying the epidemiological transition theory, mortality patterns distinguish four major successive stages. The first stage is the stage of pestilence and famine. This has already been passed by the Saudi population. The second stage is the stage of receding pandemics

where epidemics of infectious diseases are considered to be the major health threat. This has also been passed by the population in Saudi Arabia, and life has exceeded fifty years of age. The third stage is the stage of degenerative and man-made disease. This is the stage at which the Saudi population would fit, since life expectancy has exceeded 70 years of age, and infectious and parasitic diseases are not the major cause of death in Saudi Arabia, making only 3.6% and 3.5% of the causes of death for Saudi nationals and non- Saudis. On the other hand, diseases of the circulatory system and injury, poisoning and accidents represent 18.9% and 14.5% of the causes of death for Saudis and 14.9% and 18.7% for non Saudis. Conditions originating at the perinatal period are found to form a high percentage of deaths, having a value of 15.2% for Saudi nationals, indicating its high contribution to infants' and under-five mortality rates. It was reported that ill defined conditions represent a large percentage of deaths, due to incomplete information (MOH, 2001). This information is based on the deaths reported to the Ministry of Health hospitals in 1999, coded as specified in ICD-10 coding scheme, which is provided in the following table. It is worth noting that male deaths are higher than female deaths from all causes for Saudi nationals as well as non-Saudis, and male deaths form 64% of all deaths reported in Saudi Arabia.

Table 2.17.Deaths reported to MOH hospitals by cause of death and nationality, 1999

Cause of death	Saudi		Non Saudi	
	Total	Percentage	Total	Percentage
Illdefined symptoms, signs and conditions	4748	19.5	3815	34.1
Diseases of the circulatory system	4606	18.9	1662	14.9
Conditions originating during the perinatal period	3716	15.2	1041	9.3
Neoplasms	1615	6.6	434	3.9
Diseases of the blood & blood forming organs	160	0.7	42	0.4
Diseases of the				

respiratory system	1311	5.4	522	4.7
Congenital anomalies	1099	4.5	324	2.9
Endocrine, nutritional and metabolic disorders	933	3.8	259	2.3
Infectious and parasitic diseases	887	3.6	386	3.5
Diseases of the digestive system	602	2.5	296	2.6
Diseases of the genitourinary system	496	2	127	1.1
Diseases of the nervous system	429	1.8	140	1.3
Diseases of the skin and subcutaneous tissue	201	0.8	19	0.2
Pregnancy, child birth and puerperuim	19	0.1	19	0.2
Diseases of the musculoskeletal system	12	_	6	0.1
Mental disorders	2	_	_	_
Injury, poisoning and external causes	3545	14.5	2093	18.7
Total	24,381	100.0	11,185	100.0

Source: The Ministry of Health Statistical Year Book, 2001

This classification of Saudi Arabia in the third stage of the epidemiologic transition is not a clear exact fit since the population is predominately young. This is largely influenced by culture and religion which lead to the preference of large family sizes, and thus a high fertility rate, in addition to infant, under five and maternal mortality rates which are higher than that in developed countries.

2.7. CHAPTER'S SUMMARY

The Saudi health care system has developed substantially in the last three decades, and the Saudi Arabian health care system is in the 26th place world wide, in terms of its overall evaluation. Mortality rates have continuously declined, as has the prevalence of infectious diseases. This was a result of the interplay of several factors, including the development of the health care system. Chronic diseases are starting to emerge, but they do not present a major challenge to the health care system, since the population is predominately young. Saudi Arabia can be considered at the start of the third phase in the epidemiological transition, as indicated by the epidemiological profile of the Saudi population. Aside from the developments in the Saudi health care system and the improvements in the population's health, future challenges remain in order to improve the health care system and to further decrease mortality rates and improve the health status of the population.

Chapter 3

Literature Review

3.1. INTRODUCTION

In order to understand the factors relevant to health care use, a substantial amount of literature has been written throughout the years, making reference to different traditions of social sciences, including economics, sociology, psychology and epidemiology. These studies have demonstrated the effects of various factors on health service utilisation, such as sociodemographic characteristics, health beliefs, social obligations and support, accessibility factors and, most important of all, the need to use health services. In this part of the thesis I will briefly describe the main theoretical models that are used in studying health services utilisation. Since the sociobehavioural model will be applied in this thesis, the literature regarding the use of ambulatory health services will be approached according to the model's organisation of individual determinants of the utilisation of health services that is predisposing, enabling and need factors, including studies from both developed and developing countries. This is followed by a brief general critique of studies of utilisation. The last part of the chapter will include the studies carried out on the utilisation of ambulatory services in Saudi Arabia.

3.2. MODELS OF HEALTH CARE UTILISATION BEHAVIOUR

3.2.1. The health belief model

This model was developed independently by Hochbaum (1958), Kasl and Cobb (1966 a,b), and Rosenstock (1966,1974). It was originally developed to explain preventive behaviour (Kasl and Cobb, (1966 a,b)). It is hypothesised that people will be motivated to carry out preventive health activities in response to perceived threat to their health. Two classes of variables were identified: '(1) the psychological state of readiness to take a specific action, and (2) the extent to which a particular course of action is believed to be beneficial in reducing the threat' (Rosenstock, 1966). Both variables were argued to be two dimensional. The individual's readiness to act is determined by perceptions of

personal susceptibility or vulnerability to a particular health threat and perceptions of the severity which its threat might affect their life. The extent to which a course of action is considered to be beneficial is a result of weighing the beliefs about the benefits to be gained by a particular action against the costs or barriers to the health action. Thus, in addition to the variables mentioned a cue to action is also considered, which serves as a trigger to action, such as recent media attention to the issue. Within this context it is assumed that demographic, personal, structural and social variables are to work primarily on individual health motivations and subjective perceptions, rather than functioning as a direct cause of action (Becker and Haefes, 1977)

The health belief model was adapted later to explain illness behaviour and help seeking (Mechanic, 1978; Aday et al., 1980; Rogers et al., 1999). It takes into account the following four groups of variables for the explanation of help seeking behaviour:
(1) Readiness to take a particular set of actions.
(2) Perceived benefits from using health care.
(3) Internal and external cues to action (e.g., internal cues such as pain, external cues such as interference with daily activities).
(4) Modifying factors (e.g., gender, age, ethnicity, class, personality).

3.2.2. The rational choice model

The theoretical starting point of the rational choice model is that individuals make their choices according to their preferences and the constraints they are confronted with (Lindenberg, 1985). It views decision making as purposive and made by individuals who weigh up costs and benefits of particular actions in situations with variable characteristics, constraints and opportunities. It is prominent in the health economics literature and has been used most extensively in examining decisions made by health professionals (Rogers et al., 1999). It is useful in examining the utilisation of specialised services in which costs and benefits are easier to identify, while it is less powerful and relatively distant to the understanding of decision making for general services (Rogers et al., 1999). However, it has been argued that both the health belief and the socio-

behavioural models begin with economic psychology of a rational choice perspective, and is then overlaid by modifications from social sciences (Pescosolido, 1992).

3.2.3. The social process, help seeking model

The social process approach to utilisation focuses on the interaction of patients with others, and views motivations and determinants of decision making as subject to the influence of a wide range of factors which are present in the individual's environment (Rogers et al., 1999). When people become ill they usually interpret and respond to illness conditions based on their social and economic circumstances, personal biographics, health beliefs, self-concepts and through reinterpreting present, past and expected future of their health condition (Haug, 1981). Such illness experiences are seen to be shaped by sociocultural and socio-psychological factors, irrespective of their biological basis (Mechanic and Volkart, 1961). When applying this approach the primary frame is illness behaviour; that is, "the way in which symptoms are perceived, evaluated and acted upon by a person who recognises some pain, discomfort or other signs of organic malfunction" (Mechanic, 1961). The time period in which the same deviations of normal health occur is called an illness episode. These deviations necessitate decisions to be made and actions to be taken (Laumann and Knoke, 1987), and under the social process approach actions are seen to take patterns, combinations or sequences of choices and decisions over the course of an illness episode.

One prominent approach that views help seeking as a social process is the illness career approach, which is "a sequence of actions related to the attempt to rectify a health problem" (Pescosolido, 1992). The illness experience is viewed as a set of logical, critical decision points in which alternative decisions at any time can lead to further decisions to be made or to reconsider earlier ones (Twaddle and Hessler, 1977). Its stages are described as a combination of a set of changes to self identity, stages in the medical condition, psychological and personal response to the social environment, and contact with institutions and their personnel (Roth, 1963).

The Social Organisation Strategy (SOS) framework as described by Pescosolido (1991, 1992) provides a dynamic, network-centred, illness event-based approach. It focuses on patterns, combinations, or sequences of a wide range of lay and professional sources of consultation during illness. In the SOS approach illness careers start with an event that sets into motion a process of attempting to cope with a physical or emotional problem, given ongoing structured systems of social relations. These attempts of coping are created in negotiation with others and constrained by the surrounding social structure. The connection between action, interaction, and structure through networks is elaborated at four levels: the relationship between network structure and (a) effect and interaction, (b) social characteristics, (c) ideas of context, (d) the nature of institutions and organisations. This orientation provides freedom to isolate a single decision. It also emphasises ideas such as timing, spacing, duration, and order of choices and that the use of official medical care practitioners is, like any choice, embedded in a wider pattern of help seeking.

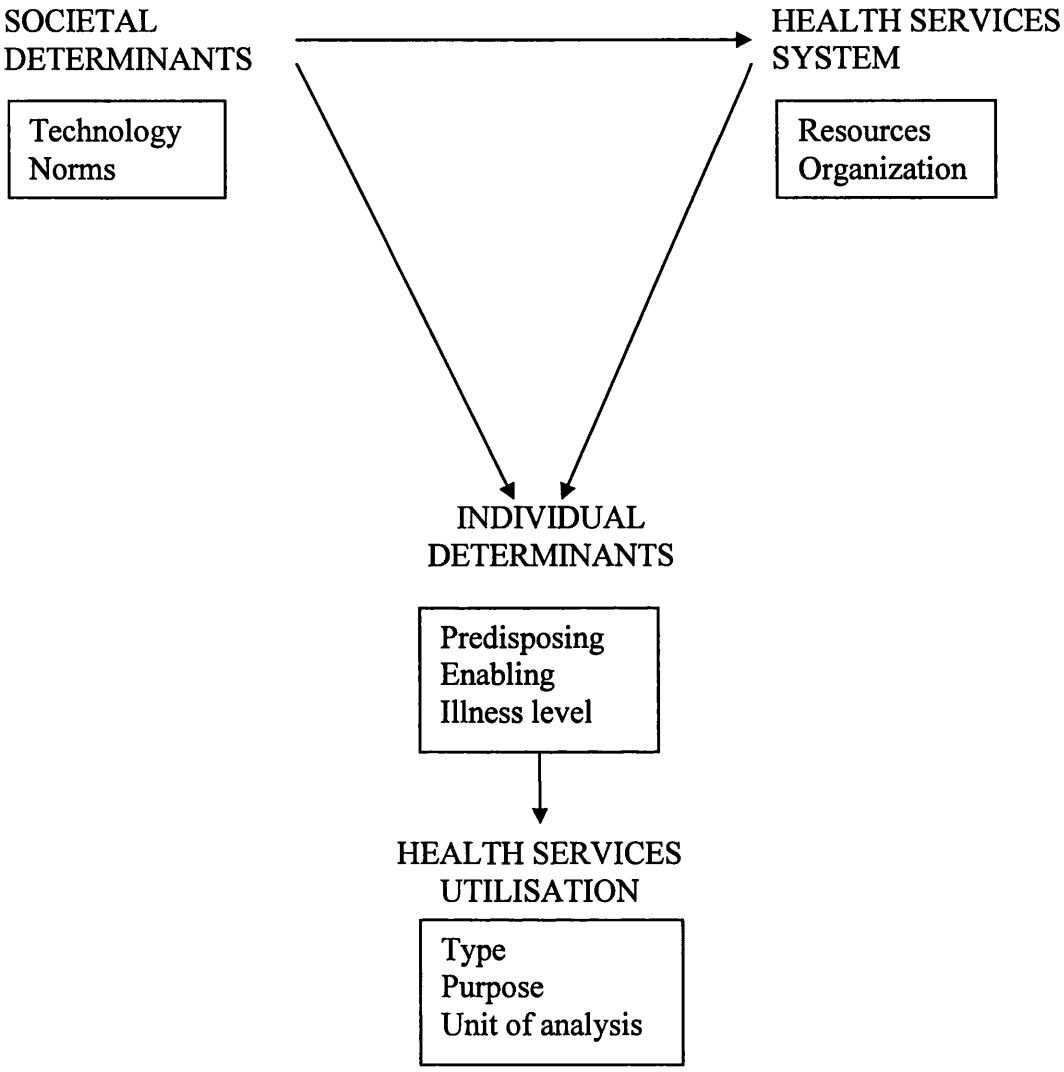
3.2.4. The sociobehavioural model

The model was initially developed by Andersen (1968) to assist in the understanding of why families use health services, to define and measure an equitable access to health care, and to assist in developing policies to promote equitable access. He used the data from the 1964 national survey of 2,367 families. But due to difficulties of developing measures at the family level, taking into account the potential heterogeneity of the utilisation of health services by different family members, Andersen and Newman (1973) shifted the focus to individual use as the unit of analysis. In their study of the societal and individual determinants of medical care utilisation in the US over time, they found that the level of illness as perceived by individuals and evaluated by physicians was consistently important in the utilisation of health services, including physician visits, and that it is the most immediate cause and the major determinant of health service utilisation (Andersen and Newman, 1973).

Ever since the model has been very popular, and it is the most widely used model in utilisation research of different types of health services in different contexts, including

both developed and developing countries. The model developed by Andersen and Newman is shown in the following figure.

Figure 3.1. The sociobehavioural model



Source: Andersen and Newman, 1973

The societal determinants of health service utilisation are: technology, which includes a set of principles and techniques useful to bring out change toward a desirable end, and

norms which correspond to social control as representing the spectrum of modes whereby social systems induce or insure compliance of the society members.

The charactertistics of the health services system consist of two main dimensions, resources and organisation. Resources include the volume and distribution of the health system components. Organisation includes the structure of health services and its accessibility.

Individual determinants include three major sets of factors as the basis for an individual rational decision regarding the utilisation of services. These factors are as follows:
(1) Predisposing factors: These refer to the predisposition to use services as suggested by demographic factors, which include age, sex, marital status; social structure, which includes education, race, occupation, family size, ethnicity, religion and residential mobility and beliefs which include values concerning health and illness, attitudes toward health services and knowledge about disease and treatment.

(2) Enabling factors: These include factors related to the accessibility of resources, including financial, geographical and organisational access. This includes two sets of factors: family level factors which include income, health insurance, type of regular source of care and access to health care and community level factors which include the ratios of health personnel and facilities to the population, price of health services, region of residence in a country, and urban-rural character.

(3) Need variables: These relate to the nature of illness. It includes perceived and evaluated illness. Perceived illness level is detected by lay individuals, and it includes the biophysical, social and psychological aspects of illness. Evaluated need includes the health professionals' identification of a disease, including symptoms and diagnoses.

Health service utilisation can be characterised by the type of service used, which includes primary, secondary or tertiary health care, purpose and the unit of analysis, such as the

number of contacts made with a physician in a certain period of time or the number of services received in a given period of time.

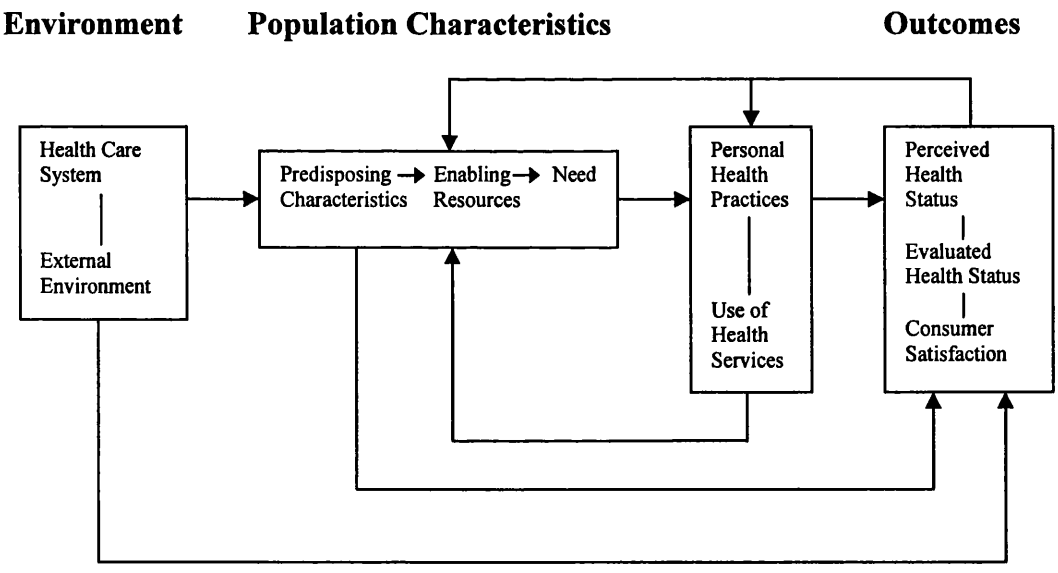
The model has recently been revised by Andersen in (1995) when he added environmental variables, including:

(a) The characteristics of the health care delivery system: These include policies, resources, organisation, and financial arrangements influencing the accessibility, availability, and acceptability of medical care services.

(b) External environmental factors: These reflect the economic climate, relative wealth, politics, level of stress and violence, and prevailing norms of the society.

They also include health behaviour, adding personal health practices to the model, and outcomes, including perceived health status, evaluated health status and consumer satisfaction, with the incorporation of multidirectional feed back loops, which reflects the dynamic nature of the variables included (Andersen, 1995; Andersen et al., 1998). See the figure.

Figure 3.2. The revised sociobehavioural model



Source: Andersen, 1995

But this model encounters several methodological complexities in its application, due to the need to extensive data regarding the wide diversity of variables, and analytical difficulties, due to the inclusion of the analysis of both aggregate-level and individual-level data and multiple feed back loops (Andersen et al., 1998).

3.2.5. A general critique of the models of health utilisation behaviour

Regarding the health belief model, although it has long been considered one of the major frames of reference in health behaviour research (Gochman, 1997) it has some shortcomings. One of the major deficiencies in the model is that it is focused on cognitive variables which are not easily measured (Rogers et al., 1999; Rutter and Quine, 2002). The variables were not operationally defined; therefore researchers used different methods (Champion, 1984). The influence of different beliefs on each other or how the explanatory variables combine to influence behaviour was not mentioned (Rutter and Quine, 2002). The model fails to view the process of help-seeking behaviour, which involves actions and interactions of many people, and the social context within which action occurs. It also concentrates on one outcome when considering health service utilisation; that is, professional health care consultation, which represents only one form of the actions undertaken during illness (Mckinlay, 1972; Dean, 1986; Rogers et al., 1999).

The social organisation strategy provides freedom to isolate a single decision with regards to health behaviour, and it also emphasises ideas such as timing, spacing, duration, and order of choices, and that the use of official medical care practitioners is, like any choice, embedded in a wider pattern of help seeking. But several problems arise when it comes to its practical application, including both the need for extensive detailed data sets, and methodological complexities, since the SOS framework often needs analyses outside the widely known standard techniques. This leads such an approach to be applicable using qualitative research, in which small samples are included, for whom detailed information can be obtained, and the analysis performed without using statistical techniques.

Reviewing the literature which applied the sociobehavioural model, it can be noted that the studies focused on the individual determinants of health-care seeking behaviour, since the type of data needed for the analysis at this level can be feasibly collected when compared to community level and state level information. Hence, even the application of the full original 1973 model is difficult, health care utilisation behaviour is an activity carried out by individuals, and identifying the individual determinants of health services utilisation is of paramount importance with regards to its policy implications.

The model has been criticised in terms of the validity of the approaches to measuring the major study concepts. Mechanic (1979) argued, for example, that measures of perceived need incorporate concepts of psychological distress due to illness that may be influenced by life events as well as physical illness, but are not interpreted as such in large-scale quantitative studies and aggregate system-level resource availability. Large areas may not adequately capture the immediate experiences of individuals in their own local community; thus caution should be practiced when interpreting the results. In addition, there is little agreement among researchers about the most appropriate operational definitions of predisposing, enabling and need factors (Harel et al., 1987). For example Fosu (1989) had defined the knowledge about the nearest clinic as an enabling factor while it was considered in the original model to be a predisposing factor. Another example would be the definition of social support as a predisposing factor in Riley et al. (1993) study while Andersen (1995) had defined social support to be an enabling factor and previous health utilisation was considered to be an enabling factor by Préville et al. (1998) while it was considered to be a predisposing factor by Andersen.

Health beliefs do not appear to be appropriately conceptualised and measured in the studies applying the sociobehavioural model (Andersen, 1995).

The sociobehavioural model has failed to address the decision-making process of service use, since the model fails to consider circumstances within which usage occurs (Strain, 1991; Rogers et al., 1999). It does not pay enough attention to social networks, social interactions and culture (Bass and Noelker, 1987; Guendelman, 1991; Portes et al., 1992

Rogers et al., 1999). But these disadvantages can be balanced by the virtue of its applicability to large data sets using quantitative techniques, as compared to the social process model which considers the surrounding social circumstances and interactions, but can only be feasibly applied to small detailed data sets using qualitative techniques, which limits the findings' generalisability.

The model is also limited in explaining delays in seeking care and reasons underlying referrals between different levels of care in the system (Andersen and Newman, 1973; Eraker et al., 1984).

Besides, the model has been criticised in that the rates of illness appear to be the basis of assessing need, which suggests that symptomatology is the primary focus of the analysis (Rogers et al., 1999). But the use of acute health services should be mainly determined by the presence of illness episodes. Thus, when studying this type of utilisation the focus on symptomatology is not considered to be a weakness, and the wide range of variables included in the model render it useful to study other types of health service utilisation, such as the utilisation of preventive health services.

According to the data available in the 1996 Saudi Arabia Family Health Survey and the research question of the thesis, and contrasting that to the sociobehavioural model characteristics, it is found that the sociobehavioural model can be applied to large data sets on which quantitative analysis techniques can be applied. The variables included in the 1996 Survey are included in the sociobehavioural model, organised in a systematic fashion that makes variable organisation and interpretation an easier task, rendering the relationship between these variables and health services utilisation clear and more defined, compared to other utilisation models. Therefore, it has been adopted in the thesis.

3.3. FACTORS THAT AFFECT THE UTILISATION OF AMBULATORY HEALTH CARE SERVICES

In the next part of the literature review, factors which affect an individual's use of ambulatory health care will be summarised according to the sociobehavioural model approach, since this is the model adopted in the thesis' analysis. Thus, the variables will be arranged as predisposing, enabling and need factors, for the general ambulatory health services utilisation, children's health services utilisation and preventive health services utilisation, including prenatal care and children's immunisation. Prenatal care utilisation is considered to be preventive since it is a scheduled routine of visits that should be made by pregnant women without the presence of any health problems or complications and is useful for screening for possible complications and can help in avoiding them, or dealing with them before their occurrence. The effect of these variables will be mentioned based on studies carried out in the context of both developed and developing countries. This is done since Saudi Arabia is a high middle income country with health care system characteristics similar in some aspects to developed countries, but a more culturally traditional society which fits into the category of developing countries. Since this is the first nation wide study of this magnitude having a nationally representative sample, comparison is done including countries of various income levels to verify Saudi Arabia's position with regards to health services utilisation.

3.3.1. Predisposing factors

The predisposing factors consist of demographic factors and social structure factors. The demographic factors include age, sex and marital status. These factors are known to influence ambulatory health service utilisation in both developed and developing countries having various effects. Social structure factors, which are the other component of predisposing factors, include education, occupation, socioeconomic status, family structure, and ethnicity and religion. They have various and important effects in both developed and developing countries, in addition to the effect of health beliefs including the self-rating of health status, stress and previous health service utilisation.

3.3.1.1. Age

General health services utilisation:

It was reported in the United Kingdom that physician consultation rates were higher for young children and the elderly; thus consultation rates showed a U distribution for the population (RCGP, OPCS and DH, 1995; Campbell and Roland, 1996; Smaje and Le Grand, 1997). In Italy, Mapelli (1993) found that consultation rates took a J shape, with the oldest age groups showing the most utilisation, and children showing more use of medical services than adults. In general, it was found that older individuals, compared to other adults, made more physician visits in several countries such as the United States (Holman et al., 2000) and in the Netherlands (Alberts et al., 1997). Older age was also associated with frequent visits such as in the study done by Blaxter (1985) in the United Kingdom and the study carried out by Baez et al. (1998) in Spain. Women between the ages 16 and 40 years were found to have higher consultation rates than other adult women (Evnadrou et al., 1992). In the United States, women were found to have made the highest number of doctors' visits in the reproductive years (Falik & Collins, 1996). These age differentials were mainly explained by increased health care need by the very young, the elderly and women in the reproductive age.

In developing countries, among adults the likelihood as well as the degree of service use was shown to increase with age. The reverse was observed for children, again giving rise to a U-shape distribution for utilisation. This was reported by Poland et al. (1990) in Grenada, West Indies, and in Cairo, Egypt (Ellis et al., 1994). Also, in Sri Lanka children under five years of age and adults over forty five years old displayed more use of modern medicine either free or purchased, compared to other age groups (Pieris, 1999). In Mexico ill people over five years old showed a decreased use of medical care (Levya-Flores et al., 2001). In Tanzania, Wyss et al. (1996) found that elderly people used government facilities more often than people between fifteen and forty nine years old, with this latter group showing the lowest utilisation rates. In rural Kujarat, India, Vissandjée et al. (1997) found that increased age for women was a significant predictor of the use of private doctor services, which was partly explained by the increased autonomy acquired by some rural women as they become older. Older age was also

found to be predictive of lower health service use in some developing countries settings. For example, Hotchkinss & Gordillo (1999) reported a negative association between age and the use of public services in Morocco. This was explained by the fact that the public sector is better equipped to respond to simple curative health care problems encountered more frequently by younger individuals, but it is less equipped to respond to chronic problems that are more common to older persons. Not only the likelihood of seeking medical care was found to be less among older individuals, taking treatment and complying with physicians' advice was reported to be less for some morbidity conditions, mainly urinary tract infections, abdominal conditions, diarrhoea, dysentery and central nervous system conditions in Madras city, India (Kachirayan et al., 1987). Older persons were also found to delay seeking modern health care services longer than younger persons in Nepal (Subedi, 1989). In an isolated island in Fiji it was found that females in the reproductive age group had the highest rates of utilisation (Andy, 1990). Thus it can be observed that age can give various indications for different settings. This can be attributed to different cultures, resources and health care systems.

Children's health services utilisation:

Younger children were reported to utilise more acute health services in the Netherlands (Bruijnzeels et al., 1998), in Catalonia, Spain (Rajmil et al., 1998), and in the United States (Horwitz et al., 1985; Newacheck, 1992; McCormick et al., 2000). Being younger explained use versus no use of health services for children in Ontario, Canada (Woodward et al., 1988). This young age association with utilisation was explained in part by the fact that younger children having more illness episodes, parent's anxiety and inexperience with very young children, together with the variance of illness severity according to age (Bruijnzeels et al., 1998). Despite this, in Perth, Australia, older children were found to have made more visits to doctors than younger children (Ward and Pratt, 1996). Maternal age increase was found to be related to a decrease in children's utilisation for a poor minority area in the United States (Kircht et al., 1976). This was explained by an increase in the mother's experience with child care.

In a study carried out by Fosu (1994), analyzing children's use of health services for six African countries, he found that the age of the child had significant effects in Kenya and Botswana, though the effects were in opposite directions. Infants under one year old and younger children who were one to two years old were more likely to be taken for a medical visit than older children who were older than three in Kenya. On the other hand, in Botswana infants were less likely to be taken to a medical facility. This was explained by the fact that in Botswana there are massive health campaigns which aid mothers in dealing with child illness at home. In Sri Lanka, Amarasiri de Silva et al. (2001) reported that younger children suffering from acute respiratory infections were more likely to have been taken to a health care facility. Maternal age was also found do have an impact on the children's health service use in various countries. In Jordan, Obermeyer et al. (1993) found that mothers aged between fifteen and twenty four years were less likely to take their children for paediatric care than mothers aged between twenty five and twenty nine and mothers aged between forty and forty nine. Fosu (1994) reported that in Uganda, Kenya, and Botswana, children of younger women were more likely to be taken for a medical visit than children of older women. This was explained by the improved access to modern health facilities and improved ability of younger mothers to interact with a modern health care system. In rural Bangladesh the use of a private doctor, the most highly trained health service provider, was more likely to be used if the mother was young (Levin et al., 2001).

Preventive care utilisation:

Regarding prenatal care utilisation, being under twenty years of age was reported to be related to inadequate care for women in Austria, Denmark, Germany, Greece, Hungary, Ireland, Italy, Portugal, Spain and Sweden (Delvaux et al., 2001). In the United States, being a teenager was also found to be associated with late, inadequate and no prenatal care (Cooney, 1985; McDonald et al., 1988; Lia-Hoagberg et al., 1990; Melnikow et al., 1991; Clarke et al., 1999). In New Zealand the delay in children's immunisation was found to be related to mothers' and fathers' being under thirty years of age, which can be partly explained by their lower levels of experience (Kljakovic, 1997).

In Kenya women who started child bearing before twenty years of age attended fewer antenatal sessions than women who started child bearing after twenty years of age (Magadi et al., 2000). In Peru, Elo (1992) found that women over thirty years of age seemed more likely to seek maternal care than younger women. The same finding was reported in Vietnam (Swenson et al., 1993). In Jordan, older age was found to be associated with better use of antenatal care (Abbas & Walker, 1986; Obermeyer & Potter, 1991). Celik (2000) reported that in Turkey rural women who were over twenty five years of age were more likely to use modern prenatal health services. In the Philippines, Wong et al. (1987) found that older women were more likely to have earlier private visits and later visits to traditional and public providers. In South India, husband's older age was also found to be associated to having more antenatal care visits (Nielsen et al., 2001). So, generally, increased age is associated with better use of prenatal care, which may indicate that age may be a proxy for women's accumulated knowledge of health care services and the value she places on modern medicine (Elo, 1992). But in Karnataka State in India, Chandrashekar (1998) reported that mothers' being over thirty was related to the lack of prenatal care. Regarding children immunisation, being a child of a younger mother was found to be associated with a better immunisation status for children in Nigeria (Akesode, 1982) and in urban Guinea (Cutts et al., 1990).

3.3.1.2. Gender

General health services utilisation:

In developed countries, being a female was related to an increase in the utilisation of physician services, such as in Britain (Blaxter, 1985; Briscoe, 1987; RCGP, OPCS and DH, 1995; Campbell & Roland, 1996; Smaje & Le Grand, 1997), in Norway (Fylkesnes et al., 1992), in Italy (Mapelli, 1993), in Denmark (Krasnik et al., 1997), in the Netherlands (Alberts et al., 1997), in Canada (Préville et al., 1998) and in the United States (Tudor, 1986, Falik & Collins, 1996). This was explained by the disadvantageous social position of women associated with either a relative lack or relative access of health information, excess somatic information, as a result of the female reproductive role, female tendency to attend to bodily cues, a female preference for a somatic attributable style, a stronger female disposition to somatise, or just merely greater willingness to

report symptoms they perceive to others (Gijsbers Van Wijk et al., 1997). In addition, the difference was reported to be greatest for women aged sixteen to forty four, due to contraception and maternity care (Campbell and Roland, 1996).

In developing countries, gender has two different effects. In China (Henderson et al., 1994), in Grenada, West Indies (Poland et al., 1990), in Mexico (Leyva-Flores et al., 2001), and in Cairo, Egypt (Ellis et al., 1994), women were found to make more use of health services than men. Females in the reproductive years were found to utilise health services much more than men in Grenada, West Indies (Poland et al., 1990) and in Fiji (Andy, 1990). In rural Bangladesh men were found to use modern health services more than women, while women and children used traditional practitioners more extensively. Women also waited longer than other family members when sick before they sought treatment (Feldman, 1983). Women were also found to delay seeking modern health services than men in Nepal (Subeidi, 1989), and were more likely to visit traditional practitioners in Sri Lanka, since they were easily accessible to them and women were more able to follow the various instructions given by them (Pieris, 1999). The women's disadvantaged position in some societies and the restriction to their mobility, and their social obligations may have resulted in their decrease in use of modern health services.

Children's health services utilisation:
Son preferential treatment was reported in some developing countries, such as in rural Bangladesh where being a male neonate was related to an increased likelihood of seeking care from a trained provider (Ahmed et al., 2001). Male children were taken more to private doctors, who were considered to be the most highly trained providers, than females (Levin et al., 2001). In Lagos, Nigeria, Akesode (1982) found that a higher proportion of immunised children were males. This son preferential treatment was argued to arise when the costs of care are considerable. Thus, families that are under economic pressure are more likely to follow traditional norms in allocating resources, whereas such patterns are less apparent in national samples with greater variability in economic status (Obermeyer et al., 1993).

3.3.1.3. Marital status

Being unmarried was related to more primary health care use in the United States (Holman, 2000). In the Netherlands it was found that the widowed and divorced showed higher utilisation rates because they suffered from more chronic conditions than the married, while the never married showed less utilisation of health services, compared to the married individuals (Joung et al., 1995). Being a married female was found to be associated with having made more visits to primary care in the United Kingdom (Evandrou et al., 1992) and adequate prenatal visits for women in the United States (Clarke e al., 1999). Being single was also found to be associated with the receipt of no or inadequate prenatal care in the United States (Sable et al., 1990; Melnikow et al., 1991). Being widowed or divorced was associated with making more visits to general practitioners in the United Kingdom (RCGP, OPCS and DH, 1995), and was associated with frequent attendance (Scaife et al., 2000). In Finland being unmarried and divorced was shown to be higher in frequent users of health care services (Jyväsjärvi et al., 1998)

In Kenya married women were found to attend more antenatal sessions than unmarried women (Magadi et al., 2000); so were women in rural Southern India (Nielsen et al., 2001), and in a peri-urban area in South Africa married women used more private health care facilities than unmarried women (Hoffman et al., 1997).

3.3.1.4. Education

General health services utilisation:

People with lower educational levels were found to have made more use of general practitioners in Italy (Piperno et al., 1990), in Finland (Karlsson, 1994; Jyväsjärvi et al., 1998), in the Netherlands (Van der Meer & Mackenbach, 1997), in Canada (McIsaac et al., 1997) and in Australia (Wiggers et al., 1995). While being referred and seen by a specialist was associated with having higher educational attainment. This was reported by Mc Isaac et al. (1997) and Dunlop et al. (2000) in Canada, by Piperno et al. (1990) in Italy, by Fylkesness (1993) in Norway, and by Van der Meer & Mackenbach (1997) and Alberts et al. (1997) in the Netherlands. These differentials may be due to the high accessibility of primary care while visiting a specialist needs referral. Since the highly

educated have better communication skills, have more knowledge about the available services and how to work the system and are socially nearer to medical professionals, this gives them the advantage of seeing specialists.

In developing countries, it was found that having higher educational levels is related to the use of modern health services rather than traditional health care. This was reported by Coppo et al. (1992) in Mali, by Subeidi (1989) in Nepal, by Jianghui et al. (1997) in rural China, by Vissandjée et al. (1997) for women in Gujarat, India, and by Pieris (1999) in Sri Lanka. This may be due to the increased familiarity with western medicine, the increased value given to health and increased female autonomy in traditional societies, which empowers them with decision making and taking action according to the acquired and learned information. Not only the educated went to modern sources of medicine for their care for illnesses, higher education was also related to the use of private sources of health care, as compared to public sources, where the choice of higher quality private care is available, such as in Cairo, Egypt (Ellis et al., 1994), in Dakar, Senegal (Fassin et al., 1988) and in Dar es Salam,Tanzania (Wyss et al., 1996).

Childrens' health services utilisation:
Maternal higher educational levels were associated with the utilisation of health services for children in the United States (Gortmaker & Eckenrode, 1982). Parental college education was also found to be associated with the high use of children's services in the United States (Newacheck, 1992). Maternal higher education explained use versus non use of ambulatory health services in Canada (Woodward et al., 1988). In a study of children's utilisation of health services in five Nordic countries, Halldorsson et al. (2001) found that differential service use was more marked in Denmark, Finland, Norway than in Iceland and Sweden. The largest difference was related to the education of the mother, rather than that of the father, or family income. On the contrary, Campion and Gabriel (1985) reported that the use of general practitioners in Scotland for children's illness tended to be less with higher educational levels. This was explained by the increased ability of educated mothers to obtain medical information available from the media and their greater ability to learn from previous experiences. In addition, this study did not

include the use of specialist services, which may have favoured children of educated mothers.

In Jordan, women who had formal education were found to take their children to paediatric care more than women with no education (Obermeyer et al., 1993). The same finding was also reported by Fosu (1994) for Ghana and Botswana. Being a child of an educated mother in rural Marrakech was associated with being treated by formal medical care for acute respiratory tract infections (Maynard-Tucker, 1998). Mothers having no formal education were found to have a suppressive effect on the probability of taking a child for medical consultation in Honduras (DeClerque et al., 1992). Father's schooling for one to five years in rural Bangladesh was also found to be positively related with taking a sick child to a trained medical health care provider (Ahmed et al., 2001) and education of the mothers and heads of households was associated with using physicians' and paramedics' services during children's illnesses in Indonesia (Chernichovsky & Meesook, 1986). In rural Bangladesh, contrary to the previous findings, Levin et al. (2001) found that mothers who had more years of education were less likely to seek care for their children during illness episodes. This was explained by the increased confidence in mothers who are better educated in their ability to treat their children effectively; thus less likely to take their children to public health care providers.

Preventive health care utilisation:
Higher educational levels were found to be related to adequate prenatal care utilisation in the United States (McDonald et al., 1988; Lia-Hoagberg et al., 1990; Sable et al., 1990; LaVeist et al., 1995; Clarke et al., 1999). The association between younger age and non white race with late or no prenatal care was mediated by education (Cooney, 1985). In Europe, Delvaux et al. (2001) reported in their study of prenatal care in Austria, Denmark, Germany, Greece, Hungary, Ireland, Italy, Portugal, Spain and Sweden, that less education with no professional qualification was related to receiving inadequate prenatal care. Early initiation of prenatal care was reported to be associated with higher educational levels in an earlier study in Italy (Ouagliata et al., 1991). These findings are as expected, since antenatal care is a preventive health care activity and the perceived

need for such care is much more likely to be dependent on knowledge and health awareness, which are better acquired by educated women. Regarding children's immunisation, in Sydney, Australia, Skinner et al. (1995) reported that children of mothers who were more highly educated were less likely to be fully immunised. This was explained by the possibility of response bias, having women with lower education under represented in the sample.

In developing countries, education was found to be one of the most significant variables with regard to prenatal care utilisation. In Vietnam (Swenson et al., 1993) and in the Philippines (Becker et al., 1993) it was found that education was the most significant predictor of using modern prenatal care. In Jordan, Abbas and Walker (1986) reported that antenatal care use was positively related to education. Being literate and having gone to school was associated with having prenatal care in Nepal (Subedi, 1989), in Benin (Bichmann et al., 1991), in Peru (Elo, 1992), in Vietnam (Swenson et al., 1993), in Northern Transvaal (Uyirworth et al., 1996), in Turkey (Celik, 2000; Celik & Hotchkiss, 2000), in rural Bangladesh (Rahman, 2000) and in India (Chandrashekar et al., 1998; Nielsen et al., 2001). Also being literate was found to be related to the adherence to most of the components of prenatal care in India (Chandrashekar et al., 1998), and having a higher educational level was found to be associated with receiving some prenatal care in Guatemala (Pebley et al., 1996). Higher educational attainment was associated with an earlier first visit to prenatal care in the Philippines (Wong et al., 1987), and in Ecuador (Eggleston, 2000). More years of schooling was also related to having more visits to prenatal care in the Philippines (Wong et al., 1987), in Jordan (Obermeyer & Potter, 1991), in Peru (Elo, 1992), in Ecuador (Eggleston, 2000), in Turkey (Celik, 2000), in rural Bangladesh (Rahman, 2000) and in Southern India (Nielsen et al., 2001). The choice of better quality prenatal health care was found to be also related to higher levels of education in the Philippines, where private care was sought more often than public health care and traditional care as the education level was higher (Wong et al., 1987), and in Turkey the private sector was preferred to government hospitals by the highly educated. Husband's higher educational level was also related to receiving some prenatal care in Thailand (Raghupathy, 1996) and to an increased number of prenatal visits in

Peru (Elo, 1992), which was partly explained by the attitude toward modern medicine and that education acted as a proxy for the economic well-being of the household. Husband's education was also positively associated with a higher number of prenatal visits in Southern India (Nielsen et al., 2001), and the head of household's education was found to be associated with the mothers' use of physician services during pregnancy in Indonesia (Chernichovsky & Meesook, 1986). The education effect on the use of maternal health services can be explained by various propositions. It was argued that educating women alters the traditional power within the family, leading to changes in the decision making process and allocation of resources in households (Cladwell, 1979; Caldwell et al., 1983). Also, education modifies women's beliefs about health and disease and, thus, alter the demand for health services (Caldwell, 1979; Caldwell et al., 1983). It also enhances the women's knowledge of modern health services and increases her value of good health, which makes her more able to make better use of available services (Caldwell, 1979; Caldwell and Caldwell, 1988). Besides, maternal schooling reflects a higher standard of living and better access to resources, and it increases the chance of marrying a wealthier husband and increasing their own earnings.

Mothers' education was found to be positively related to having their children complete the immunisation series in urban Guinea (Cutts et al., 1991), and the level of maternal education was the most consistent and important determinant of use of immunisation services for the Metro Cebu area in the Philippines (Becker et al., 1993). In Guatemala, Pebley et al. (1996) found that mothers who were highly educated were more likely to have their children immunised, and fathers who completed at least some secondary education were much more likely to have their children immunised. In India, acceptance of immunisation was also found to be higher among mothers who were educated to the sixth grade or more (George et al., 1990). In Vietnam (1991) the occurrence of BCG scars in children was reported to be strongly related to their mother's education. However, this effect was attenuated in 1994 due to the improvements in living conditions during the time period between 1991 and 1994 (Toan et al., 1996).

3.3.1.5. Occupation

General and prenatal health services utilisation:

Being unemployed was found to be associated with increased utilisation of general practitioners' services in the United Kingdom (RCGP, OPCS and DH,1995; Carr-Hill et al., 1996), in a primary care centre in California (Holman et al., 2000), and in Finland female frequent attenders were more often unemployed (Jyväsjärvi et al., 1998). Individuals in higher occupational classes showed a higher utilisation of specialist services, compared to labour workers in Italy (Piperno et al., 1990). Being unemployed was found to be associated with having inadequate antenatal care in low income women in a sample of women in the United States (Lia-Hoagberg et al., 1990).

In China, being employed in a state-run enterprise was associated with higher patterns of health services utilisation. This was explained by the presence of clinics in the work place as well as a comprehensive insurance coverage (Hendersen et al., 1994). In Cairo, Egypt, the working population showed an increased likelihood to seek medical care when sick, compared to the non working population, and students were less likely to utilise medical care when sick (Ellis et al., 1994). In urban Thailand, civil servants were found to have made more use of public services while the administrative and the professional group have made more use of private care (Pannarunothai, 1993). In India it was reported that women's employment was an important determinant of their use of private doctors and public health centres and the non-use of traditional healers. This was explained by the exposure to the outside world, improved awareness levels and better attitudes towards modern health care (Vissandjée et al., 1997). Being employed was also found to be associated with the utilisation of private services for women in South Africa (Hoffman et al., 1997). Not only being employed affects health service utilisation, but being a white collar worker was also found to be related to seeking prenatal care from private institutions, as compared to women in other working categories, which maybe an indirect influence of education and income. Semiskilled and unskilled workers were reluctant to seek prenatal care from private institutions because of the monetary costs (Chandrachekar et al., 1998).Women's husband occupation was also found to affect women's utilisation of prenatal care services. In Guatemala, Pebley et al. (1996) and in Peru, Elo (1992)

found that women whose husbands worked in agriculture appeared to make less use of modern health services. In Turkey, women married to husbands in skilled and service-related occupations, unexpectedly, showed lower utilisation of prenatal care services (Celik & Hotchkiss, 2000). In Benin, Bichmann et al. (1991) also found that living in farmers' households was associated with a decrease in the use of maternal health services. In Indonesia, living in a house where the head was a government employee was found to be associated with a greater tendency of pregnant females to use the services of midwives, paramedics and physicians, rather than those of family members of traditional practitioners (Chernichovsky & Meesook, 1986).

Childrens' health services utilisation:
Maternal employment was reported to decrease the likelihood of an ambulatory physician visit among children with no disability days in the United States affecting preventive care use (Cafferata and Kasper, 1985). Alexander and Markowitz (1986) have reported that maternal employment was associated with greater levels of social support which resulted in fewer child clinic visits for a group of low-income working class mothers in the United States. Horwitz et al. (1993), on the contrary, found that employed mothers who did not have child-care arrangements were more likely to seek treatment for child illness than non-working mothers, while employed mothers were more likely to administer care prior to seeking medical care. But this data comes from the Yale paediatric study of a population which was well educated and without financial constraints.

In developing countries, maternal employment was found to be an important determinant of children's health service utilisation. In Honduras, maternal employment outside home increased the likelihood of medical consultation for children's diarrhoea episodes (DeClerque et al., 1992). In rural Guatemala, maternal employment was also found to be related to the use of health services for diarrhoea, fever and cough symptoms in children (Van der Stuyft et al., 1996). This was partly explained by increased financial accessibility for employed mothers. In Guinea, maternal employment was found to be associated with the increased likelihood of the children's completion of the vaccination series (Cutts et al., 1990). This finding was also supported by Pebley et al. (1996) in

Guatemala. Contrary to these findings, Levin et al. (2001) reported that in rural Bangladesh, women's involvement in income-generating activities had led to severe constraints in their time, leading to the less likelihood of seeking curative care for a sick child and the less likelihood that a child be taken to a private doctor, while being in a credit union increased the likelihood of taking a child to health care services. This was due to the health promotion activities carried out in these credit unions. In addition, being a child of a father who was a business man increased the likelihood of obtaining health care during illness due to increased access to cash. In Kuala Lumpur it was found that immunisation in private clinics was related to the children's fathers working for companies with affiliated company private clinics (Chong-Ying & Yusof, 1993).

3.3.1.6. Socioeconomic status

General health services utilisation:

Lower socioeconomic status was found to be related to more use of general practitioners' services in the United Kingdom (RCGP, OPCS and DH, 1995; Smaje and Le Grand, 1997). Evandrou et al. (1992) reported that women under forty one years of age in lower socioeconomic classes and those who received supplementary benefits were more likely to consult general practitioners, while the elderly men who belonged to lower socioeconomic groups consulted general practitioners less, as financial constraints had contributed to this effect. Belonging to a lower socioeconomic class was found to be associated with frequent attendance to primary care in the United Kingdom (Scaife et al., 2000). They also found that there was an association between poor health and social deprivation which in turn was related to frequent attendance. Blaxter (1985) reported that women who were unfit belonged to the manual class, and they were more likely to be high consulters than low consulters. She also reported that males in manual classes were more likely to be high consulters, compared to ones in the non-manual classes. This relationship between frequent primary care attendance and lower social class was also reported in Finland, with the association between lower classes and poorer health status (Karlsson et al.,1994), and female frequent attenders were found to be of lower socioeconomic class (Jyväsjärvi et al.,1998). In Italy the weakest social groups were found to be the most vulnerable, and the same groups reported higher per capita

ambulatory health service use than their morbidity conditions required (Mapelli, 1993). Disadvantaged social classes were found to make more visits to the NHS services in Spain for curative reasons and received fewer preventive examinations (Borrell et al., 2001). While general practitioner consultations were found to be associated with lower social classes, higher specialists encounters were reported to be related to belonging to a higher socioeconomic class in Canada (Dunlop et al., 2000) and in the Netherlands (Van der Meer et al., 1996; Bongers et al., 1997). The difference in the Netherlands was explained by the differences in the health insurance schemes available for different social strata.

In developing countries, higher socioeconomic status was found to be related to more use of modern health care services and less use of traditional therapy, as reported in Mali (Coppo et al., 1991). In Morocco, it was found that higher socioeconomic status was associated with higher utilisation of modern health services (Hotchkiss & Gordillo, 1999). The proportion of sick respondents seeking medical consultation and taking treatment was higher in the higher socioeconomic strata, and failure to take any action during illness was significantly associated with low socioeconomic status in India (Kachirayan et al., 1987). This may reflect a more modernised culture in higher socioeconomic groups and the increased accessibility of services to them. The preferred use of private care was reported to be more frequent for higher socioeconomic classes in Kingston , Jamaica (Bailey & Phillips, 1990) and in India for curative services (Kopparty, 1994). The preference of private care was also reported for higher socioeconomic groups in Tanzania (Wyss et al., 1996) and in Sri Lanka (Pieris, 1999). This preferential use of private care by higher socioeconomic classes can be interpreted in terms of better knowledge and the availability of resources, with the perception of higher quality services in the private sector.

Children's health services utilisation:
Differential use of services was reported according to different socioeconomic strata. Curative health services was sought more for children in lower socioeconomic classes, as reported in the United Kingdom by Campion and Gabriel (1985) and by Saxena et al.

(1999). They also reported that children in lower social classes had made less consultations for preventive services, compared to children in upper social classes. In a study of five Nordic countries carried by Halldorrson et al. (2001) they found that children of lower socioeconomic status saw specialists less frequently.

In rural Bangladesh, care of a sick child was more likely to have been sought if the household was from a middle wealth group rather than from a low wealth group (Levin et al., 2001). In Marrakech, Maynard-Tucker (1998) reported that children suffering from acute respiratory tract infections were treated by private physicians and modern drugs if their socioeconomic condition was higher. In the highland of Mexico, lower socioeconomic status was associated with using local health care options, increased use of drug stores and decreased use of local clinics and private physicians for the care of diarrhoea (Granich et al., 1999).

Preventive health services utilisation:
In Kenya, the number of prenatal care visits for women in households of high socioeconomic status exceeded that for women in low status households, with their first visit being at an earlier stage of pregnancy. This was explained by the empowerment of women in higher socioeconomic strata, and such women can afford to pay for any health care and travel costs (Magadi et al., 2000). Also, a higher number of prenatal visits was reported for women in the higher socioeconomic class in India (Kopparty, 1994), and women of higher socioeconomic classes opted for higher quality prenatal care (Chandrashekar et al., 1998). Higher socioeconomic status was also found to be associated with receiving some prenatal care and with an increase in the number of prenatal care visits in rural Bangladesh (Rahman, 2000). Higher socioeconomic status was also related to the start of the immunisation series for infants in urban Guinea (Cutts et al., 1991), and to the use of immunisation services in India (Kopparty, 1994).

3.3.1.7. Family structure

General health services utilisation:

It was found in the United Kingdom that people living alone were more likely to consult general practitioners (RCGP, OPCS and DH, 1995). In Indonesia it was found that larger families tended to substitute traditional practitioners with paramedics. This was explained by the experience of the relative efficiency of the modern health care system, due to the exposure of other family members to different sources of health care (Chernichovsky & Meesook, 1986). The positive effect of extended families in the use of modern health services was reported in Southern Iraq (Habib & Vaughan, 1986), and for rural women in India, extended family households tended to have made more visits to traditional healers due to the strong emphasis on traditional values, because of the presence of the authority of older people (Vissandjée et al., 1997). In rural Cameron, Tembon (1996) found that larger families tend to choose government health units instead of private health care, since increased household size leads to a decrease in income per capita, which raises the family costs of using private care.

It is worth noting that the effect of family structure for adults in developing countries is more pronounced, since in developed countries the common living arrangement is not the extended family type nor having a large family household, which does not allow effects of such an arrangement to be explored, in addition to the presence of a universal health insurance in most of the developed countries, minimising the effect of economic constraints due to the increase in family size.

Children's health services utilisation:

It was reported in the United Kingdom that girls living with both parents had higher consultation rates than girls living with a single parent (Carr-hill et al., 1996). In the United States children from smaller families were more likely to be high users of the health services, compared to children from large families (Newacheck, 1992), and children of single mothers with low education levels were more likely to utilise health care than children living with both parents (Heck & Parker, 2002). This was partly explained by the Medicaid coverage for children of single, low educated mothers. The

number of children in a family was also reported to affect utilisation of health services. In New York, Wolfe (1980) found that a fewer number of children in a family was associated with more physician consultations and that children in smaller families appeared to be more likely to use higher quality of care. Campion and Gabriel (1985) in their study in Scotland had also reported a negative relationship between the number of children in a family and physician consultations. The reported differences in service use may be due to the difference in the availability of family financial resources and time constraints faced by parents, which effects are amplified if the children live with one parent. Birth order was also found to be a significant variable with regard to health service utilisation. Earlier born children were found to have made more doctor visits in Perth, Australia (Ward & Pratt, 1996), and used more acute health services, as reported by Horwitz et al. (1985) in the United States, and by Campion and Gabriel (1985) in Scotland. This may be due to the inexperience with children, the increased concern with health changes and the less understanding of the use and limitations of physician visits.

In Honduras a higher number of children living in a household had a suppressive effect on the consultation of medical care for diarrhoea (DeClerque et al., 1992). But in Grenada, in the West Indies an increase in household size was associated with an increase in using the health services for children which was explained by the contagion effect (Poland et al., 1990). In rural Bangladesh higher birth order was found to be related to the increased probability of taking a child to a public sector provider rather than private (Levin et al., 2001), and Ahmed et al. (2001) reported that higher birth order decreased the probability of consulting a trained health care provider for sick neonates.

Preventive health services utilisation:
Regarding prenatal care, the number of children a woman has had a negative effect on the utilisation of health services. In a study conducted by Delvaux et al. (2001) in ten European countries, women with inadequate care were of higher parity; that is, they had four or more children, compared to controls. In The United States, Melnikow et al. (1991) reported that increased parity was associated with not receiving prenatal care and McDonald et al (1988), Sable et al. (1990) and Lia-Hoagberg et al. (1990) reported that

increased parity was associated with a decrease in the number of prenatal care visits, while Clarke et al. (1999) found that increased parity increased the odds of receiving no care or inadequate care for both White and African Americans.

Regarding children's immunisation, it was reported that a child living with both parents was associated with better immunisation uptake in the United Kingdom (Li & Taylor b, 1993). In New Zealand when the mother was the only adult in the house there was a delay in immunisation (Kljakovic, 1997). This was also supported by Skinner et al. (1995). In Wales in the United Kingdom, Evans and Thomas (1998) found that children in one parent families were more likely to miss preschool booster immunisations. Increased number of children in a household was also related to delays in immunisation uptake in New Zealand (Kljakovic, 1997), and better rates of immunisation uptake was reported for the earlier born children in the United Kingdom (Li & Taylor b, 1993).

Regarding prenatal care, it was reported that in the Karnataka State in India a nuclear family system had a negative impact on maternal health care utilisation (Chandrashekar et al., 1998). This may be explained by the increased social obligations for women in nuclear families, in the absence of assistance, compared to the matriarchal system, which favoured better maternal care in Karnataka India. This finding was contradicted by Chernichovsky & Meesook in Indonesia (1986) where they found that pregnant women in larger families sought less modern care during pregnancy. This may be due to the favouring of tradition in these homes by the elderly who may have stronger decision making power, compared to young mothers. Parity was also a significant variable when it comes to prenatal care use. It was found in several countries that for nulliparous women the probability of obtaining prenatal care was more than for multiparous women. These studies include the ones conducted by Abbas & Walker (1986) in Jordan, by Elo (1992) in Peru, by Pebley et al. (1996) in Guatemala, by Uyirworth et al. (1996) in Northern Transval, by Celik (2000) and Celik & Hotchkiss (2000) in Turkey and by Nielsen et al. (2001) in rural India. Having more than two deliveries was also associated with ignoring prenatal care in Laos (Phoxay et al., 2001), and having more than two living children was found to be related to the likelihood of not receiving prenatal care in Vietnam (Swenson

et al., 1993). In Jordan, Abbas & Walker (1986) and Obermeyer & Potter (1991) reported that increased parity was associated with receiving less adequate prenatal care, and in Southern India nulliparous women had more care than multiparous women (Nielsen et al., 2001). This was explained by the doctors' role in urging nulliparous women for more visits and due to the attention and care received by the women's parents who try to make sure that their daughter receives sufficient care. Magadi et al. (2000) found that in Kenya the late initiation of prenatal care was related to higher order births. In the Phillipines the probability of choosing modern prenatal care services instead of traditional care in urban areas decreased as the number of children aged zero to six years old increased (Wong et al., 1987).The increased likelihood of having better prenatal care for the nulliparous women, compared to the multiparous women, could be explained by the mother's perception of the need of care more strongly for a first time experienced pregnancy, with the fear of complications and the importance and value given to having a healthy and normal child. Women who already had children, if their previous experiences with pregnancies went smoothly, without complications, they perceive themselves to be healthy, well experienced and that prenatal care does not have an important role, in addition to the increased social obligations of taking care of children at home. A higher number of children living in a household was related to a decrease in the probability of having a completed immunisation schedule in Nigeria (Akesode, 1982), and in Ghana (Brugha & Kevany, 1995).

3.3.1.8. Ethnicity and religion

General health services utilisation:

In the fourth national study of morbidity in general practice in the United Kingdom (1995) Pakistani/ Bangladeshi group were found to be more likely to consult general practitioners. This was supported by Smaje and Le Grand's study (1997) who found that ethnic minorities in general reported the same or higher levels of using general practitioner's services, but they were reported to have lower use of higher quality specialised services, which indicated inequity in referral patterns. In the United States, Clancy et al. (1997) also reported greater use of specialists by whites, compared to ethnic minorities.

In Sri Lanka, the Sinhalese were reported to be more likely to use traditional Ayurvedic medicine than Tamils and Muslims. Muslim women were less likely to use all of the available services to them, compared to the Sinhalese women, since they have relatively less knowledge of the outside world and have less decision-making power. When choosing a source of care, Muslim women preferred private doctors as a source of care since they have the chance to choose female doctors rather than men (Pieris, 1999).

Children's health services utilisation:

The disadvantaged position of ethnic minorities regarding health care use was also found to affect children. In the United States, using data from a representative survey of the US population, white children were found to have made twice the visits to physicians than other minority groups' children, even after adjusting for health status (Newacheck et al., 1996). White children were also found to have made more visits to outpatient departments in hospitals (Mc Cormick et al., 2000), and being non-white minimised the use of paediatric care in general (Newacheck, 1992; Riley et al., 1993; Horwitz et al., 1993). In the United Kingdom, Cooper et al. (1998) reported that South Asian children used general practitioner services more than any other ethnic group. But use of hospital outpatient services was found to be lower for children from all minority ethnic groups, compared to whites.

Fosu (1994) reported that religion affects service use for children in Ghana and Zimbabwe. Being a Christian in Ghana seemed to have a positive relationship with the use of the health care system, while not being a Christian in Zimbabwe seemed to restrict the use of modern health services. This was explained by the government subsidies to the operating costs of mission/church hospitals and clinics in rural areas and training their personnel in Ghana, and that in rural Zimbabwe mission facilities play a major role in providing health services. These differences in use may reflect the cultural barriers and probably the unseen conflict between the ideology of different religions and probably the suspicion held by non-Christians toward missionary activity.

Preventive health services utilisation:

Regarding prenatal care utilisation, it was found in the United States that Afro American women were less likely to obtain adequate plus care, regardless of medical problems or behavioural risks (Clarke et al., 1999). The late initiation of prenatal care or no prenatal care was also found to be related to being non-white (Cooney, 1985), in addition to obtaining fewer prenatal visits (Stevens-Simon et al., 1996). In the United Kingdom women of ethnic minorities made fewer antenatal visits than women of British origin (Petrou et al., 2001). This relationship between inadequacy in prenatal care and ethnic minority status was supported by the findings of a study conducted by Delvaux et al. (2001) in ten European countries. White race was related to the increased likelihood of a child being vaccinated in the United States (Swigonski et al., 1995), This disadvantage by ethnic minority status, controlling for other variables such as education, socioeconomic status and occupation, reflects the cultural aspects of health behaviour, in addition to the differences in accessibility of the health care system and the attitudes and the communication aspects between the health care providers and the ethnic minority groups.

Differences in the use of antenatal care according to ethnicity was found in Guatemala, where Pebley et al. (1996) found that indigenous women were less likely to use formal prenatal care during pregnancy, as compared to Ladino women, and when comparing municipality ethnicity, women living in more highly indigenous municipalities were less likely to use formal prenatal care. In Turkey, Celik & Hotchkiss (2000) found that Kurdish women, compared to other ethnicities, showed a lower likelihood of using prenatal care services. In a study conducted by Materia et al. (1993) in rural Ethiopia the use of prenatal care differed according to the ethnicity, since they found that women from the Orano ethnic group were more likely to use prenatal care than women from the Amhara group. In Kenya, Magadi et al. (2000) reported that the timing of the first prenatal visit varied significantly among ethnic groups. They found that the Kalenjin women started, on average, antenatal care before the Kikuyer, Meru, Embu and the Mijikenda. The increased proportion of the indigenous population in the area of residence in Guatemala was found to have a significant and negative relationship to the use of immunisation services for children, due to the dissemination of culture (Pebley et al.,

1996). Ethnicity was also found to be a significant determinant of the BCG vaccination of children in a mountainous area in Vietnam in 1991, but in 1994 due to the socioeconomic developments during the mentioned time period (Toan et al., 1996).

3.3.1.9. Beliefs, attitudes and knowledge

General health services utilisation:

Beliefs are related to the surrounding environment, personal experiences, education and the current life situation. Health beliefs interact with situational demands and constraints in relation to actions taken in the face of health threats. This was explained briefly in the health belief model described above. In the United States, it was found that high users of physician services express high anxiety levels about symptoms (Banks et al., 1975; Hershey et al., 1975). In the United Kingdom, Blaxter (1985) found that in the non-manual classes a sense of control over one's health, the belief that health being the individual's responsibility was related with the frequent seeking of medical care, while in manual classes the situation was reversed. High consultation rates were associated with a low sense of control over health and a low sense of individual responsibility. Preoccupation with health and help seeking attitude was found to relate to health service utilisation in Norway (Fylkesnes, 1993). Attitudes toward health services and professionals were found to be of paramount importance in terms of health service utilisation. An example would be the study carried out by Fiscella et al. (1998) in their analysis of the National Medical Expenditure Survey in the United States. They reported that skepticism toward doctors was related to the decreased number of physician visits and hospital emergency department visits. Perceived efficacy of care was found to be associated with an increase in the frequency of medical visits in some developed countries' settings (Berkanovic et al., 1981; Meninger, 1986; Van de Kar et al., 1992).

Some wrong beliefs can act as a deterrent of use for health services, such as what was reported by Pieris in Sri Lanka (1999) where many of the respondents claimed that modern healers cut the affected limbs to cure fractures, whereas traditional healers used gentle treatment such as oil massage. Traditional treatments were also used for those illnesses in which people believe that they are due to humoral imbalance such as chronic

rheumatism. Also cold and cough were regarded as caused by the disequilibrium of the phlegm in the body, and people treated them with herbal preparations. Being frightened of some procedures may lead to the avoidance of modern medical care, as in Noten's (1985) report that people had no objections to modern health care, but they were scared of injections and surgery so they used traditional care.

The perceived quality of care was found to be an important determinant in the choice of health services. It has been found to be the most influencing factor in the choice of type of care (i.e. public, private and traditional) in rural Cameroon (Tembon, 1996), and the use of public or private services tended to increase for each type of care as quality increased in Nigeria (Akin et al., 1995). The perception of high quality of care of the private sector, compared to the public sector, led individuals to rely on private physicians as their first contact for seeking help for their problems in Egypt (Abu-Zeid & Dann, 1985). This lower quality rating of public health facilities was also reported in Benin by Birchmann et al. (1991), in rural Kenya by Mbugua et al. (1995) and in Guatemala by Van der Stuyft et al. (1997), which had led to the under-utilisation of these services. Some of the reasons for the low quality perception were the dissatisfaction with treatments received, incompetence of the staff counseling skills and lack of drugs. The perception of bad attitudes from health care staff have also been found to deter people from using modern health care services such as in Sri Lanka where Pieris (1999) found that traditional healers were preferred by many villagers as they were easier to cope with and to communicate with, compared to doctors who worked in hospitals which were described to be unfriendly. In rural Vietnam, Tipping et al. (1994) reported that the caring attitudes on the part of the health worker was said to be more important than convenience or cost of the health services in which giving information was considered to be an essential part. They also reported that the perception of low quality of the commune health stations deterred them from their use.

Knowledge of the appropriate sources of health care was found to be important in taking the right choices for health care options. In rural Kenya, for an illness episode there was a high likelihood of consulting more than one provider for advice, because patients were

unable to distinguish between the quality of various providers and some believed that in order to get cured they must be treated by more than one provider (Mwabu, 1986). In an urban area in Ghana, Fosu (1989) found that those who knew the location of the nearest clinics were most likely to use them than others.

Children's health services utilisation:

In the United States the propensity to seek care for children was found to be associated with the utilisation of health services for children (Gortmaker et al., 1982). Mothers' satisfaction with paediatric care was found to be inversely related to maternal care action before the first paediatric visit, and mothers being less satisfied with pediatric care minimised the use of pediatric medical care (Horwitz et al., 1993). Regarding the reasons why a child with cough was taken to a physician, it was reported by Cornford et al. (1993) in the United Kingdom that mothers' fears that their children were going to die from cough or that their children would develop long term complications were important factors leading to consultation.

In Rwanda, Csete (1993) reported that the infrequent use of traditional healers for the treatment of diseases in general was due to their expectation of cure by Western methods. The perception of high quality of private care, compared to traditional healers and medical staff at health centres, was related to more use of private care for children with acute respiratory infections in Marrakech (Maynard-Tucker, 1998). In rural Bangladesh, Levin et al. (2001) found that the perception of lower quality of public services had led to less utilisation of these services. In an Indian State, respondents indicated that the efficacy of the treatment provided by private practitioners had led them to travel longer distances in order to consult them even if government practitioners were more accessible (Bhatia & Cleland, 2001). The expectancy of rapid cure for diseases in an urban slum in India resulted in the discontinuation of treatment courses, the frequent change of practitioners and the reluctance to seek hospital care (De Zoya et al., 1998).

Preventive health services utilisation:

In the United States the odds of receiving inadequate care was higher for women who had a poor understanding of or attached low value to antenatal care (Poland et al., 1987; Sable et al., 1990; Harvey & Faber, 1993), and women of low-income who did not feel the need to go to antenatal sessions and did not know where to go for care were less likely to have made prenatal visits (Aved et al., 1993). Women's perception of the health services was related to antenatal care use (Lia-Hoagberg et al. 1990).

The perception of efficacy of immunisations is considered to be an important factor in having children immunised. It was reported that the perceived efficacy of immunisations accounted for the variance in the immunisation rates for infants in a disadvantaged area in the United States (Kviz et al., 1985). Parents who had doubts about the safety of immunisations, were not favourably disposed toward immunisation or had doubts about the efficacy of immunisations had children with lower immunisation rates in the North West of England (New & Senior, 1991).

Regarding prenatal care, the perception of the high quality of private health facilities and the knowledge of the services' benefits led some families to take out loans for prenatal care in Maharashta, India (Griffiths and Stephenson, 2001). In some countries, the perception that the modern health sector is intended for curative services and because people do not know that prenatal care is for monitoring the babies and the health status of women, led to the ignoring prenatal care, such as what was reported by Phoxay et al. (2001) in rural Laos. In Bangladesh the reluctance of mothers to use maternal care health clinics was due to the perception of the unfriendly attitudes of health professionals, who sometimes demanded money for the services provided (Islam & Nielsen, 1993). This perception of negative staff attitudes was mentioned as a reason for not attending antenatal care in Lebowa, Northern Transval (Uyirworth et al., 1996). Unwantedness of a pregnancy was found to be related to attending fewer antenatal sessions in Kenya (Magadi et al., 2000), and women with unwanted pregnancies were less likely to seek out medical care, to initiate care in the first trimester and to receive an adequate number of visits in Ecuador (Eggleston, 2000).

Regarding children's immunisation, the negative perception of the town's immunisation services was related with lower immunisation coverage in Ghana (Brugha & Kevany, 1995). The lack of knowledge about immunisation was found to be a major determinant of not beginning immunisation schedules for children in Iran (Nasseri, 1990). Not having sufficient information about when to take a child for immunisation and whether to consider the formation of a post vaccination abscess to be abnormal led to the decrease in the compliance with immunisation schedules in urban Guinea (Cutts et al., 1990). In some provinces in China, not knowing when or where the immunisation took place was a reason not to have children vaccinated, while knowledge about immunisation was associated with a positive attitude and practice of immunisation (Zhang et al., 1999). In Haiti, being unconvinced of the importance of immunisation, giving low value to health and being afraid that vaccines would cause harmful side effects were mentioned to deter women from immunising their children (Coreil et al., 1994).

3.3.1.10. Health status rating

Regarding self-reported health status, it was found that self-rated health status being poorer was the most important determinant of general practitioners' visits and specialists' visits in Norway (Fylkesnes, 1993), in the Netherlands (Alberts et al., 1997), and in Canada (Birch et al., 1993; Mc Isaac et al., 1997; Dunlop et al., 2000). It also affected the use of general practitioners' services in the United Kingdom (Evandrou et al., 1992).

Parents' perception of the child's health status was the major determinant of both ambulatory care use and frequency of use of health services in Ontario, Canada (Woodward et al., 1988). In the United States the perception of fair or poor health status of a child was the most significant correlate of children's ambulatory visits for working mothers (Alexander & Markowitz, 1986); high users of health services were more likely to be perceived as less healthy (Diaz et al., 1986; Newacheck, 1992; Riley et al., 1993), and fair or poor health rating for children was associated with visits to outpatient departments (Mc Cormick et al., 2000). For young people and children in the United Kingdom, perceived health status was strongly associated with the use of ambulatory

health services (Cooper et al., 1998). In Catalonia, Spain, the perception of a child's health status to be fair or poor was associated with the increase in the utilisation of health services (Rajmil et al., 1998).

3.3.1.11. Stress

Stress was reported to be associated with increased utilisation of health services in the United States (Gortmaker et al., 1982), especially for ambiguous symptoms (Cameron et al., 1995), and in Canada it was reported that psychological distress was an important predictor of perceived health need and led to significant service use (Préville et al., 1998). In addition, a negative mood was also found to be a strong predictor of physical symptoms, which in turn predicted health behaviour (Verbrugge, 1985; Gijsbers van Wijk et al., 1999). Stress while pregnant was found to be associated with receiving inadequate care in a rural Oregon community in the United States (Harvey & Faber, 1993). Maternal stress was found to be associated with increased children's health service utilisation in Australia (Ward & Pratt, 1996) and in the United States (Riley et al., 1993). In developing countries, the relationship between stress and general ambulatory health service utilisation was not explored, to my knowledge.

3.3.1.12. Previous service utilisation

It was reported that household members' history of medical visits and previous health services use by individuals was predictive of ambulatory care visits in Quebec, Canada (Préville et al., 1998). For a group of low income women in the United States, mother's prior involvement in the health care system was associated with prenatal care use (Lia-Hoagberg et al., 1990). Regarding the relationship between maternal use of health care and children's use, it was reported in the United States that there was a clear relationship between the likelihood and volume of health services use by mothers and their children (Cafferata and Kasper, 1985), and that children whose mothers were high utilisers of health care tended also to be high utilisers of care (Horwitz et al., 1985; Riley et al., 1993). This relationship between maternal physician visits and their children's visits was also reported by Ward and Pratt (1996) in Perth, Australia. Prenatal care use was also found to be significantly related to infants' immunisation status in the United States, with

adequate care being related to a better immunisation status (Butz et al., 1993; Swigonski et al., 1995; Kogan et al., 1998; Freed et al., 1999). In addition, in New Zealand Kljakovic (1997) found that having fewer siblings immunised was associated with a delay in a child's immunisation. In the United Kingdom lower immunisation uptake was associated with the absence of or incomplete primary immunisation status of children (Li & Taylor b, 1993), and in Wales, Evans & Thomas (1998) reported that coverage of preschool booster immunisation was strongly related with completed primary immunisation status.

The relationship between previous health service contacts and subsequent utilisation was not emphasised in developing countries, and only few studies tested this relationship. Regarding prenatal care, it was found that use of modern family planning was associated with initiation of prenatal visits in the first trimester and reception of an adequate number of visits in Ecuador (Eggleston, 2000). This positive relationship between the use of modern family planning and the use of prenatal care was also established in Vietnam (Swenson et al., 1993). The receiving of prenatal care was found to be related to taking sick neonates to a trained medical provider in rural Bangladesh (Ahmed et al., 2001), and treating a child's illness at a local hospital was associated with the completion of the immunisation schedule by year one in Ghana (Brugha & Kevany, 1995). In Jordan, mothers' reception of antenatal care was associated with taking a child to pediatric care and for the child to be immunised as scheduled (Obermeyer et al., 1993).

3.3.2. ENABLING FACTORS

The enabling factors include factors that promote or impede the utilisation of health services. They include income and household economic indicators, health insurance, social obligations, social networks and stressful life events, differences according to region of residence and direct accessibility factors.

3.3.2.1. Income and household income indicators

General health services utilisation:

Income can be thought of as a proxy for the ability and willingness to pay for services, as well as certain characteristics of the household environment.

In Canada, McIsaac et al. (1997) reported that high income persons were less likely to have made six or more visits to general practitioners, but more likely to have made at least one visit to a specialist, since persons with high incomes were more likely to request the opinions of specialists. This advantage of specialist care use for Canadians with high incomes was supported by Dunlop et al. (2000). In the United Kingdom, Evandrou et al. (1992) found that for low income elderly men aged sixty or over, utilisation of general practitioner services was lower than for other income categories. This was explained by the effect of financial constraints. But for elderly women, low income had an opposite effect. In Ireland, it was reported that general practitioner visiting rates were significantly higher for those with low incomes, whose costs were covered by the state, than those who paid for such care, having controlled for other characteristics, including health status (Nolan, 1993). This reflects the positive impact of insurance for low income groups. But this high attendance of lower income groups was also reported for the United Kingdom where universal insurance exists for all income groups (Scaife et al., 2000).

In the United Kingdom people living in council or rented accommodation were more likely to consult general practitioners (RCGP, OPCS and DH, 1995). Housing tenure was found to be related to the increased likelihood of being a frequent attender of general practitioners' offices, when moving towards the poorer end of the scale (Scaife et al., 2000), and for men over forty and under sixty five home ownership had a negative impact on general practitioners' service use (Evandrou et al., 1992).

For developing countries, higher income seemed to have an effect on service use. In a study of Burkina Faso, Guatemala, Kazakhestan, Kyrgyzstan, Paraguay and South Africa richer groups were found to have higher probability of obtaining care when sick, and to be more likely to be seen by a doctor (Makinen, et al., 2000). This higher proportion of

seeking care for higher income groups was also reported in rural Indonesia (Berman et al., 1987), rural China (Hao et al., 1997), in Vietnam (Segall et al., 2000) and for women in rural India (Vissandjée et al., 1997). People having higher incomes were seen to take less time to seek modern medical care in Nepal (Subeidi, 1989). Poorer sections of a rural society in India were found to get treated more often by informal and traditional systems of medicine (Ramachandran & Shastri, 1983), while persons with higher incomes were found to have used the services of trained practitioners and physicians more often in Indonesia (Chernichovsky & Meesook, 1986), and in rural Kenya (Mbugua et al., 1995). Poorest households made much less use of the free-charging government facilities than better-off households in a poor rural area in Kenya (Mbugua et al., 1995). Higher income was shown to have a qualitative effect, shifting toward more expensive and sophisticated health services. Increased household income was found to be associated with more use of outpatient departments in hospitals in Indonesia (Chernichovsky & Meesook, 1986), in rural China (Hao et al., 1997) and in Guatemala (Makinen et al., 2000). A shift to private health care was reported for rich people in rural Indonesia (Berman et al., 1987), in urban Thailand (Pannarunothai, 1993), in rural Cameroon (Tembon, 1996) and in Guatemala (Makinen et al., 2000). It can be noted that higher income has a positive effect on the use of modern health services, with the shift toward better health services. This may reflect the ability to recognise as well as obtain higher quality of care, especially when it is known that higher income is related to higher education and/or a higher socioeconomic status.

In an urban area in Ghana, Fosu (1989) found that the presence of a toilet in the house, pipe-born water, good drainage and good overall living conditions were related to service use. The better the immediate environment situation the lower the levels of morbidity, hence the lesser use of clinic services. In Grenada, West Indies, residents of concrete homes tended to visit medical facilities less often than those housed in structures of wood or other building material. This is because those living in concrete homes had higher incomes and better education, offsetting the increased propensity to seek care, as proposed by the authors (Poland et al., 1990). In Gujarat, India, rural women who lived in households in which they had access to tap water and had their own latrines were more

likely to seek modern types of services and less likely to choose traditional services. This was explained by the use of such household facilities as an attitude marker toward modern facilities and their familiarity with modern services (Vissandjée et al., 1997). Car ownership has been shown to have an indirect effect on the choice of health care facilities, such as in Kingston, Jamaica, where Bailey & Phillips (1990) found that high car ownership seemed to cancel out the effects of distance to health care, with the increased use of private doctors' facilities. Ownership of a television was found to be associated with the use of local health centres in Southern Iraq (Habib & Vaugham, 1986).The effect of ownership of objects may be due to the fact that they reflect the economic ability to obtain care, in addition to the increased accessibility such as by having a car, or by the exposure to media and increased levels of health awareness via having a radio or a television set.

Children's health services utilisation:

In the United States the effect of income on children's ambulatory care use was evident. Children of low income families had low access to health services (Guendelman et al., 2000) and children who came from families below the poverty line were more likely to be low utilisers of health services. Children from low income families were more likely to lack a usual source of care and used less physician services, after adjusting for health status (Newacheck et al., 1996). In an earlier study by Wolfe (1980), children belonging to higher income families appeared to be more likely to use higher quality of care, compared to other children.

In urban Kuala Lamupur, poor children were found to be highly dependent on government facilities (Chong-Ying & Yusof, 1993), and in Haiti, some poor children did not use the health services, due to the difficulties they faced in acquiring proper clothes or shoes to wear to the health posts (Coreil et al., 1994). In Uganda and Togo, the lower the resources the household had the less likely the children in that household were taken for a medical visit (Fosu, 1994). In Mexico the use of locally available health care choices for diarrhoea care, as the exclusive option, was less for children in households owning cars (Granich et al., 1998). Obermeyer et al. (1993) found that in Jordan more space per

individual was related to more use of paediatric care. In the West Indies, Poland et al. (1990) reported that having more bedrooms in a house was associated with children's utilisation of health services.

Preventive health services utilisation:
In Maine, United States, per capita income was found to be a predictor of prenatal care, favouring women with higher incomes (Mc Donald et al., 1988; Sable et al., 1990). Higher income was associated with the initiation of early prenatal care and receiving adequate care for Whites in the United States (La Viest et al., 1995). In Europe, Delvaux et al. (2001) in their study of antenatal care utilisation for ten European countries, inadequate care was related to having no regular income. Regarding children's immunisation, it was reported in the United States that children from low income families were less adequately immunised than the economically better off (Swigonski et al., 1995; Newacheck et al., 1996).

In Benin, Bichmann et al. (1991) found that affluent women were over represented in the users of maternal health care services, and the urban poor were found to be highly dependent on government facilities for maternal care in Kuala Lampur, Malaysia (Chong-Ying & Yusof (1993).

In Jordan, using national data, Obermeyer & Potter (1991) found that a high standard of living was related to the increased intensity of utilisation of prenatal care and the timeliness of care, and that more available living space was associated with the use of modern health care. In Turkey, women who had flush toilets in their houses and their household owned a car were more likely to use antenatal care (Celik, 2000; Celik & Hotchkiss, 2000). In addition, women who lived in houses with modern floors were more likely to have utilised prenatal care (Celik & Hotchkiss, 2000), and rural women who lived in houses with wooden floors were more likely to have obtained modern care (Celik, 2000). A higher proportion of women who lived in villages in Vietnam where electricity and cinema were available used prenatal care than women who lived in villages without these amenities (Swenson et al., 1993). The possession of and watching

television on a daily basis was found to be associated with the use of prenatal care in Guatemala (Pebley et al., 1996). Health communication facilities such as radio and television were found to be related to prenatal care use in urban areas in Metro Cebu, Philippines. Having television and radio was related to antenatal care, with the consideration that they are proxies for health information (Becker et al., 1993).

Having a sewing machine -which was the sole indicator of economic status- was related to a better immunisation status for children in Ghana (Brugha & Kevany, 1995), although this is considered to be a poor indicator of socioeconomic status and has not been used as such in other utilisation studies. Possessing a radio and/or a television set increased the odds of children's immunisation in Metro Cebu, the Philippines (Becker et al., 1993), and the household possession of television was related to the beginning of the children's immunisation series in New Guinea (Cutts et al., 1990).

It can be noted that the availability of modern household possessions and facilities favour health service utilisation, and it is observed that these variables are accounted for in developing countries, and not the developed countries, since these facilities are readily available for most of the population in developed countries.

3.3.2.2. Health insurance

General health services utilisation:

In the United States, Falik & Collins (1996) and Clancy & Franks (1997) reported that privately insured patients showed higher utilisation levels of health care. In the Netherlands the publicly insured had to wait for a longer time to see specialists than the privately insured patients (Alberts et al., 1997).

In Indonesia, Gish et al. (1988) found that civil servants and their families who are insured used on average four times the health services of the uninsured public. In Mexico, Leyva-Flores et al. (2001) found that people without social security or private health insurance used less medical care. In rural Vietnam, Tipping et al. (1994) found that hamlets where state employees reside, commune health services were used more

frequently, partly due to their qualification for subsidised care in state health facilities. In China, when comparing urban use for the years 1993 and 1998, it was found that the decline in government health insurance and labour health insurance from 1993 to 1998 led to a decrease in the percentage of people who visited health facilities during illness. This was explained by the increase in unit costs of health care services to users (Gao et al., 2001).

Children's health services utilisation:

For children in New York, good insurance coverage appeared to be related to the use of high quality care (Wolfe, 1980). Children in the United States who were privately insured made more office-based doctor visits, the uninsured were the least likely to have made a hospital-based visit (Mc Cormick et al., 2000), and in general uninsured children were more likely to have received no care from physicians (Newacheck, 1992; Stoddard et al., 1994). Uninsured children were also found to be less likely to have a usual source of care and had less physician visits, after the adjustment for health status (Newachek et al., 1996). Poor children with Medicaid coverage, compared to poor children without insurance, experienced superior access to health services. But poor children with Medicaid, when compared to non poor children with private insurance, used similar levels of physician services, but were more likely to have unmet health needs and were less likely to have a usual source of care (Newacheck et al., 1998). The increased amount of cost-sharing was shown to have negative impact on patients' use of health services (Leibowitz et al., 1985). In Perth, Australia, children of mothers who did not pay directly for medical consultations were more likely to visit (Ward & Pratt, 1996).

In Dakar, Senegal, the existence of social insurance was found to be related to the consultation of health services and to more private consultation, compared to public consultation (Fassin et al., 1988). In Guangxi and Gansu, China, immunisation coverage was found to be related to health insurance schemes (Zhang et al., 1999).

Preventive health services utilisation:

Regarding prenatal care in the United States, it was found that private insurance was a predictor of better prenatal care (McDonald & Coburn, 1988; La Viest et al, 1995), and for a group of low income women higher levels of Medi-cal plus extra care requirements were seen as a barrier to antenatal care (Aved et al., 1993). It was also reported that the largest difference among the women with no antenatal care, compared to others, was the amount of insurance they had (Poland et al., 1987). Regarding children's immunisation, uninsured children in the US were less likely to be adequately immunised (Newacheck, et al., 1996).

In the Philippines urban women who have insurance were found to be more likely to select private care, as opposed to traditional practitioners, as their most frequent choice of care, and insured women were more likely to have earlier private care visits and later visits to traditional and public providers (Wong et al., 1987). In Turkey, Celik (2000) and Celik & Hotchkiss (2000) found that having no health insurance was associated with the probability of not using antenatal care from health care facilities, and Celik (2000) reported that having health insurance was related to the increased probability of utilisation of primary health care centres versus no prenatal care. But uninsured women were more likely to use primary health care units instead of government hospitals, where the prices are relatively lower, while insured women used the private sector more than the public sector services and traditional care.

3.3.2.3. social obligations, social networks and stressful life events

General health services utilisation:

There are strong effects of work roles and social roles on seeking health care, since they exert time pressure on individuals, making them less able to obtain health care, and increase time costs. People tend to continue carrying on their work and social responsibilities, delaying or being reluctant to seek professional health care, despite the presence of symptoms (Alonzo, 1979). But when symptoms become disruptive of daily activities they tend to trigger consultation, as was reported in Finland by Punamäki and Kokko (1995). This was explained by Cornford (1998) as being due to financial reasons

such as job security, being responsible for a family or simply just for the joy of working. In the United Kingdom, caring responsibilities for women with paid work led to ignoring health problems as a direct result of time-space pressure of social roles (Rogers et al., 1998; Young, 1999). This was also supported by Evandrou et al. (1992) where they found that married women who held a job and married women who had children were less likely to consult general practitioners. In addition, they also found that for men over forty and under sixty five working hours had a negative impact on service use, emphasising the effect of time constraints. In an earlier study in Norway carried out by Andersen and Laake (1983), they found that women's obligations, measured by the number of children they had, had a significant effect on reducing the use of health services.

Social networks and the available social support in terms of advice, emotional and material, were found to have an effect on health service utilisation. In Ontario, Canada, Préville et al. (1998) found that social support affected the respondent's perceived need for health care and indirectly reduced the respondent's ambulatory medical service utilisation. Receiving advice to consult seemed to have a positive impact on the use of general practitioners' services in the Netherlands (Van De Kar et al., 1992) and in the United Kingdom (Rogers et al., 1998). In an earlier study, in Los Angeles the higher proportion of network advice to see a doctor, and the greater the distance from network members the more likely the person was to seek medical care. They also reported that those who reported less network contact and more support were more likely to have seen a physician in the study period (Berkanovic et al., 1981). In the United Kingdom, Scambler et al. (1981) found that large active kinship networks predispose women to consult general practitioners, while large active friendship networks have the opposite effect. Low social support for persons aged fifty years and older was found to be associated with less use of general practitioners' services in Denmark (Krasnik et al., 1997), while family dysfunction in Spain was associated with frequent attendance to a public health care centre (Bellón et al., 1999), and social isolation was found to be an important factor in general practitioners' frequent visits, as found in the United Kingdom (Scaife et al., 2000).

Stressful life events may have direct or indirect effects on health care use, altering the person's ability to seek care due to the change in the surrounding social environment and the available resources, and via affecting the emotional and health status of individuals, heightening the level of perceived need for health care. In a study conducted by Gortmaker et al. (1982) in the Untied States, stressful life events were found to have a positive effect in determining the utilisation of health services, independent of reported symptoms. It was also found that traumatic life events were associated with psychiatric disorders, which in turn were strongly associated with poor physical functioning and higher rates of primary consultation (Holman et al., 2000). Stressful life situations were found to be associated with frequent use of primary health care in Finland (Karlsson et al., 1997).

In developing countries, the effect of social obligations, social networks and stressful life events were explored only in rare cases. An example of such studies would be the study conducted by Fosu (1989) in an urban area in Ghana, where the presence of children tended to limit the ability to use clinic services, and those who had family support were more likely to use the clinic's services than others. In Nepal, Subeidi (1989) reported that network relationships and help during new illnesses delayed the use of professional medical help.

Children's health services utilisation:

In an urban low income area in the United States, Alexander and Markowitz (1986) reported that having individuals whom mothers could rely on for child care, housework and personal support were associated with the use of paediatric services for non-working mothers. For an area where the parents of the study sample were mainly young and highly educated, children of individuals with large non dispersed networks were more likely to utilise pediatric health services, which was explained by the transmission of information by pro-medical care network members. Also, the tendency to contact network members for assistance was found to modify an individual's propensity to seek care for minor pediatric illness and to reduce physician visits for children suffering from acute illness episodes (Horwitz et al., 1985).

Family stressful life events were associated with the increased chances of medical consultation and hospital attendance for illnesses, accidents, burns, scalds and accidental poisoning, indicating inadequate parental care in New Zealand (Beautarais et al., 1982).

In Malaysia, Lye et al. (1994) reported that mothers having problems in the work place and household duties were too busy to seek care for their children's acute respiratory infections. Presence of a father in Marrakech was found to be related to care seeking for a child sick with an acute respiratory infection (Maynard-Tucker, 1998).

Preventive health services utilisation:
Inadequate antenatal care was found to be related to having more difficulties with child care in Europe (Delvaux et al., 2001). In the United States, Lia-Hoagberg et al. (1990), York et al (1993) and Aved et al. (1993) found that having children needing care at home was one of the barriers with regard to antenatal care. Regarding social networks, Clair et al. (1989) found that the larger the relatives network, the less the emotional intimacy with them, and the less contact with friends was related to less use of prenatal services. The third trimester initiation of prenatal care was reported to be associated with inadequate family support for adolescent mothers (Stevens-Simon et al., 1998). In an early study of prenatal care utilisation in the United Kingdom, Mckinlay (1973) reported that under-utilisers of health services consulted with a dense and interlocking network family and friends and had more relatives living with a relatively short distance, while utilisers had a separate or differentiated kin and friendship networks. Regarding children's immunisation, in England, New & Senior (1991) reported that problems related to the presence of young children and the associated mobility difficulties were among the reasons for not completing the children's immunisation schedule.

In the Philippines, Wong et al. (1997) found that an increased number of preschoolers reduced the likelihood that an urban woman would utilise prenatal care, and in Jordan it was reported that as the number of children in a household increased the utilisation of antenatal care decreased, emphasising the effect of care obligations on women

(Obermeyer & Potter, 1991). In rural Southern Laos it was found that women were prone to seek help in the decision making process from the elderly or other people that they respected. Such people may not give appropriate advice and, thus, may lead to the reluctance to seek antenatal care (Phoxay et al., 2001).

Lack of social cohesion was found to be related to low coverage of immunisation in India (Brugha & Kevany, 1995). According to a group of Haitian mothers, the most significant barriers to immunisation were the competing priorities in everyday life (Coreil et al., 1994). Advice given with regard to the use of health care for a child's illness was found to be significant in Guatemala (Heuveline & Goldman, 2000), and in Haiti it was mentioned that positive support for seeking immunisation from friends and neighbours was to be an important reinforcement for having a child immunised (Coreil et al., 1994).

Regarding the research findings related to the roles of social networks in the utilisation of health services, it is noted that they are contradictory and inconsistent. In addition, they differ according to the health conditions, types of possible health actions, and the population under study, which corresponds with the previously mentioned assumptions of the function of social networks in the SOS model. Regarding the impact of social support, Estroff and Zimmer (1994) suggested that the impact of social support on health care utilisation can be assessed by investigating the kind of people involved, in what networks, with references to situations at various points in the life course and different illness experiences.

3.3.2.4. Accessibility of health services

Accessibility of health services includes the characteristics of the health care system that affect the ease to obtain health services, covering a wide range of variables, from the supply of doctors and health services to the personal costs faced when using health care. It is worth noting that health insurance, as it affects accessibility, was mentioned above in a separate section, since it is of prime importance in health service characteristics and has a universal effect on health service utilisation when it covers the whole population.

General health services utilisation:

In Finland, it was found that the supply of doctors was an important determinant of health care use (Hakkinenen, 1991), and in Norway high ratios of general practitioners to population and residence in municipalities with referral care facilities were both found to be associated with the higher probability of referral (Fylkesnes, 1993). Continuity of care was found to be significantly related to service use in Los Angeles (Berkanovic et al., 1981). Canadians lacking a regular medical doctor were found to be less likely to receive primary and specialist care, even after the adjustment for socioeconomic variables such as income and education (Dunlop et al., 2000). Access to public and/or private transport and the location of the paid work place in relation to health care services were found to be key factors underpinning women's choices and priorities in seeking health care in the United Kingdom (Young, 1999).Time cost was found to be an important determinant of demand for doctor's visits in Finland (Hakkinenen, 1991).

In developing countries, a large emphasis has been placed on the immediate accessibility factors such as distance, transportation, travel time and costs. This is due to the relatively maldistributed health services, underdeveloped transportation systems and the unavailability of universal health insurance systems in many of the research settings.

Distance and access to a permanent health care service as a regular source of care were found to be significant predictors of utilisation of health services in the West Indies (Poland et al., 1990). The importance of distance was also proven in many other studies, such as the one conducted by Pieris in Sri Lanka (1999) where distance was a major determinant in deciding what type of treatment to be used. In a Dogon community in Mali the percentage of use of traditional therapies increased as the distance to modern care increased (Coppo et al., 1991). In Sierra Leone, Fabricant et al. (1999) found that walking time to a primary health care unit and distance to a hospital were more important influences on choice of medical treatment than most of the preference factors or the income or wealth variables. When all sources of care were considered to be as effective as modern medicine for mild illnesses, the utilisation of modern sources of care fell exponentially with distance. But when the quality of services was considered to be

higher, the distance effect seemed to be not important in Nigeria (Stock, 1983). Persons living close to public services were found to have utilised it more in Indonesia (Gish et al., 1988), in Fiji (Andy, 1990), in Bangladesh (Nessa et al., 1991), in a poor urban area in Malaysia (Chong-Ying & Yusof, 1993), and in rural India (Kopparty, 1994). Where there was a low coverage of free government health facilities, people sought care outside these facilities in rural Kenya (Mwabu, 1986). Travel time and costs were also reported to be important determinants of health care use in many studies. In Gujarat, India, Vissandjée et al. (1997) found that travel time and travel costs were important determinants of the use of modern and traditional services, even more important than the direct cost of the services itself. Travel time was found to have a deterrent effect on service use when it exceeded thirty minutes in rural China, although this was reported according to a small number of observations (Jianghui et al., 1997), and transportation fares were found to deter the use of health care facilities in Bangladesh (Nessa et al., 1991).

Total time spent in a facility, including waiting time, treatment time, laboratory tests, and pharmacy waiting time were negatively associated with the use of health services except for consultation time, which was positively related to public facilities service use in rural Cameroon (Tembon, 1996).

The accessibility and cost of health care sources were mentioned as an important factor in choosing the types of services used, with the medical shop being the most frequent option for all caste and class groups in India (Kopparty, 1994). Cost of treatment was a major consideration in deciding what type of treatment to be used in rural Vietnam (Tipping et al., 1994) and in Sri Lanka (Pieris, 1999). Higher prices at health facilities, public or private, reduced their use in Nigeria (Akin et al., 1995). In Benin, it was found that treatment cost was a barrier to modern service use, in addition to the time costs of treatment where working hours are lost (Bichmann et al., 1991). The introduction of fees for services in Kenya also led to lower utilisation levels (Mbugua et al., 1995). Half of the participants in the 1994 Mexican national health survey mentioned that they did not use medical care because they considered them to be expensive or they did not have the

money to pay for them (Levya-Flores et al., 2001). In India, the major reason for consulting primary health care units, in place of other modern and traditional service providers, was that they were free of cost (Kopparty, 1994).

Children's health services utilisation:
Having a usual source of care was associated with nearly a two fold increase in the receipt of ambulatory care for children in the United States (Mc Cormick et al., 2000).

In Malaysia the choice of the clinic to treat the child at, when sick, depended on its distance from home (Chang-Ying &Yusof, 1993). As distance and travel time to a health care provider increased, the likelihood of seeking care decreased in rural Bangladesh (Levin et al., 2001). When treating diarrhoea in a high land area, Mexico, all of the households used the local options and the distant options were used later on (Granich et al., 1999). For children in Marrakech, access to health care centres affected its utilisation for acute respiratory tract infections (Maynard-Tucker, 1998). In Marrakech, traditional care was the first choice of care for acute respiratory tract infections due to lack of cash and transportation to visit private practitioners or pharmacists (Maynard-Tucker, 1998).

In an urban slum in India the choice of health care provider for infants also favoured traditional practitioners, as they were more convenient and cost less (De Zoya et al., 1998), while Guatemalans tended to use government sponsored health facilities because of their low cost and relative accessibility (Hueveline & Goldman, 2000).

Clinics' operating times were also found to affect utilisation of services, such as in Bangladesh where Islam and Nielsen (1993) found that under-utilisation of child health clinics was affected by the clinics being open during the busy hours of family work.

Preventive health services utilisation:
Prenatal care use is also affected by accessibility factors. In Europe, Delvaux et al. (2001) found that problems with health service organisation were the most frequently cited barriers to antenatal care, with the obligation to make appointments in advance being the

most commonly cited problem, especially for foreigners who suffered from additional language problems, and distance and transportation difficulties were found to be a barrier in obtaining adequate care. In Michigan, the United States, the degree to which maternal health care clinics are available was related to the initiation and adequacy of prenatal visits for whites (La Viest et al., 1995). Depending on women's reports, Aved et al. (1993) found that inability to find a physician willing to accept them was the single largest barrier to obtaining care, with transportation difficulties being a significant barrier for women who never tried to obtain care. Transportation difficulties as a barrier to antenatal care was also reported by Lia-Hoagberg et al. (1990), and longer traveling time was found to reduce the chances of having adequate prenatal care (McDonald et al., 1988). Regarding children's immunisation, having a general practice as the provider of immunisation was related to a better child immunisation status in the United Kingdom, compared to community health clinics being the providers of children's immunistion (Li & Taylor b, 1993).

In developing countries, it was found that the distance between the mother's residence and health facilities affected antenatal care utilisation in Guatemala (Pebley et al., 1996), in rural Thailand (Raghupathy et al., 1996), in India (Chandrashekar et al., 1998; Griffiths & Stephenson, 2001; Nielsen et al., 2001), in rural Bangladesh (Rahman, 2000) and in rural Southern Laos (Phoxay et al., 2001). In rural Ethiopia, the use of prenatal care services was associated with living in villages located within ten kilometers of the well-equipped health centre (Materia et al., 1993). In the Philippines women who were able to walk to health centres in urban areas tended to decrease their number of visits to traditional practitioners (Wong et al., 1987). In Malaysia, the clinic chosen for care was the closest to the pregnant women (Chan-Ying & Yusof, 1993), and an increase in distance or time to health facilities was associated with lower use of antenatal care in Jordan (Abbas & Walker, 1986) and in Kenya (Magadi et al., 2000). A decrease in distance was related to an increase in the number of antenatal visits in Southern India (Nielsen et al., 2001). Increase in travel time was also found to reduce the likelihood of a public or private facility being the most visited by rural mothers in the Philippines (Wong et al., 1987). In Papua, New Guinea, the reasons for not attending antenatal care was that

the health centres were too far away (Karel & Rasmussen, 1994), and inaccessibility of maternity services was also a reason for not attending maternity services in Northern Transval (Uyirworth et al., 1996). But distance was reported to be an insignificant factor in determining prenatal service use in the presence of public transport in rural Vietnam (Swenson et al., 1993). Women who could not afford to travel were unable to use services that were available locally in Mahrashta, India (Griffiths & Stephenson, 2001), and transportation costs seemed to have a deterrent effect of service use in Jordan (Abbas & Walker, 1986) and in rural Laos (Phoxay et al., 2001).

Time costs were also significant, as losing time from work was found to be a deterrent of prenatal care use in Bangladesh since the opening hours of maternal services coincided with the women's working hours (Islam & Nielsen, 1993). In urban Philippines an increase in the price of a health care facility reduced the probability of that facility being the most frequently visited (Wong et al., 1987). Women in Maharashta, India, reported using lower quality health services, including traditional practitioners, since private services were too costly (Griffiths & Stephenson, 2001). Not only the cost of a health care facility had led to a deterioration in its use but also the cost of transportation was reported to decrease the likelihood of utilising prenatal care services such as what was reported in rural Bangladesh (Rahman, 2000).

Regarding children's immunisation, the distance at which the infant lived from the clinic was the only significant factor affecting immunisation uptake among a group of sociodemographic factors in United Arab Emirates (Barr & Mcllvenny, 1999). One of the important reasons for not having children immunised in Morobe Province in Papua New Guinea was that the location of the clinic was too far for villagers (Karel & Rasmussen, 1994). Travel time to health facilities was found to affect immunisation uptake in rural areas in the Philippines (Becker et al., 1993).

In India low immunisation coverage was related to its costs (Brugha & Kevany, 1995). This finding was supported by Zhang et al. (1999) in China where low immunisation coverage was associated with fees for immunisation. When the immunisation fees are

considered affordable by mothers, the children start having their immunisation series in urban Guinea (Cutts et al., 1990). Distance, in addition to cost and short waiting times, was related to the completion of the vaccination series (Cutts et al., 1990).

3.3.2.5. Area of residence

General health services utilisation:

The region someone lives in and the urban-rural character are considered an important determinant of use of health services. In the United Kingdom, living in urban areas was related to more use of general practitioners' services (RCGP, OPCS and DH, 1995). In Canada, it was found that living in an urban area was related to more GP services utilisation, compared to living in rural areas (Dunlop et al., 2000) and regional differentials in health services utilisation were reported earlier by Birch et al. (1993).

For developing countries, the distribution of and access of health services varies according to area of residence, with evident urban and rural differences, which affects health service utilisation. Inter-country variablility in rural parts of China was found to be important, with the probability of seeking assistance in Shibing being half of Donglan, while in Xuynyiil is four times larger (Jianghui et al., 1997). In Morocco, health care utilisation rates were higher for urban individuals than for rural individuals, and these differences were greater among individuals twenty four years of age and younger than among older individuals (Hotchkiss & Gordillo, 1999). The better use of services by urban populations was also reported for Mexico (Leyva-Flores et al., 2001). In Nepal residents of rural areas chose public facilities which offered traditional or modern treatments, while private modern care was the preferred choice for urban residents (Hotchkiss et al., 1998). In Sri Lanka the use of private doctors was less than hospital use among rural people due to private doctors' costs (Pieris, 1999). People living in poor areas were found to have made less use of medical services in Dar es Salaam, Tanzania (Wyss et al., 1996), and in Mexico (Leyva-Flores et al., 2001).

Children's health services utilisation:

Living in urban areas explained use versus non use of health services for children in Ontario, Canada (Woodward et al., 1988). In the United States, children living in the Southern States were less likely to be high users of the health services, compared to children residing in other States, and children who lived in suburban settings experienced a higher likelihood of high use of services, compared to children living in inner city and rural areas (Newacheck, 1992). Families who lived in higher income areas were more likely to receive medical care in New York (Wolfe, 1980). In Catalonia, Spain, children living in Barcelona were more likely to be heavy users of the health services (Rajmil et al., 1998).

Regarding developing countries, it was found that children in urban areas were found to be more likely to use health services than children living in rural areas in five African countries (Fosu, 1994). This finding was also supported by Delerque et al. (1992) in Honduras for diarrhoea patients. In Myanmar, children in urban areas were more likely to be treated in private care while children in rural areas were treated more often in public facilities for acute respiratory tract infections (Aung et al., 1994). In Jordan living in the capital city was found to be associated with better utilisation of pediatric care, compared to other parts of the country (Obermeyer et al., 1993). Living in higher altitudes was found to be associated with less use of health care services for children with diarrhoea in Rwanda (Csete, 1993). This may be due to the relative difficulty of their journey to health care centres.

Preventive health services utilisation:

Inner city status, which was reported to be related to poverty, was found to be related to receiving no prenatal care in a study carried out in the United States (Melnikow et al., 1991). In the United Kingdom, inner city status, which is considered to be a disadvantaged area, was negatively associated with infants' immunisation status (Li & Taylor b, 1993), and in Glasgow children living in socially deprived areas were less likely to achieve a high target for childhood immunisation (Lynch, 1995).

Women living in the Western and Southern parts of the country used more modern prenatal care in Turkey (Celik, 2000; Celik & Hotchkiss, 2000), while in Vietnam living in the Northern province was associated with the probability of obtaining prenatal care, compared to women living in mountains and high lands (Swenson et al., 1993).Women living in rural areas were found to be less likely to use antenatal care from health care facilities in Jordan (Obermeyer & Potter, 1991), in Peru (Elo, 1992), in Guatemala (Pebley et al., 1996), in the Philippines (Becker et al., 1993), in Vietnam (Swenson et al., 1993) and in Turkey (Celik, 2000). This is due to differences related to differences in accessibility of services (Elo, 1992; Swenson et al., 1993) and that more educated women are more likely to reside in urban areas (Swenson et al., 1993).

Urban children were also better immunised than rural children in Guatemala (Pebley et al., 1996). But an opposite finding with regard to immunisation was reported in Metro Cebu, Philippines (Becker et al., 1993) and in Iran (Nasseri et al., 1990). Better immunisation coverage in rural areas was explained by the delivery of immunisation services by mobile teams and, at times, on a door to door basis or through local health centres that seek and monitor the participation of mothers in activities related to children's health (Nasseri et al., 1990). Living in mountainous areas which had poor economic conditions was associated with low immunisation rates in China (Zhang et al., 1999). Thus it is evident that immunisation rates vary according to area of residence.

3.3.3. Health care need

General health services utilisation:

A person's use of medical services is partly dependent on his recognition of a need for such services and his response to this need (Wiggers et al., 1995). Need can be represented in many ways such as disability days or role limitations, symptoms and diagnosis of medical conditions, their characteristics and sickness days. It is the most important determinant of health services utilisation.

Abnormal physical functioning or limitations in normal daily activities were found to be associated with the use of health services in the Netherlands (Alberts et al., 1997), in

Denmark (Krasnik et al., 1997), and in the United Kingdom (Blaxter, 1985; Evandrou et al., 1992; Smaje & Le Grand, 1997). Being sick and confined to bed led to more health service use than being sick without restrictions in Italy (Mapelli, 1993), and the number of disability days was associated with ambulatory care utilisation in Norway (Andersen & Laade, 1983) and in the United States (Pope, 1988). Over half of the women with disabilities were high consulters in the Blaxter's study (1985) in the United Kingdom. People with long term disabilities were found to be over represented in health service utilisers in Finland (Karlsson et al., 1994; Jyväsjärvi et al., 1998).

Short term health complaints were associated with general practitioners' visits and specialists' visits in the Netherlands (Alberts et al., 1997). Presence of symptoms was related to the number of visits to physicians in Quebec, Canada (Préville et al., 1998). The mean level of symptoms reported by a family affected family health service utilisation in Boston, USA (Gortmaker et al., 1982). The number of self reported symptoms was strongly associated with having made at least one general practitioner's visit and a strong predictor of making six or more general practitioners' visit in Canada (Mc Isaac et al., 1997). Not only the presence of symptoms affected service use, severity of the illness was also found to be the most sensitive to use of services in Italy (Mapelli, 1993), and it was important in making a decision to visit a doctor in the Netherlands (Van De Kar et al., 1992). Perceived seriousness of symptoms and the likelihood of symptom recurrence was found to be a significant predictor of health service utilisation in Los Angeles (Berkanovic et al., 1981). The importance of perceived severity and seriousness of health problems was also recognised in the health belief model as being important in the decision of seeking care. Pain in particular was identified as the main reason for attending health care centres in Finland (Mäntyselkä et al., 2001). It was found that stigmatising and embarrassing physical symptoms lead to health interventions, including seeking health care in a sample in the United Kingdom (Rogers et al., 1998).

In Canada the number of health problems was consistently associated with increasing physician utilisation for both primary and specialist care (Dunlop et al., 2000). This was also reported for Quebec, Canada, by Préville et al. (1998). Chronic disease was found to

be significantly related to the use of health services in Denmark (Krasnik et al., 1997) and in the United Kingdom, according to Evandrou et al. (1992) and to the data from the fourth national morbidity survey of general practice (Carr-hill et al., 1998). The number of medical diagnoses accounted for a large proportion of the variance of medical service utilisation in a sample of general out-patient departments in the United States (Barsky et al., 1986). Frequent attendance was found to be associated with more physical disease in Finland (Karlsson et al., 1994; Jyväsjärvi et al., 1998) and in the United Kingdom (Neal et al., 2000). Chronic illness and mental disorders were associated with frequent attendance in Spain (Baez et al., 1998; Bellon et al., 1999). Psychiatric morbidity was also found to be a significant determinant of frequent attendance in Finland (Karlsson et al., 1994; Karlsson et al., 1997; Jyväsjärvi et al., 1998) and in Southern California (Holman et al., 2000).

In developing countries, need was found to be a significant predictor of health care use, although the main focus was on the characteristics of illness episodes. In an urban area in Ghana, the amount of abnormal health conditions was the most significant variable associated with the use of clinic services (Fosu, 1989). In rural Kenya visit patterns were shown to vary greatly according to type of illness and stage of illness (Mwabu, 1986). In Southern Iraq the proportion of persons in the household with acute sickness versus chronic sickness was associated with the use of local health centres (Habib & Vaugnan, 1986). In rural China being confined to bed for longer periods increased the likelihood of seeking formal treatment (Jianghui et al., 1997), and villagers were more likely to use village and private health care unless illness is severe in which case medical care was sought at hospitals (Hao et al., 1997). Longer illness duration was also found to be associated with the increase in the utilisation of health services in Vietnam (Segall et al., 2000) and in Nepal (Subedi, 1989). Increased severity of illness was associated with seeking health care treatment in rural west Java, Indonesia (Berman et al., 1987). When an illness results in a disability of normal activities the percentage of consultation increased in rural Bolivia (Frerichs et al., 1980).Type of illness reported seemed to affect health care service use. In Dakar, Senegal, gynaecological symptoms for women led to more consultations than other diseases due to the perception of the importance of

reproduction (Fassin et al., 1988). In rural Vietnam, there was a preference towards the use of over the counter drugs and commune public services for respiratory illness and private care for non-specific aches, pains and skin disorders (Tipping et al., 1994).

Children health services utilisation:

High utilisers had higher associated disability and more days lost from school (Diaz et al., 1986). In Sweden, utilisation of primary care increased with disability (Westbom & Kornfält, 1991). It was reported in Scotland that the presence of significant symptoms in children was the strongest predictor of frequency of new consultations (Campion & Gabriel, 1985), and in the Netherlands, Bruijnzeels et al. (1998) found that consultations differed greatly according to symptoms, as general practitioners were more often consulted for ear, then for skin problems, with the least likelihood of consultation for headache and tiredness.

In the United States, children who were constantly high users were much more likely to experience a wide range of types of health problems (Starfield et al., 1985; Diaz et al., 1986; Newacheck, 1992; Riley et al., 1993) which were also more severe problems (Diaz et al., 1986). In Perth, Australia, the child's health condition, represented by the general practitioner's diagnosis of health problems, was found to be related to service utilisation (Ward & Pratt, 1996). In the United States, children with limitations in activity and children with behavioural problems showed higher rates of health service utilisation (Newacheck, 1992). In Sweden, it was found that chronically ill children made more than double ambulatory care visits than normal children (Westbom & Kornfält, 1991). In Perth, Australia, children with no chronic illness were the least likely to attend general practitioners' clinics (Ward & Pratt, 1996), and in Ontario, Canada presence of chronic conditions explained, in part, use versus non use of ambulatory health services (Woodward et al., 1988). Children who had mental health problems were among the high utilisers of ambulatory services (Woodward et al., 1988). In Catalonia, Spain, children who were reported to have had a chronic disease, experienced an accident or any restrictions in activity were more likely to be high utilisers of health services (Rajmil et al., 1998).

In developing countries, illness episodes for children and their characteristics were the main form of measurement of health care need. In Fosu's study of six African countries (1994) he reported that children in households reporting fewer illness episodes were less likely to be taken for a medical visit in the six countries. Severity of illness was an important factor in the decision to seek curative care in a Nigerian clinic (Akesode, 1982), in rural Bangladesh (Levin et al., 2001), and for diarrhoea in Lesotho, West Java, Central Java, Zaire, Nigeria, and the Philippines, where symptoms were the most predictive of the decision to treat at all and to take a child to a health facility (Yoder & Hornik, 1996). In Tlaxcala, Mexico, the severity of diarrhoea and its progression was a primary reason for seeking health care (Pérez-Cuevas et al., 1996). In Sri Lanka, the perceived severity of an acute respiratory infection was associated with the utilisation of health services for children (Amarasiri de Silva et al., 2001). Duration of illness was also considered when taking health care actions, as an increase in acute illness days led to health care consultation in North India (Berman et al., 1997), in a highland region in Rwanda (Csete, 1993), for cough in Marrakech (Maynard-Tucker, 1998), and for diarrhoea in Honduras (DeClerque et al., 1992). Type of illness or symptoms were also found to be significant in the decision to seek care, such as suffering from fever in an urban slum in India, which was related to seeking care from health services to avert possible brain damage (De Zoysa et al., 1998), and the suffering from measles in Senegal was related to service use due to the perception of its severity (Fassin et al., 1988).

Preventive health services utilisation:

Although the state of pregnancy is considered to be an indicator of need of prenatal visits, complications and increased risk pregnancies constitute a group of variables that increases the need for more prenatal care visits. In a Swedish county previous obstetric complications increased compliance with the visit schedules, and complications during pregnancy were important for the number of extra visits planned by staff and led to self-referral to health care (Berglund & Lindmark, 1998). In Wales, high risk pregnancies were booked for and made more antenatal visits (Petrou et al., 2001). Clarke et al. (1999) found in Florida that there was an association between having medical problems and

having received adequate plus care, and as the number of medical problems increased for the whites the number of visits increased. This probably reflected the clinical intention to schedule more visits for these women. Women with gynaecological problems were significantly less likely to obtain no care or inadequate care, relative to adequate care, and having previous abortions reduced the chances of not having care for both white and black women.

3.4. A GENERAL CRITIQUE OF THE STUDIES PRESENTED ON HEALTH SERVICES UTILISATION

Regarding the studies reviewed above it can be concluded that a multiplicity of factors act upon the process of decision making regarding health services use. But it is noteworthy that there are some common weaknesses in some of these studies.

The qualitative study approach, using semi-structured interviews or focus groups, emphasises the actual processes involved in decision making, contains detailed information and exemplifies the subjective nature of the respondent's perceptions and contains considerable information on symptoms, perceived causes of illness as well as the use of non bio-medical treatments. It also emphasises health related actions, including the use of non bio-medical treatments and informal providers such as the home remedies, pharmacists and traditional practitioners. But it has limited utility due to the of inclusion of only a small number of respondents who are non-randomly selected, making it unfeasible to apply multivariate analysis to test empirically for the effects of these factors, in addition to their geographical limitation. In order to interpret the results, the researcher should be cautious in terms of understanding the proposed relationships since they can not be tested by multivariate models and they lack standardisation in the wording of questions and responses. Examples of these studies included in the literature review would be the studies conducted by Punamäki & Kokko (1995), Cornford (1998), Rogers et al. (1998), Young (1999), Neal et al. (2000) and Phoxay et al. (2001).

On the other hand, quantitative studies involving cross-sectional analysis, which represents most of the studies included in the literature review, and using multivariate

techniques on a relatively large sample provides better control on the variables under study, which makes the predictive values of such studies useful for policy making, planning and budgeting. But they fail to address the complex effects of psychosocial influence on help-seeking behaviour. Standardised questionnaires included in the studies typically do not allow for an adequate presentation of the complexity of illness in terms of timing and nature of symptoms and perceptions about the causes and seriousness of illness and the complexity of treatment behaviour in which families typically seek advice and treatment from multiple resources. The reporting of diseases in standardised questionnaires can be biased for disadvantaged groups, since they are acquainted with disease and consider it as a part of life, and not as illness. There is also a problem of the tendency of underreporting the use of traditional healers, since the interviewers are considered to be highly educated and come from official agencies. When it comes to attitudinal variables the measures obtained can be biased, since factors such as mood and current situation or experience may affect the response, which would not be the same if it were measured at the time of service use.

In some studies where the respondents are asked to state which of the reasons mentioned for using or not using a service, the researchers report this as a fact, without paying attention to the possibility that the respondent may choose the answer which he or she considers to be probably applicable, and not reflecting the individual's situation, such as in the studies carried out by Aved et al. (1993), Harvey & Faber (1993), York et al. (1993), Coreil et al. (1994) and Leyva-Flores et al. (2001).

Another problem in some of the studies mentioned in the literature review is applying bivariate associations without multivariate analysis, which can result in the wrong specification of significant variables, since it does not control for the associations between the independent variables themselves, such as the studies conducted by Abu-Zeid & Dann (1985), Mwabu (1986), Berman et al. (1987), Kachirayan et al. (1987), Gish et al. (1988), Bailey & Phillips (1990), Piperno et al. (1990), Poland et al. (1990), Csete (1993), Materia et al. (1993), Cameron et al. (1995), Mbugua et al. (1995), Edwards & Pill (1996), Wyss et al. (1996), Van der Stuyft et al. (1997), Hotchkiss &

Gordillo (1999), McIlvenny & Barr (1999), Pieres (1999), Bhatia & Cleland (2001) and Leyva-Flores et al. (2001).

For prospective studies, when information is gathered at a base line, these variables may change over time. Besides, in prospective studies, such as the ones carried by Wong et al. (1987), Horwitz et al. (1993), Ward and Pratt (1996), Krasnik et al. (1997), Bhatia & Cleland (2001), individuals behave in a way that they think is consistent with what they have said. Another problem related to prospective studies is the one associated with health diaries, including the studies carried out by Gortmaker et al. (1982), Alexander and Markowitz (1986), Cornford et al. (1993), Bruijnzeels et al. (1998) and Gisbers van Wijk (1999). Although this method provides an excellent instrument for having detailed information it may sensitise individuals and make them more aware of health conditions and fluctuations, and thus affects their behaviour. In addition, data aggregation bias may occur when the information is compiled from diaries; thus losing some important information regarding the process of illness behaviour, such as what was reported by Gortmaker et al. (1982) for their compiled health diary data. Besides, diary data could not establish a causal ordering, and they faced measuring problems when assessing the fluctuations in psycho-social variables. But these problems are also shared by other data collection methods and data analysis techniques in relation to the utilisation of services.

As for retrospective studies, recall bias may cause a major problem, especially if the data is collected for a long period of time as in the Blaxter's study (1985). When she compared actual utilisation rates with the respondent's reports, she found out that there were some differences due to preferred presentation, with young women over estimating their consultations. This was also reported in the Andersen and Laake study (1983) when measuring need by the number of disability days for a one year period, they brought to attention that this measure of need was actually related to the individual's illness behaviour. An example of studies which may have had the problem of recall bias due to a prolonged period of six months or more would be the studies carried out by Fassin et al. (1988), Coppo et al. (1991), Fylkesnes (1993), Van der Stuyft et al. (1997), Vissandjée et al. (1997). Also, in retrospective studies response bias may be a problem since

individuals justify past behaviour by adopting concurrent points of view. An example of such response bias would be the study carried out by Berkanovic et al. (1981) in which persons who consulted doctors when they had health problems may have reported their illnesses to be serious and that the doctor did something about it. It should be noted that retrospective cross sectional surveys were the predominant method in studying health service utilisation, due to their feasibility, affordability and that the results obtained were found to give a good interpretation of service utilisation.

For studies including only small samples – which were selected from one or few health care facilities- generalisability of the research findings is considered to be a major problem, since these samples were not representative of the general population. Examples of these studies include the ones carried out by Akesode (1982), Blaxter (1985), Alexander and Markowitz (1986), Poland et al. (1987), Clair et al. (1989), Subeidi (1989),Van de Kar et al. (1992), Butz et al. (1993), Islam & Nielsen (1993), Mapelli (1993), York et al. (1993), Cameron et al. (1995), Punamäki & Kokko (1995), Edwards and Pill (1996), Uyirworth et al. (1996), Jyväsjärvie et al. (1997), Karlsson et al. (1997), Baez et al. (1998), Cornford et al. (1998), Bellon et al. (1999), Gijsbers van Wijk, (1999), Neal et al. (2000) and Mäntyselkä et al. (2001).

Regarding prenatal care, the initiation of prenatal care is rarely tested for its association with possible affecting variables in developing countries, and in some instances there was no information presented on the number of visits made during pregnancy nor the source of care, such as the one conducted by Swenson et al. (1993). For diarrhoea and respiratory tract infections, most of the studies were descriptive and lacked multivariate analysis.

3.5. AMBULATORY HEALTH SERVICES UTILISATION IN SAUDI ARABIA

Since the major developments in the Saudi health care system took place during the last three decades, the major concern was the formulation and application of development projects and plans and the building of a new modern health care system. Therefore, the main concern regarding utilisation was to increase the accessibility and acceptability of the newly introduced services, and this was observed by the recording of the number of

visits to health services by the Ministry of Health. But as the utilisation of services grew steadily, the issue of resource constraints and cost containment were brought into consideration in the late 1980's (MOP, 1991). Since then, the importance of utilisation studies was brought up and studies regarding ambulatory care utilisation were carried out, from which I will summarise the ones related to the use of services during acute illness, prenatal care use and childhood immunisation.

In an early study carried out by Sannia (1983) in Makkah city, he studied the characteristics of the male utilisers of the public health services, providing only descriptive statistics. 425 individuals were interviewed. He found that, from the predisposing factors, being in the age group 30-39 years old showed the highest percentage of utilisation, followed by respondents in the age group 20-29 years, with the least utilistion reported for respondents 60 years and older. Regarding education, the illiterates showed the highest rates of utilisation while university degree holders showed the lowest percentages of utilisation, and most utilisers were found to be government employees and labour workers.

Regarding the enabling factors, persons with low incomes constituted the majority of the utilisers of the public services in Makkah city. Individuals living in traditional houses, compared to individuals living in modern houses, showed higher utilisation rates. Persons who did not own their homes displayed a slightly higher percentage of utilisation, compared to individuals who owned their homes. He also found that a private car is the most used transportation facility to get to the public health care facilities.

Regarding the evaluation of the services, most of the respondents were satisfied with the services in general. This included the quality of the services, its organisation, attitude of staff and cleanliness. They complained of overcrowding and the unavailability of car parking space. This study is an early attempt to study the utilsation of health services, but it only included the male utilisers of the public health services thus the sample is not representative of Makkah city and only percentages were provided thus the relationship

between utilisation and the mentioned characteristics of respondents can not be established.

In a study carried out by Abu-Zeid (1989) on the use of health services in two urban communities in the Southern Abha region, heads of households of a sample of one hundred and forty six families, including nine hundred and forty two individuals, were interviewed by telephone. Cross tabulations were used for the analysis of a ten months retrospective period. It was found that overall, 67.7% of all the health conditions received care in the primary health care centres. The second commonest source of care was the hospital's out-patient department in which 16.5% of illnesses were treated, out of which only 8.4% of health problems required hospitalisation. The largest proportion of reported health problems were respiratory and gastro-intestinal diseases. Other infections and dental problems received treatment in primary health care centres, in addition to childhood immunisation, while a relatively large proportion of chronic conditions were treated in out-patient departments of hospitals. As for prenatal care, 88.2% of women had received prenatal care. Out of the fifty one reported pregnancies, thirty two women received their care from primary health care centres, seven from hospitals, four from both a primary health care centre and a hospital, and only two received prenatal care from a private source.

As patient's satisfaction was included in the study, it was reported that 57% of the heads of households were completely satisfied with the services, 37% were moderately satisfied with the services and 6% were not satisfied. Although this study is an important study in the sense that it explores ambulatory health service utilisation for the first time in the Southern region using a random sampling technique, the covered area is very small; so the results may not only apply to areas other than urban areas in Abha region. The data is purely descriptive and does not explore any types of relationships between health service use and possible related variables. In addition, response bias may have been introduced, since a telephone survey technique was used without mentioning the percentage of the population who has telephones and the possible response biases that may occur, as people are not familiar with this research technique. Besides, a ten month retrospective period is

too long for the recollection of morbidity data, especially when it includes acute illness episodes for the whole family members which, for an example, may have been too mild to remember.

In a PhD thesis on health service utilisation in Makkah city in the Westren Province, Elzahrany (1989) explored the effect of various sociodemographic, attitudinal and need variables on the utilisation of health care services. He applied a household survey technique, including the interviews of three hundred and eighty nine heads of households in different areas in Makkah. He applied univariate, bivariate and multivariate multiple linear regression analysis. The dependent variable he used was the number of times household members utilised different sources of health services during a retrospective twelve months period.

From the predisposing factors included, he found that the married status of the household in the Northern sector explained in part the variation in the utilisation of government services in general, and government hospitals and primary health care units in particular. Some of this effect was probably due to the demand for maternity care for the wives of the married and the availability of primary health care centres in this area of Makkah, which is more likely to increase the utilisation of female household members as they do not need a male escort to take them to the clinic. Holding a government job, in comparison to being unemployed or having a temporary job, had a small effect and a positive one on the use of private health services. Families of the Central sector that were headed by a worker or households of the Southern sector, which were headed by businessmen, as compared to those headed by an unemployed man or someone with a temporary job, utilised more primary health care centre services . Having a post-college degree held by the head of the household in the Central sector explained in part the variation in primary health care utilisation.

The perceived quality of the services was also found to be significant. It was reported that the evaluation of primary health care centres or private services as excellent or good, in comparison with bad or do not know, was related to the use of primary health care

centres and private services, respectively. In the Eastern and Western sector, families which were headed by those who believed in regular medical check ups tended to utilise primary health care centres less often, maybe reflecting a higher level of socioeconomic status, which is related to the use of other sources of health care. The perception of an excellent or good family health status was found to be related to lower rates of primary health care in some sectors.

Regarding enabling factors, it was found that all the variation in the utilisation of private clinics by the households in the Central sector was due to car ownership, indicating that only the more affluent families in this sector utilised private health care services. In the Southern sector, the number of cars owned by a household was related to the overall utilisation of services, the utilisation of government hospitals and the use of primary health care centres, also indicating that affluent families utilise more health services. The utilisation of health services –especially primary health care centres- by the Northern sector was negatively related to the number of rooms in the housing unit. This was explained by the probability of having a better health status for families that live in large housing units. Living in a villa or an apartment, compared to living in a traditional house or other types of housing, explained a little of the variation in the utilisation of private services.

Regarding need factors, he found that most of the explained variations in the utilisation of several health services in Makkah were attributed to need factors. The number of household members who had physical impairments, handicaps or chronic illness was one of the major determinants of overall utilisation of services and the utilisation of government services, especially hospitals. It was also a major determinant of utilising both traditional healer services by the population of the City and primary health care centres by the households of the Northern sector. The number of days spent in bed at home by household members due to illness or injury during the last twelve months was also a strong determinant of health service use. For example, the number of people who stayed home for a day or more due to illness or injury explained about 11% of private services utilisation by the City households. But need variables explained only a small

proportion of the variation in primary health care centre utilisation. This may be due to the fact that at the time of the study primary health care clinics were not equipped to deal with chronic illness, pregnancy or illnesses that required hospitalisation. Although this study applies a household survey technique and included a wide range of factors and multivariate analysis, the one year time frame for recollection of events by head of household participants for the whole family members is likely to be compromised by its length. Applying a linear regression modeling technique, treating health care visits as a continuous variable, results in inefficient, inconsistent and biased estimates (Long, 1997), and partitioning a relatively small number of observations into five subsections according to area of residence raises questions about reliability of the results of the models obtained.

In a PhD thesis written by Al-Ribdi (1990) he explored the use of primary health care and the effects of socioeconomic and demographic variables on their use. The area of study was Al-Qaseem region in Central Saudi Arabia. He included one thousand and eighty five males above the age of fifteen, who were interviewed. The sample was picked depending on the presence of the participants in the chosen twenty three Ministry of Health primary health care clinics, three small private clinics and an out-patient department at a central urban hospital. Thus the sample was not randomly selected, and included users of health services only; thus it was not representative of the area of Al-Qaseem. No basis for the choice of number of types of ambulatory health care services was established, and females were not included. For data analysis, frequency distributions, cross tabulations and chi-square tests were applied for a one year recall period. No multivariate analysis was included, which raises questions regarding the relationships reported in the thesis, since a chi-square test does not control for the effect of other variables, and spurious effects may be reported, not exploring the real effects. In addition, the prolonged recall period may have lead to recall bias.

The author found that in the previous year 48% of the participants recalled medium use of health services (i.e. 3-12 visits), 35.8% reported high use (i.e. 13 or more visits) and only 16.1% were low users (i.e. 1-2 visits). Although it should be noted that the grounds

on which the number of visits grouped was not mentioned and the medium range of use is questionable, since it includes a wide range. Regarding predisposing factors, he found that increased age led to an increase in utilisation, except for males aged between fifteen and nineteen years, due to increased levels of accidents and because they drive other family members to the health centres; thus they are encouraged to see doctors for minor problems. He found that Saudi frequent users were four times more than non-Saudi nationals. It was also reported that frequent users tended to be farmers, herders, retired or unemployed, while government workers and students were over represented in the middle use group. Private employees were often infrequent users, as companies usually have their own health care schemes. Family size seemed also to have an effect on primary health care utilisation. Increased family size was associated with an increase in utilisation. Increased utilisation was also related to a decrease in education level, since the highly educated had higher incomes and used other sources of care.

Regarding the enabling factors, it was found that people residing in rural areas used services more than those in urban areas, and that nomads constituted a higher proportion of the high utilisers of primary health care centres. This was explained mainly by the fact that people living in remote areas had no other sources of care, and that the rural and the nomadic populations formed two distinct groups with regard to service use, one which used primary health care centres extensively and another which consulted local healers and did not use modern health care. A direct relationship between income and primary health care centres use could not be established. There was an inverse relationship between distance and primary health care use. But this was not of great magnitude since most respondents used their cars to reach the primary health care centres. For reasons regarding the use of primary health care clinics, 72% reported easy access, 18% reported the quality of services and 5% were referred from other clinics or a hospital, and the rest for other reasons.

In (1992), Al-Shammari conducted a study on help seeking behaviour of adults in the Riyadh area. A random sample of five hundred and sixty six respondents suffering from illness episodes during a four week retrospective period was included. Frequency

distributions and chi-square analysis were presented. It was found that the most common disease condition was respiratory tract infections. Regarding the help-seeking response, 77% of the cases consulted medically trained practitioners who were mainly primary health care physicians. 21.4% of them had specialist treatments, of which 79% were done by self referral. 87.3% of the cases had family health records. It was reported that 78.9% of the individuals having medical records sought medical care, compared to 63.9% of individuals who did not have medical files.

He found that married individuals and persons with higher education were more likely to consult medically trained professionals. In general, the self-care actions reported were the consultation of trained medical professionals by 77%, local healers by 17%, pharmacists by 4% and lay care by 2%. Though this study applied a random sampling technique, collecting data via household interviews, it covered only the city of Riyadh, and the respondents were chosen dependent on their availability and willingness to respond during the data collection process, which decreased the chances of female respondents to be included in the study. In addition, response bias is evident since the education levels of the respondents in this study were more biased toward higher education, with more than 90% of the sample having at least high school education, which is not representative of the educational level in Riyadh. This may have resulted from a mistake in the sample selection procedure, with the randomly choosing process of two to three clusters from each of the five assumed divisions of the city. The data analysis technique excluded multivariate analysis, even when this was a rare opportunity to collect data on a household basis, including non users of modern health services.

In another study of the utilisation behaviour of Riyadh residents, Saeed et al. (1992) investigated the factors related to primary health care use. They interviewed five hundred and sixty patients, selected by a systematic procedure on alternative days of the week for a three months period for one chosen primary health care centre. They also included a 20% random sample of families with medical records who did not use the primary care centre for the previous year.

Using cross-tabulations and chi-square analysis, it was found, regarding predisposing factors, that non-Saudi visitors used the centre more than Saudis, and patients with higher levels of education used the primary health care centre more than illiterates. Age, sex, and occupation were not found to be significant.

Regarding enabling characteristics, it was reported that 72% of the patients traveled five kilometers or less to get to the health centre, and only 2% traveled more than twenty kilometers. Most of the patients, constituting 85% of service users, went by private cars, 7% used public transport and 8% walked to the health centre, although this high percentage of car owners who used the services may be due to the high percentage of car ownership in Saudi Arabia.

Reasons mentioned for attending the health centre included shorter waiting times, as mentioned by 34% of the respondents, followed by perceived quality of the services by 31%, familiarity with the centre by 12%, proximity by 5% and 18% admitted choosing this centre for various other reasons. It was also reported that 90% of the patients were satisfied with the services, compared to 10% who were dissatisfied. Referring to the medical files, 30% of the registered families did not use the primary health care centre services, but when they were interviewed 50% admitted that they had visited the clinic without identifying themselves to the administrating nurse. The same problem of sampling strategy applied to other studies was also evident here; i.e., including only users of one primary health care centre and families registered at the same centre. Thus the generalisability of this study's results is limited, in addition to its lack of use of multivariate analysis in which definite relationships can be established.

A study carried out by Al-Khalifa et al. (1993) investigated the factors that are associated with the utilisation of private health care services in Saudi Arabia. The sample was collected from the utilisers of the private and the public services from 18 cities in Saudi Arabia, and a household survey was conducted in Riyadh city interviewing heads of households, in addition to the interviewing of some of the managers of private and public health care facilities. The total respondents interviewed in health care facilities were 6163

respondents, the total heads of household interviewed in Riyadh city were 1453, and the total managers interviewed were 239 managers.

Applying multivariate regression analysis, the researchers found that, from the predisposing factors, families with a high proportion of males, a high proportion of older individuals, a higher proportion of single individuals and a larger family size were associated with the utilisation of private health care services. Higher educational levels and a higher occupational level were found to be associated with the utilisation of private health care facilities, with farmers and workers in the public service sectors being related to the less utilisation of private services. This finding was explained by the higher level of incomes for individuals with higher educational levels and higher occupational level and the absence of private health insurance schemes for workers in the public services' sector. Foreign residents from Arabic and Asian countries were related to the lower utilisation of private services, while being a resident from a European country was associated with the utilisation of private services. This was also related to income levels and the presence of private health insurance. It was also found that when the respondents believed that the public hospitals were crowded and that their organisational structure had some problems they tended to utilise the private services. When the respondents believed that the private facilities were crowded and that utilising the private services was only a trend they tended to utilise the public services.

From the enabling factors, being a resident in the Southern region was associated with the less likelihood of the utilisation of private services, while being a resident in the Eastern, Western and Central regions was found to be associated with the utilisation of private services. Providing free services in the public sector was related to the decrease in the utilisation of private services, as mentioned by respondents. Having a usual known doctor who provided health services in the private sector was found to be associated with the utilisation of the private sector services. A private health care facility being close to home was found to be associated with its utilisation.

Regarding the views of the managers of the health care facilities, it was found that providing fast services without the need for long waiting times, providing effective health care services and suitable working hours were important in attracting patients to utilise health services. Although his study had a sample selected from different cities in the country, the sample was not representative of the population, since it only included utilisers in cities, excluding non-utilisers and rural residents; thus the results can not be generalised to the total population.

In the National Saudi Maternal and Child Health Survey (1991), information on prenatal care, childhood immunisation and some related socioedemographic variables were presented. To obtain a representative sample of the Saudi population, a standard (WHO) cluster technique was employed, and household surveys were carried out. Regarding prenatal care, it was observed that women aged over forty exhibited the highest percentage of no antenatal visits (21.4%). Women's education was found to affect prenatal care use, with women who obtained basic education showing the least percentage of failure to attend pre-natal care of 9.4%. Regarding husband's education the results showed a graded deterioration to the illiterate end of educational level. Regarding regional distribution, the Central and Eastern regions had the highest antenatal attendance, with no antenatal care for only 8.7% and 8.4%, respectively, followed by the Northern, Western then the Southern areas. Rural women had a higher percentage of failure of attendance to prenatal care of 16.6%, compared to 11.5% for urban women. Reasons for not attending prenatal care were only the postponement of care and willingness to go later for about 35 %, followed by the perception of no need for care for 29.6%, a husband being busy for 17.8%, no time for 10.8%, the place was far for 2%, and only 5% for other reasons.

With relation to the timely attendance to prenatal care, those who were young –under twenty of age- were the timeliest attending group, with 88.1% being on time. Those with the least percentage of timely attendance were the forty and over age group, with 77.8% attendance. As regards to couple's education, there was a good improvement with better educational levels. Regional differentials were reported, with the Central area having the

highest percentage of 88.6% timely attendance. Urban-rural distribution was similar for urban and rural groups.

Immunisation status of children was also found to be related to some sociodemographic variables. Increased child immunisation uptake was found for younger mothers, except for mothers who were thirty five to thirty nine years old; having only basic education, compared to mothers' who were more educated, and being an infant of a student mother, followed by a non-working mother. Infants of working mothers had the lowest immunisation rates, although these infants were partially immunised, and the non-immunised infants (0.5%) were related exclusively to the non-working mothers. Father's educational level had no effect on immunisation uptake. Regional differences were observed, with the highest coverage observed in the Eastern region (93.3%), the Northern region (90.7%), Southern region (89.1%), Central (84.9%) and the Western region (78.6), with rural infants having higher immunisation coverage than urban infants.

A nation-wide vaccination coverage survey (1995), including maternal health care and immunisation coverage, was conducted in order to assess the continuously progressing maternal and child health. The standard WHO thirty cluster technique was used, and household interviews of mothers were conducted. In all the regions, except the Western, the antenatal care rate was high and varied between 93-97%. In the West, less than twenty year old mothers had antenatal care at the rate of 80%, which was the lowest in any region or age group. Illiterate mothers in all regions had the lowest coverage rates, compared to other educational levels. On a national level wives of illiterate husbands had the lowest coverage (87%), followed by husbands with primary education (93%), followed by husbands with intermediate or higher levels of schooling (96%). Antenatal care for mothers who were students was 100% in both Eastern and Central regions, and for employed women in the East. On a national level the utilisation levels were best for the employed (97%), followed by the students (95%), followed by being a housewife (93%). Parity had an effect on prenatal care use, with less children being related to the utilisation of prenatal care. 96% of mothers who had one child used prenatal services, 95% of women having two or three children utilised the services and 93% of women who

had four or more children used prenatal care.Regarding regional differentials, it was found that the average of service use did not vary greatly according to regions, with no less than 93% coverage, except for the Western region which displayed lower utilisation levels. The national average of antenatal care was almost the same in urban and rural areas. Thus, comparing to the 1991 maternal and child health survey it can be observed that prenatal care coverage had improved in terms of the percentage of service users and with regards to regional differentials, except for the Western region, which may indicate increased service coverage, or the success of the maternity health programmes provided in primary health care units.

Regarding immunisation, it was reported that the highest percentage of fully vaccinated children was in the North (94%), exceeding the immunisation rate that was the highest in the Eastern region as reported in the 1991 Maternal and Child Health Survey. In the Eastern, Central, Western and Southern regions, the immunisation coverage was 91.5, 87.7%, 82.4% and 82.2%, respectively. This shows a small but general improvement of immunisation coverage, compared to the above mentioned 1991 report, except for its deterioration in the Southern area. Females on a national average had 1.5% higher rates of immunisation than males, the difference being slightly higher in rural area (1.5%) than in urban areas (0.8%). The overall national average of immunisation was 88.1%, with the urban areas having a lower coverage (86%), compared to rural areas (92%). Thus it can be observed that immunisation favoured the rural areas, although generally in the literature they are considered to be disadvantaged in terms of service coverage, and that female infants did not suffer from any disadvantages in terms of preventive health care. Although this survey gives us an idea about the progress in terms of the accessibility of antenatal care, it does not include the start of prenatal care, and only the association between immunisation and area of residence was explored, excluding other important sociodemographic variables.

A study on the utilisation of maternity health services was conducted in the rural and semi-rural area of Al-Baha region in Southern Saudi Arabia. Al-Nasser et al. (1994) had eight hundred and eighty women attending primary health care centres interviewed.

About 91.3% of the women expressed positive views with regards to obtaining antenatal care in these centres. 92.6% of the respondents believed that antenatal care was important. The nearness of the centres to the women's homes was the major reason mentioned for their choice of prenatal care, expressed by 49.9%. Other major reasons were the availability of midwives and female doctors. On the issue of the number of visits, 74.1% of the women recommended between five and ten visits. Only 8.6% recommended less than five visits and 15.3% ten or more visits. Younger mothers tended to recommend a higher number of visits, and literates favoured more prenatal visits than illiterates. 81% of women said that they kept their appointments with prenatal care. The reason given by the majority of women who reported failing to keep their appointments was the difficulty in coming to the centre due to either the non-availability of the spouse to escort them to the clinic or the distance to the centres. Although this study explores prenatal care in a relatively remote region, it relies mainly on women's reports of their attitudes and opinions about service utilisation, which may not reflect the actual utilisation behaviour. The sample was selective, including users of primary health care centres only, and no multivariate analysis was performed.

In Riyadh city, Al-Shammari et al. (1994) had one thousand and forty four pregnant women interviewed in fifteen primary health care centres, representing different areas of Riyadh city and covering 25% of the Saudi capital. In addition, family health records were consulted to check for information given by the respondents. Applying multiple linear regression, they found that the number of visits was associated with the earlier initiation of prenatal visits and higher income. In the case regarding the initiation of prenatal care, poor obstetric history, instrumental delivery and higher levels of education were found to be significantly associated. These were explained by the perception of increased risk and related anxiety. Those with higher education had improved levels of health awareness, and women with higher incomes had no difficulty in transport nor with domestic work. This was reflected through more frequent attendance. Nationality, age, occupation and parity were not found to be significant. The reasons for non-compliance with prenatal visits schedules were mainly the difficulty in accessibility to health centres in some areas, while another major reason was the lack of awareness among some

pregnant women about the importance of antenatal care. Though this study includes multivariate analysis, the sample included users of primary health care services and excluded non users, who may include the most disadvantaged groups.

As childhood immunisation is one of the major preventive activities performed in primary health care centres, Al-Shammari et al. (1992) conducted a study to determine the underlying factors for parent's compliance with immunisation schedules. They interviewed the persons who accompanied children two years or under for reasons other than immunisation in fifteen primary health care clinics in Riyadh. One thousand and twenty two respondents were included and chi-square tests and logistic regression analyses were applied. It was found that 87.3% of the parents were compliant with the immunisation schedules. For the remaining non-compliant parents, 21.2% attributed that to inaccessibility, while the rest mentioned various other reasons. Of the sociodemographic variables, younger maternal age was associated with more compliance with immunisation schedules. Increased level of maternal education was also associated with the increased rate of up to date immunisations. Higher father's occupation status was also associated with better compliance. Birth order did not seem to have an effect. This study had an advantage of applying multivariate analysis; thus allowing the establishment of the effects of the included variables, while controlling for other possibly significant ones. But its shortcoming lies in its dependence on a selected sample of primary health care users, who were already familiar with these centres, and are thus more acquainted with the services, compared to non-users.

A PhD thesis was written by Bakhashwain (1995) including the utilisation of primary health care in Jeddah city in the Western Province. He included 354 respondents drawn from primary health centres, private clinics and large mosques, to cover possible non utilisers of services. But this is not considered to be a complete random process with the equal representation of the sample respondents, since a household survey was not carried out, and the researcher did not have previous estimates of service users in Jeddah. He applied univariate and bivariate statistical analysis, and excluded multivariate analysis.

The researcher reported that better education was related to the utilisation of health services by children, with the likelihood of taking them more to primary health centres when they were sick. Regarding family size, he found that more than 60% of family size of 2-4 would take the sick child to the health centre when sick rather than give him/her medicine, while those with 5-7 or 8-10 members were less likely to take the child to the health centre. This may be because travel to the health centre for a large family can be difficult unless there is someone to stay at home with the other children. Being Saudi or non-Saudi did not make a difference in the treatment of children. Regarding enabling factors urban-rural residence did not have a significant effect.

Many respondents (42%) mentioned that one reason for not taking a child to primary health care units was because working hours were inconsistent with their own working time. For more than 15%, the obstacle was fear of overcrowding or long waiting times at the primary health care centre, while more than 61% indicated that they had to make special arrangements such as taking time off work or having someone available to drive to the health centre. Being registered at the primary health care centre, indicating a regular source of care, was related to taking a child to a primary health care centre when sick. The author mentioned that the majority of utilisers of the primary health centre services owned cars, suggesting that people who did not have cars might be less likely to use the services. This assumption was not proven. Regarding the relationship between income and children's service use, high income families were more likely than low and middle income families to take their sick children to primary health care centres, rather than give them home medications.

Regarding children's immunisation, the predisposing factor that affected immunisation was parents' education. The higher the parents' level of education the more likely the children were vaccinated. Skepticism toward modern medicine was not found to be significant; neither was maternal utilisation of health care, since immunisation is compulsory and is reinforced by law. Regarding the enabling factors, the rate of vaccination for urban children was higher than for rural children. Those parents who

mentioned facing some difficulties in relation to service organisation had lower rates of children's vaccination.

With regards to antenatal care, many predisposing factors were explored. He found that the number of visits made by a pregnant woman increased with the level of education. Working women were more likely to have made more prenatal visits. This was explained by the increased contact with work colleagues who favoured the use of prenatal care or might have used it by themselves. Working women are more likely to be better educated and have the means for transportation. Nationality was not found to be significant. Satisfaction with primary health care services was related to more frequent prenatal visits, while being dissatisfied was associated with less and rare prenatal visits. Previous compliance with doctors' instructions was also positively related with visiting as scheduled and thus increasing the number of visits.

Although this study explored the relationship between primary care use and many variables, it has a major weakness, like the previous studies, as it only included a non representative sample of the population of Jeddah city of which specifying rural residence is not understood, and it did not include multivariate analysis, which casts doubts regarding the validity of the established associations. The basis for selecting variables for each type of use included was not established. Neither was the time frame for use, since the questions were for the use of services in general; thus opinion may have played a great part in the responses, giving the more favourable response rather than the actual one. While various factors were shown to affect various types of service use they were only included in one aspect of service use, not all, such as that urban-rural differentiation was not included for prenatal care and the organisation of services' effect, which was not included for prenatal care and was unclear in its representation with regard to immunisation. The author also did not explain what he exactly meant by organisation difficulties in relation to immunisation services.

Reviewing the Saudi studies on utilisation, it can be observed that there was not a single study that included a representative national sample covering the utilisation of general

curative services. The only studies that included representative samples were the 1991 Saudi Arabia Maternal and Child Survey and the 1995 Saudi Arabia Vaccination Coverage Survey, both of which lacked multivariate analysis, which is necessary to establish the presence of significant relationships between the variables included and utilisation. Samples included in the Saudi utilisation studies were generally localised to limited geographical areas, mainly major cities, and the samples chosen were mostly from utilisers of health services, excluding non utilisers. The studies concentrated mainly on the utilisation of public health services only, to the exclusion of private care. Multivariate analysis was rarely conducted and when it was, not all the studies chose the right model that would suit the nature of the dependent variables.

The 1996 Saudi Arabia Family Health Survey has obtained a nationally representative sample of Saudi nationals, with the inclusion of information regarding the utilisation of health services in response to general acute sickness, the utilisation of health services in response to children's diarrhoea and acute respiratory infections, prenatal care utilisation and infants' immunisation, in addition to information regarding various predisposing, enabling and need factors. It was thus chosen for the present work, to study health service utilisation for Saudi nationals in Saudi Arabia, applying multivariate analysis, with the inclusion of both curative and preventive services utilisation, the thesis being the first study of its kind conducted for Saudi Arabia.

3.6. CHAPTER'S SUMMARY

Ambulatory care utilisation has been explored throughout the world, exploring the effects of various variables. Predisposing, enabling and need factors were found to be associated with either increased or reduced use of health services, depending on the context where the studies were carried out. Thus ruling out the importance of the socioeconomic and cultural context in relation to utilisation behaviour, not missing out the importance of the characteristics of the different health care systems around the world. There were some common weaknesses in the studies in general which were described briefly.

Regarding Saudi studies, it is evident that they were only a few, mostly localised to small areas and lacking multivariate analysis, which is essential in assessing the presence of the real effect of the proposed associated factors to the dependent variable. This is why the author has chosen to study the utilisation of health services, applying multivariate analysis on a nationally representative sample.

Chapter 4
Methodology

4.1. INTRODUCTION

In the previous chapter, the international literature with regards to ambulatory health services utilisation was presented in the frame work of Andersen's sociobehavioural model. This was preceded by an overview of the Saudi Arabian health care system and population health. These chapters laid down the ground work for the thesis research questions and hypotheses. In this chapter, the methodology applied in the thesis is explained. It starts with the research questions and hypotheses to be tested with the application of Andersen's sociobehavioural model. A brief description of the sampling design, the questionnaire and data collection procedure of the 1996 Saudi Arabia Family Health Survey follows, after which the data analysis procedure is described. This is followed by the description of the independent and dependent variables included in the analysis. Finally the sample characteristics and a comparison between the sample characteristics and the population characteristics is presented.

4.2. RESEARCH QUESTION AND HYPOTHESES

Before explaining the methodology used, I will restate the research question intended to be answered in the thesis and the related hypotheses.
The research question to be answered is: "Is need the principal determinant of the utilisation of ambulatory health care for Saudi nationals in Saudi Arabia?"

Need for health care can be measured in a number of ways. One of the most commonly used methods is in terms of health status of individuals, with worst health status associated with greater need (New & Le Grand, 1996). Another common method to measure need is by "the capacity to benefit" from health services, but this faces some problems such as developing an acceptable measure of health and an acceptable measure of health gain (Cuyler, 1995).

Since the application of the capacity to benefit principle is not feasibly applicable in this research context and since self-reported morbidity is the available measure of health status while medical records' information is not available, health status as reported by heads of households and children's mothers is used as the measures of need in the thesis, especially when perceived need is the most immediate factor causing someone to utilise the health services (Poole & Carlton, 1986). Self-reported morbidity in general can lead to obtaining reliable information providing a cost-effective way to gather information regarding illness from a large sample since obtaining medical records' information for a large representative sample of the population is not a feasible option (Jones et al., 1998). But self-reported morbidity faces some problems. First, it is sensitivite to inaccuracies in recall and the particularities of an individual's knowledge and experience (Kleinman, 1980). This had led the Saudi Arabia Family Health Survey conductors to limit acute morbidity recall and its associated response to a two week period. Second, individuals may feel compelled to respond in a manner consistent with their behaviour and the interviewees' expectations (Okojie & Swinkels, 1994; Heveline & Goldman, 2000). Third, individuals tend to underreport milder illnesses for which no medical action was taken and tend to overreport more severe illnesses and illnesses that they thought needed health care services in order to deal with them (Baker et al., 2001). Fourth, individuals in low socioeconomic classes tend to underreport illnesses as these illnesses become part of everyday life and are considered to be normal, but this is applicable if individuals in low socioeconomic status were generally unhealthy, in addition being unhealthy and being acquainted to illness can be characteristic of some of the socioeconomically advantaged individuals in society (Okojie & Swinkles, 1994; Leyva-Flores et al., 2001). In Saudi Arabia, it has not been established that individuals in low socioeconomic status are generally unhealthy especially when endemic infectious diseases are not considered to be a major public health problem in Saudi Arabia. Fifth, stigmatizing diseases such as sexually transmitted diseases are generally underreported, but since the Saudi society is a conservative society extra-marital relationships are rare resulting in the low prevalence of this group of diseases. Due to the reasons mentioned, the results will need to be interpreted baring in mind that these problems may have had an effect.

In this research, need for curative care during acute sickness is defined by the presence of a medical condition -for which the original 1996 Saudi Arabia Family Health Survey utilisation data was gathered- disability due to sickness and sickness days for both adults and children for a retrospective two week period. For children under five suffering from diarrhoea and acute respiratory infections which were considered in a separate analysis as indicators for need for health care, in addition to sickness days for both diarrhoea and acute respiratory infections and having difficulties in breathing for acute respiratory infections. This information was also provided for a retrospective two week period.
For the utilisation of preventive services, being pregnant is considered to be the need indicator for having to receive some prenatal care, initiate prenatal care in the first trimester and to have the required number of prenatal care visits, in addition to having medical conditions which may lead to a need to increase the number of prenatal care visits. For infants' full immunisation, being an infant indicates the need of an infant to be immunised as scheduled.

Since both curative and preventive services are included in the analysis, two sets of hypotheses were set.

The curative services investigated are the utilisation of doctors' services in response to acute sickness for adults and children and the utilisation of health services in response to children under five diarrhoea and acute respiratory infections. The related hypotheses are:
a) Need is the major determinant of the utilisation of doctors' services for the care of acute sickness, with the predisposing and enabling factors having no or minimal effects.
b) Need is the major determinant of the utilisation of health services for the care of children under five diarrhoea and acute respiratory infections, with the predisposing and enabling factors having no or minimal effects.

The utilisation of health services in response to acute sickness was chosen for the analysis, since this is the only general curative services utilisation that was included in

the 1996 Saudi Arabia Family Health Survey, the only source available containing information regarding country wide utilisation. In addition, this type of utilisation is reflective of the demand on curative services in Saudi Arabia at primary health care centres, which are the first point of contact in the Saudi health care system.

Diarrhoea and acute respiratory infections were chosen for the analysis because diarrhoea and acute respiratory infections are two of the main causes of deaths in children under five (WHO, 1995), with diarrhoea globally accounting for 15-30% of deaths in under five children (Enzley & Barros, 1997) and respiratory infections alone accounting for about 27% of deaths in under five children (WHO, 1995). These deaths mainly occur in developing countries. Besides, diarrhoea and acute respiratory infections account for a large proportion of children seeking care at health facilities (WHO, 1990; WHO, 1995). Also, morbidity from diarrhoea disorders seems also to have a debilitating effect on the health of young children (Bern et al., 1992), and morbidity surveys have indicated that acute respiratory infections are the most common cause of children's absenteeism from school (Lye et al., 1994). A large proportion of the deaths caused by these two categories of diseases as well as great suffering from them could be avoided by the application of existing technology and established medical practice (Douglas & Kerby-Eaton, 1984). This is why the utilisation of health services for children under five in response to acute dirrhoea and respiratory infections is of great value.

The preventive services investigated in the thesis are prenatal care utilisation and infants' full immunisation. The related hypotheses are:

a) The predisposing and enabling factors and the medical conditions included in the survey do not have an effect on the utilisation of prenatal care services versus non utilisation.

b) The predisposing and enabling factors do not have an effect on the time of initiation of prenatal care.

c) The predisposing and enabling factors do not affect the number of prenatal care visits, but having a medical condition does.

d)The enabling factors have no effect on the choice between the public and the private health care services for the provision of prenatal care services.
e)The predisposing and enabling factors do not affect infants' full immunisation status.

Regarding prenatal care utilisation, previous research in developed countries has established that timely and adequate prenatal care is effective in reducing the likelihood of low birth weight and other adverse pregnancy outcomes (Greenberg, 1983; Peoples & Siegel, 1983; Showstack et al., 1984; Moore et al., 1986; Buescher et al., 1987; Hoff et al., 1986; Murray & Bernfield, 1988). In particular, infants of women who initiated prenatal care early and received the recommended number of visits were less likely to be born preterm or at low birth weight (Quick et al., 1981; Sokol, 1990; Poland et al., 1991). Low birth weight and prematurity increase the risk of infants' death and play an important role in the development of chronic and debilitating medical problems during early infancy (Kleinman & Kessel, 1987; Hughes et al., 1986). It has also been proven that the provision of prenatal care is very cost effective in terms of improving health (Corman & Grossman, 1985; Moore et al., 1986).

In developing countries the association between the lack of prenatal care and adverse pregnancy outcomes, such as maternal mortality, perinatal mortality, low birth weight and premature delivery, has been established (Stokoe, 1991; Ahmed & Das, 1992; Mbizvo et al., 1993; Mavalankar et al., 1994; Corio-Soto et al., 1996; Fawcus et al., 1996; Hollander, 1997). Lack of prenatal care was found to be associated with maternal mortality in Saudi Arabia (Al-Meshari et al., 1996) and it was found to be associated with infant mortality in Saudi Arabia (Al-Mazrou et al., 1997). Thus identification of subgroups of women who do not utilise prenatal care or use it inadequately is of great importance.

Childhood immunisation has been shown to be cost-effective (Koplan & Preblud, 1982; Hinman & Koplan, 1984), leading to a decrease in infant and under five mortality rates, adult morbidity and mortality and the incidence of vaccine preventable diseases (Gyorkos et al., 1994). Childhood immunisation can lead to the eradication of infectious diseases,

as herd immunity can be achieved for measles and pertussis by reaching a 92%-96% immunisation coverage, and 84%-88% immunisation coverage for rubella and 88%-92% coverage for mumps (Anderson & May, 1985). Thus, it is clear that children's immunisation is an effective measure for the improvement of the health status of the population; hence the importance of identifying the factors related to the deficiency in children's immunisation.

4.3. SAMPLE DESIGN

The sample for the Saudi Arabia Family Health Survey (1996) was a two stage, stratified probability sampling design, based on the 1992 census as the sampling frame. The first stage consisted of selecting 370 primary sampling units, defined as census enumeration areas, or combinations of enumeration areas. The second stage entailed a selection of 30 Saudi households from each selected primary sampling unit for a total of 11,100 households.

Sampling at the first stage was done by systematic probability proportionate to size selection from a geographically ordered and stratified listing of the census enumeration areas displaying the number of Saudi households by enumeration area and was accumulated. The census count of Saudi households constituted the measure of size for establishing the probability proportionate of size selection probabilities. The sample was proportionately distributed by governorates and by urban-rural residence. At the second stage, a sample of 30 Saudi households was selected in each of the 370 primary sampling units. Non-Saudi households were not included in the survey. This may be due to the changing and unstable foreign population, since foreigners generally come to live in the country for only a few years and only when contracted. Foreigners also come from all over the world with a variable health status, without a known stable proportion of differing nationalities; thus different health problems may emerge according to the composition of the contracted foreign population. This sampling process was designed by the Central Department of Statistics, Ministry of Planning.

4.4. THE QUESTIONNAIRE

The questionnaire from which the variables were extracted was developed by the Gulf Family Health Survey Central Unit. This was done with the cooperation of the World Bank and the US National Centre for Health Statistics. The survey was designed to include four different questionnaires. These were:

(1) The household health status questionnaire. This included the demographic and socio-economic module, the general morbidity module, the long standing illness module, other indicators of health status and general mortality module.

(2) The household socio-economic and environmental conditions questionnaire. This included two modules: the environmental conditions and ownership of objects and assets. This questionnaire and the household health status questionnaire were administered to the head of the household who was asked to respond for all members.

(3) The reproductive health questionnaire: This questionnaire was administered to all ever-married women under 50 years of age. It included the following modules: woman's resources, marriage, reproduction, maternal health during current pregnancy, maternal health in the last three years, child feeding , birth spacing, fertility preferences and husband's background.

(4) The child health questionnaire: This included four modules: the child care module, the child health status, immunisation and nutritional status modules.

The questionnaires' questions included in the analysis are presented in the appendix. It is worth noting that beside the original data set, each of the questionnaire's responses was contained in a separate data file in SPSS format at the Ministry of Health, thus requiring the merging of variables from different files for data analysis.

4.5. DATA COLLECTION

Fieldwork for the Saudi Arabia Family Health Survey (1996) was carried out during November 1996 to January 1997 by 43 interview teams, each consisting of one male supervisor, one female field editor and three female interviewers. The fieldwork was supervised by 21 regional coordinators. The household health interview, the reproductive health interview and the child health interview were generally conducted during a single visit to the selected sample household. Interviewers were instructed to make at least three visits to a household in an effort to contact the head of household and eligible women. No substitution for the originally selected households was allowed to be done. The teams were given timetables for conducting interviews at certain locations. There was daily supervision, and quality control measures were applied before leaving the cluster. In order to ensure a high response rate a publicity campaign was launched containing the information regarding the survey. This was released in the media: radio, television and newspapers.

The application of the sampling plan described above yielded a sample of 11,080 Saudi households for the survey, but only 10,942 were found. Household health status questionnaires were successfully applied in 10,510 households, resulting in a 96.1% response rate. Within the 10,510 households a total of 9,044 ever-married women under 50 years of age were identified as eligible for the reproductive health interview of whom 8,894 were interviewed (98.3%). The total number of eligible children under five years of age were 10,857, of whom 10,831 (99.8%) were covered in the survey. The overall response rate –which is the product of the household response rate and the eligible woman response rate- was 94.5%. But it should be noted that there are some individual questions which had a lower response rate, compared to others, rendering them practically non-applicable in data analysis.

4.6. DATA ANALYSIS

In order to answer the research question put forward in the thesis, multivariate analysis was performed controlling for the effects of the other independent variables. In this section the analytic prodecures applied are briefly described.

Regarding the utilisation of doctors' services during acute sickness episodes, multinomial logistic regression was applied using the computer package SPSS 11. It compares the users of the public doctors' services, the users of private doctor's services and the users of both services to a base line group of sick persons who did not utilise any of the services. It explores the relationship of the independent variables to the probability of the use of the three categories of utilisation of doctors' services. Doctor's services was chosen since it is the major source of ambulatory care in Saudi Arabia while other lower quality services are rarely used. The variables included in the analysis are predisposing, enabling and need factors as described below. Equation 4.6.1. describes the model as follows:

$$\text{Log}\,(p_{ij}/p_{1j}) = \beta_0 + \beta'_j X'_{ij} + \varepsilon_{ij} \quad \text{.....(4.6.1.)}$$

where

β_0 = constant

β'_j = a vector of nx1 coefficients for n explanatory variables.

X'_{ij} = a vector of nx1 explanatory variables.

ε_{ij} = measurement error term.

The dependent variable is the log odds that individual *i* will choose a doctors' services alternative *j* ($j = 2, 3, 4$) relative to alternative 1, where alternative 1 is the non utilisation of doctors services, 2 is the utilisation of public doctors' services, which is most likely to be GP services in primary health care centres, 3 the utilisation of private doctors' services and 4 the utilisation of both the public and private doctors' services. The explanatory variables consist of predisposing, enabling and need factors.

The final model was determined by its recorded significance in the SPSS output, which uses the Log Likelihood ratio test. The log likelihood values reflect the likelihood that the data would be observed, given the model's parameter estimates (Armitage & Berry, 1994, Pampell, 2000). The log likelihood ratio test reveals if the change in the log likelihood due to the independent variables that have occurred beyond a 0.05 significance

level, and for given degrees of freedom the larger the chi-square value the greater the model improvement over the baseline (Pampell, 2000). The RRR (relative risk ratios) are elaborated in the thesis, since they provide the differences in the likelihood of the use of a specific type of health services compared to the base line group of non users of the health services, according to different levels of the independent variables. The final reported models are the parsimonious models that include all significant variables. Interaction terms were also tested for using most of the possible combinations. Two models are estimated, one for adults fifteen years and older and one for children who are younger than fifteen years. It is worth noting that in the Saudi Arabia Family Health Survey Report (2000), the only reported analysis for the utilisation of services in response to acute sickness was a cross tabulation of the health care provider consulted versus age, sex, region of residence and its urban/rural character.

For the children under five years of age, the utilisation of public services and the utilisation of private services was compared to a baseline group of non-utilisers of either of the services in response to acute diarrhoeal and respiratory tract infections, applying multinomial logistic regression. The same technique and procedure applied for the analysis of the utilisation of doctors' services during acute sickness was applied. This also tests for the effects of the predisposing, enabling and need factors. In the Saudi Arabia Family Health Survey Report (2000), the analysis included, regarding the use of services for the treatment of diarrhoea and acute respiratory infections, was a cross tabulation of the source of health advice and the age and sex of the child, the region of residence and its urban/rural character.

Regarding the utilisation of prenatal care services, the utilisation of any prenatal care services versus non utilisation and the initiation of prenatal care in the first trimester versus the initiation of prenatal care after the first trimester were explored for the live births during a retrospective three years period . The independent variables were the predisposing and enabling factors, with the addition of the occurrence of medical problems for the use versus non-use of prenatal care. For the use of public versus private services as the place of the last prenatal care checkup, the effect of the enabling factors

was analysed using the data available for currently pregnant women. The multivariate analysis technique applied was the logistic regression technique, since the dependent variables are in binary form, using SPSS 11. In addition, one year infant's full immunisation was analysed applying logistic regression, since the variable includes two categories whether the infant is fully immunised or not. To demonstrate the mathematical formulae for the logistic regression, the utilisation versus non utilisation of health services is considered as an example.

Considering the dichotomous event (Y_i) of having received prenatal care, the probability of which can be presented as follows:

$\Pr(Y_i = 1) = p_i$ (where $0 < p_i < 1$)

and

$\Pr(Y_i = 0) = 1 - p_i$

Using the logistic regression model (4.6.2.)

$$\text{Logit}(p_i) = \log \frac{p_i}{1-p_i} = \beta_0 + \beta'_j X'_{ij} + \varepsilon_{ij} \quad \text{.....(4.6.2)}$$

where

p_i = probability of a mother receiving some prenatal care

β_0 = constant

β'_j = a vector of nx1 coefficients for n explanatory variables.

X'_{ij} = a vector of nx1 explanatory variables.

ε_{ij} = measurement error term.

In most statistical investigations there is a vector of covariates, or explanatory variables ($X_1, X_2, \ldots X_n$) are associated with each individual. The principal objective of the model is to investigate the relationship between the response probability p_i and the explanatory variables $X_1, X_2, \ldots X_n$. $\beta_1, \beta_2, \ldots \beta_n$ is a vector of coefficients of the effect of the explanatory variables on the log odds of the probability p_i.

The log likelihood technique was used in order to compare the nested obtained models for their significance. The procedure for fitting a model using this method usually involves iteration; that is repeating a sequence of calculations until a solution is reached. In this study the reference models were chosen including all the variables with significant effects. Then the variables were removed selectively, and the log-likelihood of each nested model is compared to other reference models and tested for significance. After that, a parsimonious model, which is the model including all significant variables, was chosen. The final parsimonious model was tested for its goodness-of-fit using the Hosmer and Lemeshow test, which proceeds by collapsing the data into deciles based on the probability of having the characteristic of interest (Menard, 2002). It follows a chi-square distribution. The null hypothesis for the test is that the data have been generated by the fitted model, and rejection of the null hypothesis implies that the model is not a good fit. The odds ratio is reported in the SPSS output. It indicates the odds of having a certain characteristic of the dependent variable at a certain level of the independent variable compared to the reference category of the dependent variable. If the odds ratio in greater than one, this indicates that the odds of the non reference category increases when the independent variable increases, and an odds ratio less than one indicates that the odds of the non-reference category of the dependent variable decreases when the independent variable increases (Menard, 2002). The values of odds ratios are explained in detail with regards to each of the obtained models

In addition to the application of the logistic regressions in the analysis of prenatal care use, the factors affecting the number of prenatal care visits including the predisposing, enabling and increased need factors were analysed applying the Poisson regression technique, using the statistical package STATA 7. Poisson regression is considered to be a special case of general linear modeling technique in which the mean value of the dependent variable is expressed as a linear function of a set of explanatory variables, and the expected Poisson variable is positive and never assumes a negative value (Selvin, 1995; Armitage & Berry, 1994). This is in contrast with the general notion of treating count variables, including health care visits, as continuous variables where linear regression models are applied. This may result in inefficient, inconsistent and biased

estimates (Long, 1997). With the Poisson regression model the probability of a count is determined by the Poisson distribution where the mean of the distribution is considered to be a function of the independent variables (Long, 1997). Equation 4.6.3. describes the Poisson model as follows:

$$\ln(\mu_i) = \beta_0 + \beta'_j X'_{ij} + \varepsilon_{ij} \quad \text{.....(4.6..3)}$$

where

μ_i = the expected count of the number of visits an individual i can make.

β_0 = constant

β'_j = a vector of nx1 coefficients for n explanatory variables.

X'_{ij} = a vector of nx1 explanatory variables.

ε_{ij} = measurement error term.

In the analysis, the number of visits were represented according to their value, except for twelve or more visits, since twelve visits is the number of visits recommended by the Ministry of Health. The model chosen was the parsimonious model. It was chosen after the application of a series of the log-likelihood tests. The values of the IRR (incidence rate ratio), which are a measure of the increased risk of making more prenatal care visits, are explained in detail in the preventive services utilisation chapter. In the Saudi Arabia Family Health Survey Report (2000), the reported analysis for the variables included in the thesis analyses were for the results for the live births during a retrospective three years period. It included a cross tabulation of the coverage of prenatal care versus mother's age, education, working status, region of residence and its urban/rural character, a cross tabulation of seeking prenatal care as a regular checkup or due to occurrence of a health problem versus mother's age, education, work status, region of residence and its urban/rural character. A cross tabulation of the number of antenatal care visits versus mother's age, education, working status, region of residence and its urban/rural character was also reported.

Before displaying the multivariate analysis results the bivariate associations between the independent variables and the dependent variables are presented. The bivariate analysis procedure included in the study were cross tabulations which were tested for their significance using Pearson's chi-square test statistic. These cross tabulations are useful in identifying the association between variables, since it calculates percentages across the dependent variables. Pearson chi-square test is used for the determination of the likelihood that the independent variables and the dependent variable are associated.

It is worth mentioning that in the early stage of the statistical analysis, binary logistic regressions were carried out to test the effect of the independent variables for some types of service utilisation each type of service use modeled separately. It was found that the results of these binary logistic regressions were very similar to the results of the multinomial logistic regressions adding no additional value to the analysis so they were not completed for all types of service utilisation and were not included in the thesis.

4.7. THE STUDY VARIABLES

4.7.1. Utilisation of health services in response to acute illness or injury

In order to carry out the statistical analysis procedure for the utilisation of health services in response to acute illness or injury the researcher has chosen and reorganized the categorization of the following variables. The independent variables will be described first, followed by the dependent variables.

4.7.1.1. The independent variables

a) The predisposing factors:

Demographic factors:

Age: This includes the age of the person in years, grouped into six groups for adults: 15-19, 20-29, 30-39, 40-49, 50-59, 60 and above years. For children, there are three age groups: 0-4, 5-9, 10-14. In addition, the age of the head of household is also included since heads of households play a central role in decision making in Saudi families even for adults. They are grouped into five groups which are 20-29, 30-39, 40-49, 50-59, 60 and above years.

Gender: This identifies the subject as being male or female.

Marital status: This includes the current marital status of the persons above fifteen years of age. This includes being single or katib kitab (legally engaged and the couple still practice their single lives). This is a usual state for some families in Saudi Arabia before the marriage comes into effect. The other categories include being married, divorced or separated, which are joined in one category, and being widowed.

Social structure factors:
Household size: This includes the number of persons living in the household. For an analytical purpose, this has been re-categorised into quintiles using SPSS, since the variable includes a wide range of counts, some with only a few observations, which are not practically applicable in the multivariate model. The quintiles are equivalent to 1-5 persons, 6-7 persons, 8-9 persons, 10-11 persons and 12+ persons.

Relationship to the head of household: This variable is included for children only. It is divided into two categories, being a child (son or daughter) of the head of household or not. This is to test if there is a cultural advantage of sons and daughters in comparison with other family members with regards to health care.

Education: This variable is included for adults and for heads of households for both adults and children. Its categorization is done similar to the Saudi Vaccination Coverage Survey (Al-Mazrou et al., 1997) and the Saudi Arabia Family Health Survey (Khoja et al., 2000), and according to the study on the variance of income levels according to education, which was published in the year 2000, sponsored by the Ministry of Planning. It shows that income increases gradually with education as shown in the following table. It is worth noting that there is no income tax in Saudi Arabia so the average monthly income is not affected by deductions due to tax.

Table 4.1. Average monthly wages for Saudi employees in S.R.

Educational level	Average monthly wage
Illiterate	2568
Read and write	2747
Primary school	3553
Preparatory school	4308
Secondary school	5447
Diploma	5155
University graduate	8555
Post graduate	16418
Not reported	9000
General average	5446

Source: Ministry of Planning National Wages Study, 2000

Thus the education variable consists of these categories: illiterate, read, primary, preparatory, secondary or diploma and university.

Economic activity: This variable is included for adults and for heads of households for both adults and children. The importance of the economic activity of the heads of households in Saudi Arabia is significant, since the head of the household is the one who is culturally responsible for providing the material needs of the household. It is originally categorized as working, unemployed, retired, seeking work for the first time, in school, doing housework and other. For practical purposes, unemployed, seeking work and other have been joined together in the same group. For heads of households, since being in school constitutes only a small proportion of heads of households' economic activity this category has been joined to being unemployed, seeking work and other since being a student as an economic activity indicates a non working status.

Occupation: This variable is included for heads of households for children. This was originally categorized as a salaried employee, own account worker (self-employed), employer, unpaid family worker or apprentice. Since 72.6% of the working heads of households are salaried employees, the variable has been re-categorised into salaried employee and non-salaried employee, knowing that being a salaried employee indicates a regular source and amount of income and familiarity with modern health care. This variable has not been included for the analysis of the utilisation of services for the

individual adults since there is a large proportion of missing values for other than head of household members.

b) The enabling factors:

Region: This identifies the region of the country an individual lives in. It is organized into five categories: the Central region which includes Riyadh and Al-Qaseem, the Western region which includes Makkah, Jeddah, Al-Medinah and Taif, the Eastern region which includes Dammam, Al-Hassa and Hafr Al-Baten, the Northern region which includes Hail, Tabouk, Qurayat, Al-Jouf and Al-Shamalia, and the Southern region which includes Aseer, Al-Baha, Gizan and Najran. This categorization into five regions has been adopted for health care studies in Saudi Arabia, such as the Saudi Maternal and Child Health survey (Al-Mazrou et al., 1993), the Saudi Arabia Vaccination Survey (Al-Mazrou et al., 1997) and the Saudi Arabia Family Health Survey (Khoja et al., 2000).

Urban/rural residence: This variable identifies the living place of individuals as being urban if they reside in a place that has at least five thousand inhabitants or more or has its own municipality, and rural if otherwise. This definition has been identified through asking the Ministry of Municipality and Rural Affairs, the Military Survey Agency at the Ministry of Defense, and the Ministry of Planning. The variable was not available in the original data set, and a matching of the above criteria and the place which the sample cluster represented was applied in order to obtain this differentiation. Three different sets of lists were obtained from the three above mentioned sources, and the one which was found to be representative of the study period was the one provided by the Ministry of Planning, using the census data of 1992 which the sampling procedure in the 1996 Saudi Arabia Family Health Survey has taken into account.

Number of public doctors per 10,000 of the population: This represents the number of public service doctors for every 10,000 of the population. This variable was not included in the original survey, and in order to create this variable the number of doctors in each of the Saudi administrative divisions was obtained from the Ministry of Health Annual Health Report (1996) divided by the population estimates of 1996 for each area, obtained

from the Ministry of Planning, and multiplied by 10,000. The resultant values were grouped into quintiles using SPSS for statistical purposes.

Number of private doctors per 10,000 of the population: This represents the number of private service doctors for every 10,000 of the population. The same process for obtaining the values for this variable used for the ratio of public doctors to 10,000 of the population was applied, and the resulting values were grouped into quintiles using SPSS.

The economic enabling factors:
Since an income variable has not been included in the original survey, and according to the Ministry of Finance and the Ministry of Planning information departments there is no available economic index or specified standardized indicators for dividing the population into various income strata in Saudi Arabia, several economic indicators were chosen. This is based on the literature review. Variables found to be significant with regards to utilisation of health services in Saudi Arabia and other research settings were chosen. It should be noted that in some countries a summary assets index was used as a proxy for income such as what was indicated by Filmer and Pritchett (1998), Gwatkin and Pande (1999), Montgomery et al. (2000) and Sahn and Stifel (2000). This may be useful in composing a summary index in further research.

Type of dwelling: This includes living in a villa, an apartment, living in a duplex which is a two story level apartment with a separate entrance. The duplex's size and market value is close to an a apartment; that is why the researcher included it in the same category. The remaining categories were living in a traditional or Arabian house and other. In the analysis, the variable has been re-categorised into living in a villa, an apartment or duplex and living in a traditional or Arabian house, which is also considered to be some form of traditional housing.

Housing tenure: This identifies the house that the participants live in as being owned or owned jointly, being rented, or being provided by the employer and other than the above mentioned. In Saudi Arabia the preferred state is living in an owned house, indicating a

higher income, compared to other categories. In the analysis, the variable is categorized into owning a house, renting it, or having it provided by an employer or other than those categories.

Crowding: This variable is the result of the division of the number of persons living in the household by the number of rooms, thus obtaining the number of persons living in a household per room. Due to the great number of various values, the variable has been grouped into quintiles using SPSS. The crowding index is considered to be an indicator of the level of wealth of a family.

Floor material: This variable originally had seven categories. These included earth, tiles/cement, stone/brick, vinyl, fitted carpet, marble and other. For statistical purposes, it is grouped into two categories: a modern floor and a non modern floor. The modern floor includes tiles/cement, vinyl, fitted carpet and marble. The other group includes the remaining categories. This variable is considered to be a wealth indicator, as richer families only have a modern type of floor.

Type of toilet: This variable originally included six categories. These are flush toilet connected to a sewer network, a flush toilet connected to a septic tank, a bucket, a pit, open field and other. For analytical purposes it has been re-categorised into two categories, either having a flush toilet or not having a flush toilet. This variable is also considered to be a wealth indicator.

Main drinking water source: This variable is originally formed from nine categories. They included drinking from a pipe water supply, public tap outside dwelling, well with pump, well without pump, tanker truck (or similar), bottled, stream, rain water catchment, and other. For statistical purposes, this variable has been categorized into having a pipe or bottled water supply or another source of water supply. This can be considered an indicator of wealth, since the economically advantaged either drink bottled water or tap water; they do not use any other source. This classification is the same as the one used by Al-Mazrou et al. (1997) in their analysis of childhood mortality in Saudi Arabia.

Type of lighting: This variable includes five categories. These are having electricity, gas, kerosene/ oil lamps/ candles, other and none. It has been re-categorized as having electricity at home or not, as the presence of electricity is a wealth indicator.

Car ownership: This variable has two values, either owning a family car or not. This is an important variable in the sense that private car transport is the main vehicle of transportation in Saudi Arabia. Thus having a car in the household enables its members to easily reach the health services, in addition to being a wealth indicator, as well as being an indicator of access.

Media communication: There are three variables representing media communications including having a radio, a colour television set and a satellite TV/cable in the household or not. The presence of these objects indicates a higher level of modernization, and more exposure to health information and education. Having a satellite dish indicates also the level of the acceptance of the household members -especially the head of household- of new and incoming goods and services, and a higher income. For some segments of the population, not having a colour television set may be due to a disadvantaged economic position, but this is not always the case since some of the conservative families consider some television programmes as containing materials not suitable for family viewing; thus they do not have television sets in their houses.

c) Need related factors:

Since the utilisation of services during the last two week period was only asked for members of the family who suffered from an illness or an injury –that is individuals in need- the need related variables included the two characteristics of illness or injury. These are disability due to sickness, which indicates if a family member was kept from normal activities at work, about the house, or from going to school because of an illness or injury, and number of sick days, grouped into being sick for: zero days, 1-2, 3-4, 5-6, 7+ days.

4.7.1.2. The dependent variable

The dependent variable for the analysis of utilisation of public and private doctors' services was a created four category variable including a base category of using no doctor's services from either the public or the private sector, a category of visiting a doctor in the public services only, a category visiting a doctor in the private service only and visiting both a public and a private services doctor. Thus, the effect of the independent variables will be displayed for the use of public, private and both public and private service doctors, compared to using no health services. This is applied for adults fifteen years and older as well as children younger than fifteen years of age.

4.7.2. Utilisation of health services in response to children's diarrhoea and acute respiratory infections

4.7.2.1. The independent variables

The following table displays the independent variables included in the analysis of children under five utilisation of health services in response to diarrhoea and acute respiratory infections.

Table 4.2. The independent variables for the analysis of children under five's utilisation of health services in response to diarrhoea and acute respiratory infections

Independent variables	
Predisposing factors	
Child's age	Child being less than one year old,1, 2, 3 or 4 years old
Child's gender	Male or female
Birth order	A child order of birth in relation to his/her siblings grouped into 1st , 2-3rd , 4-5th , 6+
Mother's age	Grouped into 15-24, 25-34, 35-44, 45+
Head of household age	Grouped into 20-29, 30-39, 40-49, 50-59, 60+
Household size	Grouped into quintiles equivalent to 1-5 persons, 6-7 persons, 8-9 Persons, 10-11 persons and 12+ persons
Mother's education	Grouped into illiterate, read, primary, preparatory, secondary or

	higher
Mother's economic Activity	Grouped into doing housework, working, other.
Head of household education	Grouped into illiterate, read, primary, preparatory, secondary or diploma, University
Head of household economic activity	Grouped into working, not working.
Child health rating	Grouped into excellent or good, normal, ill from time to time or often ill
Enabling factors	
Region	Grouped into Eastern, Western, Northern, Southern, Central
Urban/rural	Grouped into urban, rural
Type of dwelling	Grouped into villa, apartment or duplex, traditional or Arabian house
Housing tenure	Grouped into own the house, renting it, provided by an employer or other
Crowding	Grouped into quintiles
Floor material	Grouped into modern floor, non modern floor
Type of toilet	Grouped into flush toilet, no flush toilet
Drinking water	Grouped into pipe or bottled water supply, other
Type of lighting	Grouped into having electricity, not having electricity
Car ownership	Own a car, do not own a car
Radio	Have a radio, do not have a radio
Coloured TV	Have a coloured TV, do not have a coloured TV
Satellite TV/ cable	Have a satellite TV/cable, do not have a satellite TV/cable
Need factors	
Number of sick days	Grouped into 0-2 days, 3-4 days, 5-6 days, 7+ days
Difficulties in breathing	A child suffering from difficulties in breathing when having an

	acute respiratory infection, not suffering from difficulties in breathing

4.7.2.2. The dependent variables

There are two dependent variables, one for the utilisation of health services during diarrhoeal episodes and one for the utilisation of health services during acute respiratory infections. Each of these variables includes three categories: a baseline group of non utilisers of either the public health services- including primary health care centres and public hospitals- or the private health services, a second category which includes the utilisers of public health services and a third category of the utilisers of the private health care services. A fourth category was initially created for the utilisers of both services, but the numbers were small especially for diarrhoea, and thus could not be used as an independent category in the multinomial logistic regression models.

4.7.3. Utilisation of prenatal care services

4.7.3.1. The independent variables

The independent variables included in the analysis of prenatal care utilisation are presented in the following table.

Table 4.3. The independent variables for the analysis of prenatal care utilisation

Independent variables	
Predisposing factors	
Mother's age	Grouped into 15-24, 25-34, 35-44, 45+ years
Father's age	Grouped into 20-29, 30-39, 40-49, 50-59, 60+ years
Birth order	The birth order of the live birth in relation to his/her siblings grouped into 1st, 2-3rd, 4-5th , 6-7th , 8+
Household size	Grouped into quintiles
Mother's education	Grouped into illiterate, read, primary, preparatory, secondary or higher
Mother's economic Activity *	Grouped into doing housework, working, other

Father's education	It includes literate, primary, preparatory, secondary, university
Time of the initiation of prenatal care	Grouped into before the end of the first trimester, after the end of the first trimester
Satisfaction with care	Being satisfied with care, not being satisfied with care
Enabling factors	
Region	Grouped into Eastern, Western, Northern, Southern, Central
Urban/rural	Grouped into urban, rural
Type of dwelling	Grouped into villa, apartment or duplex, traditional or Arabian house
Housing tenure	Grouped into own the house, renting it, provided by an employer or other
Crowding	Grouped into quintiles
Floor material	Grouped into modern floor, non modern floor
Type of toilet	Grouped into flush toilet, no flush toilet
Drinking water	Grouped into pipe or bottled water supply, other
Type of lighting	Grouped into having electricity, not having electricity
Car ownership	Own a car, do not own a car
Mother's daily radio listening	Mother listens to the radio on a daily basis, mother does not listen to the radio on a daily basis
Mother's TV watching	Grouped into mother watches television, mother does not watch television
Mother's weekly newspapers and magazine reading	Mother reads newspapers and magazines on a weekly basis, mother does not read newspapers and magazines on a weekly basis
Usual place of prenatal care visits	It includes primary health care centre, public hospital, private health care facility
Traveling time	Time taken to reach the health care facility where the last prenatal care checkup took place, grouped into 1-15, 16-30, 31+ minutes

Mean of transport	Transportation method used to reach the health care facility where the last prenatal checkup took place, grouped into private car, other
Waiting time	Time a woman waited at the health care facility where the last prenatal care checkup took place, grouped into less than 30 minutes, 30 minutes to one hour, more than one hour.
Medical problems	These include severe breathlessness, vaginal bleeding, high blood pressure, swelling of face or body, a severe headache, convulsions, pain in the upper abdomen, diabetes, painful urination, each categorized as suffered from the medical problem or not.

* Mothers economic activity is considered to be an enabling factor for the utilisation of public versus private care since its categorization indicates women's increased ability to pay for private care as no base line group of non-utilisers of prenatal care services is included for this type of analysis and thus propensity to seek care due to the economic activity is not tested

It is worth noting that 'the father's ability to read' variable was intended to be included in the analysis, but due to the large proportion of missing values it was not included, so was the father's occupation variable.

4.7.3.2. The dependent variables

The utilisation versus non utilisation of prenatal care services: This variable included two categories, either having made at least one prenatal care visit or not, when she was pregnant with a live birth child in the last three years before the survey.

The time of initiation of prenatal care: This refers to whether a mother had made her first prenatal care visit in the first trimester or not for live birth children in the previous three years preceding the survey.

The number of prenatal care visits: This variable indicates how many visits a mother made during her pregnancy for live birth children during the previous three years before

the survey, with twelve or more visits being joined in one category. This is because twelve visits is the approximate number of visits recommended by the Ministry of Health.

The place of the last prenatal care checkup: This refers to whether a mother went to a public health care source, including public hospitals and primary health care centres, or to a private source of care for her last prenatal checkup in the current pregnancy.

4.7.4. Infants' full immunisation

4.7.4.1. The independent variables

In the following table the independent variables included in the analysis of infants' full immunisation are listed.

Table 4.4. The independent variables for the analysis of infants' full immunisation

Independent variables	
Predisposing factors	
Child's gender	Male or female
Birth order	A child order of birth in relation to his/her siblings grouped into 1st, 2-3rd, 4-5th, 6+
Mother's age	Grouped into 15-24, 25-34, 35-44, 45+
Head of household age	Grouped into 20-29, 30-39, 40-49, 50-59, 60+
Household size	Grouped into quintiles equivalent to 1-5 persons, 6-7 persons, 8-9 persons, 10-11 persons and 12+ persons
Mother's education	Grouped into illiterate, read, primary, preparatory, secondary or higher
Mother's economic Activity	Grouped into doing housework, working, other
Head of household education	Grouped into illiterate, read, primary, preparatory, secondary or higher
Head of household economic activity	Grouped into working, not working

Child health rating	Grouped into excellent or good, normal, ill from time to time or often ill
Early initiation of prenatal care	Grouped into started prenatal care in the first trimester, started prenatal care after the first trimester
Number of prenatal care visits	Grouped into 1-5, 6-8, 9-11, 12+ visits
Enabling factors	
Region	Grouped into Eastern, Western, Northern, Southern, Central
Urban/rural	Grouped into urban, rural
Type of dwelling	Grouped into villa, apartment or duplex, traditional or Arabian House
Housing tenure	Grouped into own the house, renting it, provided by an employer or other
Crowding	Grouped into quintiles
Floor material	Grouped into modern floor, non modern floor
Type of toilet	Grouped into flush toilet, no flush toilet
Drinking water	Grouped into pipe or bottled water supply, other
Type of lighting	Grouped into electricity, no electricity
Car ownership	Own a car, do not own a car
Radio	Have a radio, do not have a radio
Coloured TV	Have a coloured TV, do not have a coloured TV
Satellite TV/ cable	Have a satellite TV/cable, do not have a satellite TV/cable

4.7.4.2. The dependent variable

Infants' full immunisation: This indicates whether a one year old infant has been fully immunised or not. This is based on the immunisation card and the respondents' reports.

4.8. THE CHARACTERISTICS OF THE HOUSEHOLD POPULATION

A total of 10,510 households with a de jure population of persons were included in the data sets. In the following section, a brief description of the characteristics of the sample, including both the independent and dependent variables description, will be given.

4.8.1. The independent variables

The original values as well as the recategorised values of the independent variables are presented in the appendix.

a) The predisposing factors:

The demographic factors:

Age:

Looking at the table, it can be observed that the age distribution of the population shows a very young population for Saudi Arabia, with nearly 46.4% of the population being less than fifteen years old. This conforms to the pattern observed in high fertility countries. But it is evident that the 0-4 age group's proportion is lower than the 5-9 age group, indicating a drop in fertility. Overall, there are larger numbers of the population in the younger age groups, compared to the older age groups with the population 15-64 accounting for approximately 50%, with the remaining population 65 years and older constituting only 3.7%.

Gender:

In the population included in the sample, there were 36,917 males (50.2%) and 36,691 females (49.8%). The sex ratio for the population was 100.6 males for every 100 females.

Marital status:

This variable originally consisted of five categories. It was recorded for individuals fifteen years and older. Being single is the most frequent marital status, although the percentage of married individuals is very close to the percentage of single individuals. The high percentage of the single status is partly due to the inclusion of very young individuals.

Social structure factors:

Household size:

The average Saudi household size was found to be 7 persons per household. Many households are quite large. Only one of four households includes four or fewer persons, but around one in every six households has ten or more persons.

Relationship to the head of household:

Looking at the variable's distribution, it can be observed that being the son or the daughter of the head of household is the most common relationship to the head of household, and looking at the percentages for the different categories of the variable, it can be inferred that nuclear families are the dominant type of families in Saudi Arabia, since the percentage of head of households being very close to the percentage of being a wife to the head of household, and 62% of the individuals included in the analysis were either sons or daughters of the head of household.

Birth order:

In addition to the above mentioned variables, birth order was included in the analysis of children under five's use of health services for acute diarrhoeal and respiratory tract infections and the infant's complete immunisation schedule. In addition, birth order was included in the analysis of the utilisation of prenatal care services for the preceding three-year period live births. The distribution of the variable according to different categories is displayed in the appendix.

Education:

The educational level of household members is an important indicator of social development. This is recorded for individuals age 6 years and older. Looking at the variable's distribution, it can be observed that the variable's distribution is towards the lower categories of the educational variable which can be partly attributed to the the large proportion of the young population.

In the analysis, the secondary and diploma categories were merged since they represent a similar income group as reported by the Ministry of Planning (2000) and the persons who have diploma degrees make only 2.2% of the sample participants. For statistical purposes, having secondary or above diplomas have been merged for mothers included in the prenatal care analysis and the children's service use analysis and for heads of households education in the analysis of infants' full immunisation. In addition, a different education variable for fathers of the live birth children was included in the analysis. This was based on reports by the wives.

Economic activity:

This includes the economic activity of individuals fifteen years or older. The categories of this variable are reduced according to its distribution for various forms of statistical analysis. These new formed categories are explained above. The most common value is doing housework. Doing housework is the mode of this variable, since in Saudi Arabia most of the females are housewives.

Head of household employment status:

The most common value is being a salaried employee, representing 72.6%. Since most of the head of households are salaried employees –having a regular income- this variable has been reduced into two categories, either a salaried employee or not.

Child health status rating:

This variable was included for children under five years, for the analysis of the utilisation of health services due to diarrhoea or to an acute respiratory tract infection, in addition to infants' full immunisation. Looking at the variable's distribution, it can be observed that a child having a normal health is the most common value for this variable, with 88.1% of the children considered to be normal or better than normal. This variable has been re-categorised. Its values are presented in the appendix.

Number of prenatal care visits:

This is grouped into four categories dividing the number of visits below the recommended number of twelve visits into three groups each constituting approximately 20% of the observations. This variable is included as an independent variable for the analysis of infants' full immunisation.

b) The enabling factors:

Region of residence:

This is grouped into five regions. Their values are presented in the appendix.

Urban/rural residence:

According to the bases for the differentiation between urban and rural areas, as provided to the researcher by the Ministry of Planning, 51052 (67.6%) of the sample participants are considered to be urban residents while 24497 (32.4%) are considered to be rural residents.

Type of dwelling:

The most common value for this variable is living in an apartment. In the analysis, the categories of the variable were regrouped, as mentioned above. Their values are displayed in the appendix.

Housing tenure:

The most common value of this variable is owning the house by the members of the family that live in it. The variable has been re-categorised for statistical purposes, as mentioned above.

Floor material:

The most common value for this variable is having a carpet on the floor, and most of the sample population live in houses that have a modern floor. The variable has been re-categorised for analysis purposes, as mentioned above.

Main drinking water source:

The most common value for this variable is having a pipe water supply. The variable has been re-categorised into having a pipe water supply or bottled water and not.

Type of lighting:

The most common value for this variable is having electricity as the source of lighting. The variable has been categorized whether electricity is the main source of lighting – indicating that electricity is supplied to the house- or not.

Type of toilet:

The most common value for this variable is having a flush toilet connected to a septic tank; closely following it, in terms of numbers, is having a flush toilet connected to the sewers. The variable was re-categorised into having a flush toilet or not.

Crowding:

This variable assumes 114 different values. Its minimum value is 0.08 and its maximum value is 12. The mean is 1.85, the standard deviation is 1. It has been re-categorised into quintiles. The values are displayed in the appendix.

Private car:

From the population sample, 66,549 (88.1%) of individuals belong to families that own a private car, while 8995 (11.9%) belong to families who do not own a private car.

Radio:

61,491 (81.3%) of individuals belong to families that have a radio at home, while 14189 (18.7%) of individuals belong to families that do not have a radio at home.

Colour television:

66,764 (88.2%) of the sample participants belong to families who own a colour television set, while 8933 (11.8%) belong to families that do not own colour television sets.

Satellite TV/cable:

15,269 (20.2%) of sample participants belong to families who have a satellite TV or cable at home, while 60,356 (79.8%) belong to families that do not.

Women's TV watching:

This variable is included for the analysis of prenatal care utilisation. The most common value for this variable is watching television on a daily basis, and only few women do not watch television, most likely being highly conservative and do not have television sets in their homes or being economically disadvantaged and thus not having a television set at home.

Women's daily radio listening:

This variable is included in the analysis of prenatal care utilisation. It was reported that about 50% of women listen to the radio on a daily basis

Women's weekly newspaper/magazine reading:

This variable is included for the analysis of prenatal care use. It was reported that about 73% of ever married women read newpapers/ magazines at least once a week.

Number of public doctors per 10,000 of the population:

This calculation is done based on the information provided by the Ministry of Health Annual Health Report for 1996 and the data provided by the Ministry of Planning Statistics Department on the population estimates for 1996. Looking at the variable's distribution, it can be observed that there is a wide range of differences with regards to the number of public doctors in each region, but it should be noted that regions which are privileged in the number of doctors are areas which have a high percentage of scattered populations. In order to have a good coverage of the population, a higher number of doctors should be appointed to have a more equitable geographical distribution and higher accessibility levels.

Number of private doctors per 10,000 of the population:
The same method for the calculation of this variable's values was applied as for the number of public doctors per 10,000 of the population. The variable's values according to the geographical distribution and its recategorised values are presented in the appendix.

The usual place of checkup:
This variable is included for the analysis of prenatal care use including the analysis of the early initiation of prenatal care and the number of prenatal care visits. Looking at the variable's distribution, it can be observed that the main source of prenatal care are the primary health care centres, followed by public hospitals, while private care plays a minor role.

Traveling time:
This variable is included for the analysis of the choice of the place for the last place of prenatal care checkup for currently pregnant women. Its minimum value is one minute and its maximum value is 603 minutes. The mean traveling time is 22.76 minutes, the median is 15 minutes and the standard deviation is 34.77. The categorised values of this continuous variable are displayed in the appendix.

Mean of transport:
This variable is included for the analysis of the choice of the place for the last prenatal care checkup. It is evident that private cars are the main mode for transportation for reaching the health care facilities while using other forms of transportation is not frequent.

Waiting time:
This variable is included for the analysis of the choice of the place for last prenatal care checkup. Waiting for less than ½ hour is the most frequent waiting time and 85.9% of the pregnant women waited for less than one hour in the health care facilities.

c) The need variables:

Disability due to sickness:

This variable is included for the analysis of the utilisation of doctor's services due to acute sickness. 4082 (50.8%) of the sample participants who suffered from acute sickness in the two weeks prior to the survey reported disability due to sickness, while 3949 (49.2%) did not suffer from disability due to acute sickness.

Number of acute sickness days:

This variable is included for the analysis of the utilisation of doctor's services due to acute sickness. The mean for this variable is 5 days with a standard deviation of 3.44. The median is 4 days and the mode is 3 days. This variable has been re-categorised for statistical purposes; its new categories' frequencies are displayed in the appendix.

Duration of the last diarrhoea episode:

This is included for the analysis of children under five utilisation of health services in response to diarrhoea. The mean of this variable is having diarrhoea for 3.8 days with a standard deviation of 1.97. The median is having diarrhoea for 3 days, and the mode is having diarrhoea for 3 days.

Duration of the acute respiratory tract infection:

This is included for the analysis of the use of health services due to an acute respiratory infection during the retrospective two week period. The mean is having an acute respiratory tract infection for 4.9 days with a standard deviation of 2. The median is 5 days and the mode is 7 days.

Difficulty in breathing:

This is included in the analysis of the health services for children's acute respiratory infections. 946 (31.9%) of children suffered from difficulties in breathing, while 2017 (68.1%) did not have this problem.

Medical problems during pregnancy:

The frequency and percentage of medical problems is included in the analysis of prenatal care utilisation for live births during the three year period prior to the survey. This is applied for utilisation versus non utilisation of the prenatal care services and the number of prenatal care visits.

4.8.2. The dependent variables

The utilisation of doctors' services during acute sickness:

The initial information provided in the Saudi Arabia Family Health Survey included the consultation of health care sources if an acute illness or injury was reported for an individual during a retrospective two week period prior to the survey. Thus, the utilisation of health services is only recorded for these individuals. It is as presented in the following table.

Table 4.5. The utilisation of health care in response to acute sickness during the previous two week period

	Public doctor Number (%)	Private doctor Number (%)	Nurse Number (%)	Pharmacist Number (%)	Traditional healer Number (%)	Other person Number (%)
Adults	2159 (66.7)	590 (18.4)	92 (2.9)	256 (8)	54 (1.7)	50 (1.6)
Children	3420 (71.3)	840 (17.6)	84 (1.8)	288 (6.1)	47 (1.0)	73 (1.5)
Total	5579 (69.4)	1430 (17.9)	176 (2.2)	544 (6.8)	101 (1.3)	123 (1.5)

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

As the utilisation of each of the six sources of health care was recorded for each type of services separately which may also overlap since a person could have referred to more than one source of care, there was no variable indicating the use versus non use of any of the six sources of health care in the survey nor it was indicated in the Saudi Arabia Family Health Survey Report (2000).

Since the utilisation of doctors' services is found to be the main source of health care indicating higher quality of care for these individuals, compared to individuals cared for by other sources of care, and knowing that private doctors' care indicates a higher possibility of using specialist care, compared to general practitioners care in the public health care services, a four category variable was created taking into account these differences. The variable includes a category of utilisers of only public doctors' services, who are most likely to be general practitioners in primary health care centres; a category of the utilisers of only private doctors' services, who are more likely to be of a higher level of quality since they are more likely to be specialists; a category of the utilisers of both the public and private doctors' services, thus having more than one source of care for their acute sickness and a base line category of the non utilisers of doctors' services. Since a separate analysis was applied for adults and children, the following table will display the values of the categories of the two dependent variables.

Table 4.6. The utilisation of public and private doctors' services for acute sickness during the previous two week period

	Both public and private doctor consultation Number (%)	Public doctor consultation Only Number (%)	Private doctor consultation Only Number (%)	No doctor consultation Number (%)	Total
Adults	149 (4.7)	1954 (61.6)	406 (12.8)	664 (20.9)	3173 (100)
Children	183 (3.9)	3142 (66.9)	598 (12.7)	776 (16.5)	4699 (100)
Total	332 (4.2)	5096 (64.7)	1004 (12.7)	1440 (18.3)	7872 (100)

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

The utilisation of health services for the care of acute diarrrhoeal episodes:
In total, about 67% of the children under five years of age who suffered from diarrhoea during the retrospective two years period before the survey was taken to a health care provider (Khoja et al., 2000). It was reported for the two week retrospective period before the survey that out of the children under five years of age who suffered from diarrhoea

172 (17.7%) were taken to a public hospital, 371 (38.1%) were taken to a primary health care centre, 113 (11.6%) were taken to a private doctor, 46 (4.7%) for whom advice was offered by a pharmacist, 6 (0.6%) for whom advice was offered by a traditional herbalist and 25 (2.6%) of the sick children for whom advice was offered by someone else. In the analysis a three category variable was created. It includes the utilisation of health care institutions' services, which are the main source of health care in Saudi Arabia. The variable includes the utilisation of the public health services including both primary health care centres and public hospitals only, the utilisation of private doctors' services only and a base line group of non utilisers of neither the public nor the private health care services. A fourth category was initially introduced including the utilisers of both the public and the private services -as in the utilisation of health services during general acute sickness, but due to the small number of children who utilised both services it was omitted from the analysis, for statistical purposes. There were 468 (52.3%) taken to a public health care facility, 81 (9.1%) were taken to a private health care provider and 346 (38.7%) were not taken to either of the health care providers.

The utilisation of health services for the care of acute respiratory tract infections:
In total, around 86% of the children under five years of age who had a respiratory infection -in the two week retrospective period before the survey- were taken to a health care provider (Khoja et al., 2000). It was reported that 637 (21.3%) of those who suffered from an acute respiratory infection were taken to a public hospital, 1482 (49.4%) were taken to a primary health care centre, 455 (15.2%) were taken to a private doctor, 150 (5%) for whom advice was offered by a pharmacist, 20 (0.7%) for whom advice was offered by a traditional herbalist, 48 (1.6%) for whom advice was offered by a relative or a friend, while 43 (1.4%) for whom advice was offered by someone else. In order to analyse the utilisation of formal health services where a child is seen by a doctor, a three category variable was created. Knowing that the major source of health care is doctors' services at health institutions, the variable covers the utilisation of public health services, including both primary health care centres and public hospitals only, the utilisation of private doctors' services only and a baseline group of non utilisers of either of the services. There were 1855 (68.1%) sick children taken to a public health care provider,

343 (12.6%) were taken to a private health care provider and 524 (19.3%) were not taken to a public facility nor a private health facility for the treatment of acute respiratory tract infections.

The utilisition of prenatal care services versus non-utilisation:
This variable is a two category variable. It includes either using or not using some prenatal care for the live births during a retrospective three year period. 6029 (92.8%) of the mothers belonged to the first group, while only 471 (7.2%) were non utilisers of prenatal care.

The time of initiation of prenatal care:
This variable indicates whether a mother had started her prenatal care visits in the first trimester, as recommended by the Ministry of Health, or not. It is recorded for the live births during the retrospective three year period. The original variable indicated the month in which the mother initiated her prenatal care visits. It assumes the following values.

Table 4.7. The month when the first prenatal care checkup took place for the live births during the previous three years period

The month when the first checkup took place	Frequency	Percentage
0	18	0.3
1	1242	21.2
2	2268	38.7
3	1121	19.1
4	575	9.8
5	278	4.7
6	130	2.2
7	115	2
8	72	1.2
9	43	0.8
Total	5863	100

Source: Analysis of the Saudi Arabia Family Health Survey, 1996.

The mean for this variable is 2.65 months. The standard deviation is 1.79. The median is 2 months and the mode is 2 months. In the analysis, the variable has been re-categorised

into two categories, whether prenatal care was initiated in the first three months or later. 4649 (79%) women initiated prenatal care in the first three months of pregnancy, while 1214 (21%) did that later.

The number of prenatal care visits:

This includes the number of prenatal care visits a mother made during her pregnancies with the live births she had during a retrospective three year period. Recognising that the approximate recommended number of visits is twelve visits, women who had made twelve or more prenatal care visits were put in the same category. This is done excluding women who did not remember the number of prenatal care visits they made.

Table 4.8. The number of prenatal care checkups that took place for the live births during the previous three years period

Number of prenatal care checkups	Frequency	Percentage
1	90	1.7
2	164	3.2
3	207	4
4	274	5.3
5	383	7.4
6	410	8
7	434	8.4
8	562	10.9
9	656	12.7
10	424	8.2
11	175	3.4
12+	1372	26.8
Total	5151	100

Source: Analysis of the Saudi Arabia Family Health Survey, 1996.

The mean number of visits is 8.6. The standard deviation is 3.7. The median is 8.6 visits and the mode is 9 visits.

The place of the last prenatal care checkup:

This variable originally contained four categories. It was reported that the place of the last checkup was a public hospital for 334 (30.7%) of the currently pregnant women, a public health care centre for 539 (49.5%) of the pregnant women, a private health facility

for 215 (19.7%) of the pregnant women and only one woman (0.1%) reported that her last prenatal care checkup was at home. In order to compare the utilisation of public and private health care services and their characteristics, a two category variable was created. This is represented by the utilisers of the public health care services, including public hospitals and primary health care centres, and the utilisers of the private health care sector. The mode of this variable is the utilisation of the public health services.

The full immunisation of infants:
This variable included two categories, whether a 12-13 months old infant had the complete set of immunisations recommended by the Ministry of Health or not.
It was reported that 1746 (79.5%) of the infants were fully immunised, while 451 (20.5%) of the infants were not fully immunised. It was intended to include a dependent variable of whether an infant had received any immunisation or not, but the data set included only 357 children, with only 13 children who did not receive any immunisation. This may be due to the fact that if the mother showed the immunisation card she was not asked this question.

4.9. A COMPARISON BETWEEN THE GENERAL SAMPLE CHARACTERISTICS AND THE CHARACTERISTICS OF THE SAUDI POPULATION

In order to assess whether the sample is representative of the Saudi population, a comparison between some of the sample characteristics and the characteristics of the Saudi nationals population, as reported in the 1992 Saudi demographic survey, is presented in this section. These characteristics include area of residence, age group, sex, marital status and educational attainment.

The distribution of the sample population compared to the Saudi demographic survey according to area of residence is provided in the following table.

Table 4.9. The distribution of the sample population and the Saudi population according to area of residence

Area of residence	The percentage in the Saudi Arabia Family Health Survey	The percentage in the Saudi demographic survey
Riyadh	22.8	21.2
Makkah	16.2	22.6
Eastern Province	15.5	15.5
Al-Medinah	14.9	6.8
Asir	8.9	9.3
Gizan	5.9	4.7
Al-Qaseem	4.3	4.9
Tabuk	3.3	3
Hail	3	2.8
Al-Baha	2.7	2.4
Najran	2.1	2
Al-Jouf	1.1	1.8
Northern boundaries	1.8	1.5
Total	100	100

Source: The Saudi Arabia Family Health Survey, 1996, and the Saudi demographic survey, 1992

It can be seen in the table that the sample is considered to be representative in terms of area of residence except for Al-Medinah where there seems to be some over representation in the percentage of sample participants, while for Makkah there is some under-representation in the sample.

Regarding age distribution, the following table displays the percentages of the population falling into each age group for the study sample and the Saudi demographic survey.

Table 4.10. The distribution of the sample population and the Saudi population according to age group

Age group	Percentage in the Saudi Arabia Family Health Survey	Percentage in the Saudi demographic survey
0-4	14.7	17.5
5-9	15.7	17.1
10-14	16	14.6
15-19	13.3	10.8
20-24	8.5	8.5
25-29	6	7

30-34	4.8	5.3
35-39	4.6	4.5
40-44	3.2	3
45-49	2.4	2.6
50-54	2.9	2.4
55-59	2.1	1.7
60-64	2.1	1.8
65-69	1.2	0.97
70+	2.5	2.29
Total	100	100

Source: The Saudi Arabia Family Health Survey, 1996, and the Saudi demographic survey, 1992.

It can be seen from the table that the percentage distribution of the population according to age group in the Saudi Arabia Family Health Survey is considered to be representative of the Saudi population. The sex distribution is also very similar with 50.2% of the sample being males and 49.8% being females, while in the Saudi demographic survey 50.49% were males and 49.51% were females.

Regarding the marital status of the population, the following table will display the percentage distribution of the Saudi Arabian family health survey sample and the Saudi population according to marital status.

Table 4.11. The distribution of the sample population and the Saudi population according to marital status

Marital status	Percentage in the Saudi Arabia Family Health Survey	Percentage in the Saudi demographic survey
Single (never married)	49.4	42.2
Married	46.2	52.2
Widowed	3.4	4.2
Divorced	1	1.5
Total	100	100

Source: Saudi Arabia Family Health Survey, 1996 and the Saudi demographic survey, 1992

It can be seen that the sample population marital status values are similar to the ones reported in the Saudi demographic survey.

In the following table, the education of the sample participants is compared to the education of the Saudi population as reported in the 1992 Saudi demographic survey.

Table 4.12. The distribution of the sample population and the Saudi population according to educational level

Educational level	Percentage in the Saudi Arabia Family Health Survey	Percentage in the Saudi demographic survey
Illiterate	24.3	28.4
Read	28.2	23.4
Primary	20.9	22.4
Preparatory	13.1	12
Secondary	7.8	8.7
Diploma	2.2	1.6
University and above	3.5	3.43
Total	100	100

Source: The Saudi Arabia Family Health Survey, 1996, and the Saudi demographic survey, 1992

It can be seen from the table that the educational levels of the Saudi Arabia Family Health Survey sample are very similar to the educational levels reported in the Saudi demographic survey.

On the comparison between the above sample characteristics of the Saudi Arabia Family Health Survey and the characteristics of the Saudi population, it is found that the sample is representative of the Saudi population; thus the results found in this study can be generalized to the Saudi population.

4.10. CHAPTER'S SUMMARY

In this chapter the methodology applied in the thesis was presented, starting with the research question and hypotheses. A brief description of the sampling process, the questionnaires, data collection and the data analysis methods applied was provided. This was followed by the description of the study variables and the sample characteristics. Finally, a comparison between the basic sample characteristics and the Saudi population characteristics was applied where it was found that the sample of the Saudi Arabia Family Health Survey is representative of the Saudi population.

Chapter 5

The Utilisation of Ambulatory Care Services for Acute Sickness

5.1. INTRODUCTION

The main aim of this chapter is to explore the utilisation of ambulatory health services during acute illness or injuries. This is in attempt to answer the research question if need is the major determinant of ambulatory care utilisation. The chapter will start by displaying the results of the analysis, including descriptive statistics, bivariate analysis and the multinomial logistic regressions for the utlisation of doctors' services in response to acute sickness during the previous two week period prior to the survey. The models are the parsimonious models and include only the significant predisposing, enabling and need factors. This will be followed by the discussion of the findings of the analysis, along with international comparisons and the chapter's summary.

5.2. RESULTS

5.2.1. Utilisation of health services for general acute sickness

There was a total of 8205 (10.8%) reports of acute illness or injuries during the two weeks preceding the survey. For adults over fifteen years of age, there were 3302 (8.4%) reports of illness and injuries. Whereas for children, there were 4896 (14.3%) reports of illness or injuries during the last two weeks. In response to acute sickness, several sources of health care were sought as a response. Table 5.1. shows the resort to care for adults, children and the total sick population. It is important to note that more than one source of care may have been sought for the same individuals; thus the events in the table are not mutually exclusive.

Table 5.1. Percentage of adults and chidren who have sought health care in response to acute sickness by the type of health care provider in the previous two week period

	Public doctor Number (%)	Private doctor Number (%)	Nurse Number (%)	Pharmacist Number (%)	Traditional healer Number (%)	Other person Number (%)
Adults	2159 (66.7)	590 (18.4)	92 (2.9)	256 (8)	54 (1.7)	50 (1.6)
Children	3420 (71.3)	840 (17.6)	84 (1.8)	288 (6.1)	47 (1.0)	73 (1.5)
Total	5579 (69.4)	1430 (17.9)	176 (2.2)	544 (6.8)	101 (1.3)	123 (1.5)

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

5.2.2. Utilisation of doctors' services

The following table displays the values of the various categories of the dependent variable included in the multivariate analysis. It is worth noting that utilisation data has been only recorded for individuals who reported acute illness or injury during a retrospective two week period before the survey.

Table 5.2. The utilisation of public and private doctors' services for acute sickness in the previous two week period

	Both public and private doctor consultation Number (%)	Public doctor consultation Only Number (%)	Private doctor consultation Only Number (%)	No doctor consultation Number (%)	Total
Adults	149 (4.7)	1954 (61.6)	406 (12.8)	664 (20.9)	3173 (100)
Children	183 (3.9)	3142 (66.9)	598 (12.7)	776 (16.5)	4699 (100)
Total	332 (4.2)	5096 (64.7)	1004 (12.7)	1440 (18.3)	7872 (100)

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

Regarding the utilisation of physician's services, a chi-square analysis has been performed on the cross tablulations between all of the independent variables and the dependent variable included in the multivariate analysis for adults and for children. Multinomial logistic regression has been also applied to the adults' and children's data in order to verify the effects of the predisposing, enabling and need factors on doctors' services utilisation including only significant variables in the final models.

5.2.2.1. The chi-square analysis for the utilisation of doctors' services in response to acute sickness

The following two tables display the results of the chi-square analysis for the effect of all of the independent variables and the utilisation of doctors' services as categorized in the dependent variable for the multivariate analysis for adults and for children. The cross tabulations are presented in the appendix.

Table 5.3. The chi-square results of the associations between the independent variables and adults' utilisation of doctors' services

The variable	Chi-square	df	Significance
Predisposing factors			
Age group	42.37	15	0.000
Gender	6.10	3	0.107
Marital status	20.80	9	0.014
Head of household age	43.75	12	0.000
Household size	79.04	12	0.000
Education	96.51	15	0.000
Economic activity	18.33	12	0.106
Head of household education	92.95	15	0.000
Head of household economic activity	16.29	9	0.610
Enabling factors			
Region	167.26	12	0.000
Urban/rural residence	144.40	3	0.000
Proportion of public doctors/10,000	119.67	12	0.000
Proportion of private doctors/10,000	121.69	12	0.000
Type of dwelling	84.18	6	0.000
Housing tenure	21.11	6	0.002
Crowding	104.28	12	0.000
Floor material	17.69	3	0.000
Toilet type	103	3	0.000
Main drinking water	102.60	3	0.000
Electricity	25.71	3	0.000
Car ownership	15.03	3	0.002
Radio	31.30	3	0.000
Colour TV	31.07	3	0.000
Satellite TV/cable	119.49	3	0.000
Need factors			
Disablity	88.61	3	0.000
Sick days	65.50	12	0.000

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

Table 5.4. The chi-square results of the associations between the independent variables and children's utilisation of doctors' services

The variable	Chi-square	df	Significance
Predisposing factors			
Age group	30.70	6	0.000
Gender	6.27	3	0.099
Head of household age	95.93	12	0.000
Household size	155.76	12	0.000
Relationship to head of household	11.16	3	0.011
Head of household education	247.17	15	0.000
Head of household economic activity	42.65	9	0.000
Enabling factors			
Region	287.96	12	0.000
Urban/rural residence	235.99	3	0.000
Proportion of public doctors/10,000	183.76	12	0.000
Proportion of private doctors/10,000	180.76	12	0.000
Type of dwelling	115.59	6	0.000
Housing tenure	73.36	6	0.000
Floor material	30.52	3	0.000
Toilet type	144.81	3	0.000
Main drinking water	123.99	3	0.000
Electricity	41.42	3	0.000
Car ownership	11.36	3	0.000
Radio	69.81	3	0.000
Colour TV	79.85	3	0.000
Satellite TV/cable	191.47	3	0.000
Need factors			
Disability	72.35	3	0.000
Sick days	110.88	12	0.000

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

5.2.2.2. The multinomial logistic regression model for adults' utilisation of doctors' services

For adults, predisposing, enabling and need related factors were included in the analysis, comparing the use of both public and private doctor's services, public doctor's services and private doctor's services to a threshold base line group of non users of doctors' services. This analysis was done on the data available on utilisation, which was provided for individuals who reported acute illness or injury during a retrospective two week period. Only the significant variables were included in the final model with the omission of the non significant variables as indicated by the likelihood ratio tests. The following

table displays the values for the obtained model. The likelihood ratio tests are provided in the appendix.

Table 5.5. The multinomial logistic regression results related to the utilisation of doctors' services for adults during a two week period

Number of observations: 3106, Pseudo-Rsquare: 0.18									
-2 Log Likelihood: 5263, chi-square: 625, chi-square significance: 0.000									
	Both public and private doctors			Public doctors			Private doctors		
Variable	beta	exp (B)	S.E.	beta	exp (B)	S.E.	beta	exp (B)	S.E.
Gender									
Female		1			1			1	
Male	0.153	1.17	0.208	0.278	1.32	0.101***	0.055	1.06	0.142
Marital status									
Married		1			1			1	
Single/ katib kitab	-0.088	0.92	0.257	0.240	1.27	0.124**	-0.285	0.75	0.174*
Divorced/ separated	-0.198	0.82	0.794	0.266	1.31	0.346	-0.318	0.73	0.574
Widowed	0.601	1.83	0.344*	-0.168	0.85	0.203	0.010	1.01	0.316
Education									
Illiterate		1			1			1	
Read	0.525	1.69	0.309*	-0.209	0.81	0.169	0.129	1.14	0.261
Primary education	0.121	1.13	0.329	-0.107	0.90	0.158	0.438	1.55	0.242**
Preparatory education	-0.019	0.98	0.369	-0.229	0.80	0.171	0.504	1.66	0.256**
Secondary education or diploma	0.376	1.46	0.345	-0.325	0.72	0.178*	0.884	2.33	0.249***
University	-1.172	0.31	0.776	-0.444	0.64	0.244*	0.630	1.88	0.319**
Head of household age									
20-29		1			1			1	
30-39	-0.001	1.00	0.345	0.449	1.57	0.178**	0.477	1.61	0.253*
40-49	0.091	1.00	0.355	0.488	1.63	0.180***	0.566	1.76	0.256**
50-59	0.236	1.27	0.356	0.680	1.97	0.184***	0.962	2.62	0.263***
60+	-0.61	0.94	0.346	0.433	1.54	0.176**	0.268	1.30	0.265
Region									
Central		1			1			1	
Eastern	0.091	1.00	0.284	0.231	1.26	0.158	0.524	1.69	0.203***
Western	-0.648	0.52	0.255**	-0.311	0.73	0.129**	-0.006	0.99	0.172
Northern	-0.074	0.93	0.448	0.412	1.51	0.220*	-1.786	0.17	0.551***
Southern	-0.617	0.54	0.329*	-0.238	0.79	0.158	-1.517	0.22	0.332***

Urban/rural									
Rural		1			1			1	
Urban	-0.122	0.86	0.256	-0.455	0.64	0.125***	0.569	1.77	0.226**
Radio									
No radio		1			1			1	
Have a radio	0.768	2.16	0.365**	-0.264	0.77	0.140*	0.005	1.00	0.232
Colour TV									
No colour TV		1			1			1	
Have a colour TV	0.394	1.48	0.332	0.360	1.43	0.148**	0.852	2.35	0.306***
SatelliteTV/ cable									
No satellite TV/cable		1			1			1	
Have a satellite TV/ cable	0.163	1.18	0.224	-0.365	0.69	0.116***	0.421	1.52	0.148***
Disability									
No disability		1			1			1	
Suffered from a disability	1.392	4.02	0.209***	0.700	2.01	0.097***	0.907	2.48	0.138***
Sick days									
0 days		1			1			1	
1-2 days	-1.972	0.14	0.765**	0.385	1.47	0.407	0.821	2.27	0.805
3-4 days	-1.215	0.30	0.712*	0.559	1.75	0.404	0.943	2.57	0.799
5-6 days	-0.195	0.82	0.745	0.731	2.08	0.432*	1.530	4.62	0.822*
7+ days	-0.081	0.92	0.696	0.648	1.91	0.405*	1.247	3.48	0.799
***p < 0.01, **p < 0.05, *p < 0.1									

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

The utilisation of both public and private doctors' services:

In modeling the factors affecting utilisation, with the threshold base line group being the non users of neither the public nor the private services, it has been found that from the predisposing factors, being widowed increased the likelihood of seeking both public and private care by about 1.8 times, compared to the married. But this finding is marginally significant. Being able to read, compared to illiterates, increased the likelihood of seeking both public and private care by about 1.7 times, but this finding is also marginally significant.

Regarding the enabling factors, living in the Western region decreased the likelihood of seeking both public and private care services by 48%, compared to the Central region. Living in the Southern region decreased the likelihood of seeking both public and private care by 46%, compared to the Central region, but this finding is marginally significant. Having a radio at home was associated with more than doubling of the likelihood of visiting both public and private service doctors.

Regarding the need related factors, the severity of illness, as indicated by having role limitations, was found to be associated with quadrupling the likelihood of seeking both public and private care. Sickness days was also related to the use of both public and private services, but in an unexpected way, where being sick for a day to two days and being sick for three to four days decreased the likelihood of visiting a doctor in both the public and private sector by 86% and 70%, respectively, but the second finding is marginally significant.

Other factors included in the model that were not found to be significant with regards to the use of either public or private services were gender, head of household age, urban/rural residence, having a colour television and a satellite TV or cable.

The utilisation of public doctors' services:
Comparing the threshold of non use of either public or private doctor's services, the predisposing factors significantly associated with public doctors' visits included gender, as males were 1.3 times more likely to visit a public service doctor, compared to females. Being single also increased the likelihood of visiting a public service doctor by about 1.3 times, while being highly educated decreased the likelihood of using public doctors' services by 28% for secondary or diploma degree holders, and by 36% for university and higher degree holders, compared to illiterates, but these findings are marginally significant. Being a head of household thirty years or older increased the likelihood of adult family members using doctors' services in the public sector by about 1.6 times for the heads aged between thirty and forty nine. Being a head of household aged between fifty and fifty nine and a head aged sixty or over increased the likelihood of adult family

members visiting the public services' doctors by about 2 times and 1.5 times, respectively, compared to heads less than thirty years of age.

Regarding enabling factors, living in the Western region was associated with a 27% less likelihood of visiting a doctor in the public services, while living in the Northern region increased the likelihood of visiting a public service doctor by 1.5 times, compared to the Central region, but this second finding is marginally significant. Living in an urban area, compared to a rural area, decreased the likelihood of visiting a public services' doctor by 36%. Having a radio at home decreased the likelihood of visiting a public health service doctor by 23%, but this finding is marginally significant. Having a satellite TV/cable decreased the likelihood of visiting a public health service doctor by about 30%, while having a television set at home increased the likelihood of visiting a public service doctor by 1.4 times.

Regarding the need related variables, being disabled due to illness led to the doubling of the likelihood of visiting a public services' doctor. Being sick for five or more days also led to the doubling of the likelihood of making a visit to the public service doctor, but this finding is marginally significant.

Utilisation of private doctors' services:
When comparing the threshold of no use of public or private services to that of using private services only, it has been found that among the predisposing factors being single decreased the likelihood of visiting a private services' doctor by 25% compared to the married, but this finding is marginally significant. Higher education was found to be positively associated with the use of private doctors' services. For primary, preparatory, secondary or diploma and university degree holders, they were found to be associated with the increase in likelihood of visiting a private doctor by about 1.6, 1.7, 2.3 and 1.9 times, respectively, compared to illiterates. Head of household age was also found to be significant. Being a family member in a family where the head of household's age was between thirty and thirty nine led to an increase in the likelihood of visiting a private doctor by 1.6 times, but this finding is marginally significant . Head of household's age

between forty and forty nine, and between fifty and fifty nine led to an increase in the likelihood of adult family members of visiting a private doctor by 1.8 and 2.6 times, respectively, compared to heads of household younger than thirty years of age.

Regarding the enabling factors, living in the Eastern region increased the likelihood of visiting a private doctor by 1.7 times, compared to the Central region, while living in the Northern or Southern regions decreased the likelihood of visiting a private doctor, compared to the Central region by about 83% and 78%, respectively. Living in an urban area increased the likelihood of visiting a private doctor by about 1.8 times as compared to living in a rural area. Having a television set at home or a satellite TV/cable increased the likelihood of visiting a private doctor by 2.4 and 1.5 times, respectively.

Need related factors were also found to be significant, with being disabled due to illness or injury leading to a increase of 2.5 times in the likelihood of visiting a private doctor, and being sick for five to six days increasing the likelihood of visiting a private doctor by 4.6 times, but the second finding is marginally significant.

It has been found that for adults among the predisposing factors, gender, marital status, education, head of household age were found to be significant predictors of physician service utilisation while an adult's individual age, household size, economic activity, head of household education and economic activity were not found to be significant. Regarding enabling factors, region of residence, urban/rural differentiation, having a radio, a television and a satellite TV/cable were found to be related to service use, while crowding, the type of housing, housing tenure, floor material, pipe or bottled drinking water, having electricity, having a flush toilet and owning a family car in the household and the number of public physicians and the number of private physicians per 10,000 of the population were not significantly related to service use. Regarding the need factors included, both disability due to illness and sickness days were found to be associated with service use, but sickness days association was marginally significant.

5.2.2.3. The multinomial logistic regression model for children's utilisation of doctors' services

For children, predisposing, enabling and need factors were tested for their association with the use of both public and private doctor's services, public doctors' services and private doctor's services in comparison to a threshold base line group of children who did not use either the public or private doctors' services in response to acute sickness. The model presented is the parsimonious model including the significant factors only as indicated by the likelihood ratio tests. The model characteristics are presented in the following table. The likelihood ratio test for the variables included in the model is provided in the appendix.

Table 5.6. The multinomial logistic regression results related to the utilisation of doctors' services for children during a two week period

Number of observations: 4018, Pseudo R-square: 0.21									
-2 Log Likelihood: 6360.612, chi-square: 910.515, chi-square significance: 0.000									
	Both public and private doctors			Public doctors			Private doctors		
Variable	beta	exp (B)	S.E.	beta	exp (B)	S.E.	beta	exp (B)	S.E.
Gender									
Female		1			1			1	
Male	1.001	2.77	0.370***	0.489	1.66	0.160***	0.396	1.52	0.447
Household size									
Fifth quintile (12+)		1			1			1	
First quintile (1-5)	0.763	2.18	0.387**	0.091	1.12	0.202	0.085	1.10	0.291
Second quintile (6-7)	-0.275	0.77	0.335	0.077	1.09	0.160	-0.199	0.82	0.243
Third quintile (8-9)	-0.238	0.79	0.314	0.224	1.26	0.150	-0.252	0.78	0.236
Fourth quintile (10-11)	-0.994	0.37	0.411**	0.133	1.15	0.157	-0.248	0.78	0.264
Head of household age									
20-30 years		1			1			1	
30-39 years	-0.150	0.46	0.304	-0.031	0.99	0.167	0.359	1.46	0.232*

40-49 years	0.511	1.69	0.348	0.160	1.19	0.185	0.492	1.65	0.262*
50-59 years	0.989	2.73	0.407**	0.354	1.45	0.214*	0.562	1.75	0.313*
60+ years	1.457	3.99	0.496***	0.497	1.53	0.243*	-0.026	0.88	0.480
Head of household education									
Illiterate		1			1			1	
Read	0.122	1.10	0.445	-0.112	0.88	0.159	0.326	1.34	0.342
Primary	1.137	3.05	0.393***	0.126	1.11	0.156	0.966	2.54	0.312***
Preparatory	1.177	3.20	0.422***	0.198	1.21	0.178	0.827	2.27	0.330***
Secondary or diploma	1.294	3.62	0.438***	0.535	1.70	0.190**	1.586	4.82	0.328***
University	1.213	3.34	0.450***	0.219	1.24	0.195	1.291	3.62	0.334***
Head of household occupation									
Salaried employee		1			1			1	
Not a salaried employee	-0.448	0.64	0.255*	-0.333	0.71	0.112***	-0.163	0.86	0.164
Region									
Central		1			1			1	
Eastern	0.464	1.60	0.269*	0.114	1.12	0.145	0.786	2.20	0.192***
Western	0.059	1.05	0.259	-0.208	0.81	0.130*	0.734	2.08	0.178***
Northern	-0.790	0.46	0.766	0.612	1.86	0.222***	-0.509	0.60	0.457
Southern	-0.606	0.56	0.331*	-0.301	0.76	0.147*	-1.213	0.31	0.331***
Urban/rural									
Rural		1			1			1	
Urban	-0.111	0.90	0.363	-0.263	0.78	0.156*	0.983	2.71	0.358***
House ownership									
House is owned		1			1			1	
House is provided by an employer	0.051	1.06	0.324	0.042	1.05	0.182	-1.192	0.31	0.311***
House is rented	-0.168	0.85	0.228	-0.062	0.94	0.114	-0.100	0.90	0.149
Crowding									
Fifth quintile		1			1			1	
First quintile	0.557	1.74	0.438	-0.197	0.82	0.181	1.197	3.30	0.326***
Second quintile	0.648	1.90	0.426	-0.132	0.87	0.170	1.129	3.08	0.316***
Third	0.560	1.76	0.406	-0.115	0.90	0.150	0.844	2.35	0.306***

quintile									
Fourth quintile	0.794	2.20	0.421*	0.202	1.22	0.154	1.077	2.93	0.315***
Flush toilet									
Do not have a flush toilet		1			1			1	
Have a flush toilet	0.560	1.78	0.380	0.043	1.06	0.141	0.774	2.22	0.367**
Car ownership									
Do not own a car		1			1			1	
Own a car	-0.608	0.55	0.272**	0.084	1.09	0.143	0.400	1.50	0.242*
Radio									
Do not have a radio		1			1			1	
Have a radio	0.211	1.24	0.292	-0.098	0.91	0.121	0.727	2.09	0.239***
Colour TV									
Do not have a colour TV		1			1			1	
Have a colour TV	0.832	2.31	0.401**	0.345	1.40	0.139***	1.289	3.65	0.374***
Satellite TV/cable									
Do not have a satellite TV/cable		1			1			1	
Have a satellite TV/cable	0.219	1.24	0.206	-0.228	0.80	0.113**	0.339	1.40	0.140***
Urban*male	-0.857	0.42	0.424**	-0.487	0.61	0.192***	-0.435	0.64	0.467
***p < 0.01, **p < 0.05, *p < 0.10									

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

Utilisation of public and private doctors' services:

Comparing the utilisation of public and private doctors' services to the lowest threshold baseline of using neither a public nor a private doctor's services it has been found that, from the predisposing factors, being male was associated with the increased likelihood of visiting both public and private care by 2.77 times, but being a male living in an urban area was associated with about a 60% decrease in the likelihood of being taken to both

public and private doctors, compared to females. Being a child in the smallest household size quintile i.e., there are 1-5 persons living in the household, was associated with about doubling the likelihood of visiting both a public and private services' doctors, compared to the fifth quintile i.e., there are 12 or more persons living in the household, while living in a household with a household size in the fourth quintile i.e., 10-11 persons living in the household was associated with decreasing the likelihood of visiting both public and private care by 63%. Living in a household where the head's age is older was associated with the increased likelihood of visiting both public and the private services, since being a head whose age is between fifty and fifty nine years old and being sixty or older was associated with a 2.73 and about 4 time increase in the likelihood of the child visiting both a public and private care doctors, respectively, compared to heads of household being less than thirty years of age. Being an educated head of household was associated with an increased likelihood of using both the public and private services for children. Holding a primary degree, a preparatory degree, a secondary degree or diploma and a university degree was related to the increased likelihood of a child visiting public and private service doctors by 3, 3.2, 3.6 and 3.3 times, respectively, compared to illiterate heads of households. Being a non-salaried employee head of household was associated with decreasing the children's likelihood of visiting both public and a private service doctors by 36%, but this finding is marginally significant.

Regarding the enabling factors, it has been found that living in the Southern region was associated with a 44% decrease in the likelihood of a child visiting both a public and a private care doctor, while living in the Eastern region was associated with the increased likelihood of visiting both a public and a private doctor by 60%, compared to the Central region, but these findings are marginally significant. Another marginally significant finding was living in a household in the fourth quintile of crowding, which was found to be associated with an increased likelihood of a child visiting both sources of care by 2.2 times, compared to the fifth quintile. A family owning a car was also associated with decreasing the child's likelihood of visiting both sources of health care by 45%. Having a television at home was associated with a 2.3 times increase in the likelihood of a child visiting both a public and a private service doctor.

Other factors included in the model that were not found to be significant with regards to the children's use of public and private doctors' services were urban/rural residence, tenure of the house, having a radio, satellite TV or cable and having a flush toilet at home.

The utilisation of public doctors' services:
In comparison with the base line group of non utilisers of doctors' services, it has been found that from the predisposing factors being a male child was associated with a 66% increase in the likelihood of visiting a public service doctor, but being a male living in an urban area was associated with about a 40% decrease in the likelihood of being taken to see a public service doctor, compared to females. Head of household characteristics were also found to be significant. Being a child living in a household where the head was over fifty years old was associated with the increased likelihood of visiting a public service doctor, with a 1.45 and 1.5 times more likelihood of a child visiting a public service doctor for heads aged between fifty and fifty nine and heads aged sixty and older, respectively, compared to heads of households younger than thirty years old, but this finding is marginally significant. Living in a household where the head of household had a secondary or diploma degree was associated with a 70% increase in the likelihood of a child visiting a public sector doctor. The head of household being a non-salaried employee was associated with about a 30% decrease in the children's likelihood of visiting a public service doctor.

Regarding enabling factors, it has been found that living in the Northern region was associated with an 86% increase in the likelihood of visiting a public service doctor, compared to the Central region. Living in the Western region or the Southern region was associated with the decreased likelihood of visiting a public doctor by 19% and 24%, respectively, compared to the Central region, but these findings are marginally significant. Living in an urban area was related to a 22% decrease in the use of public doctors' services, compared to living in a rural area. Having a television at home was related to a 43% increase in the likelihood of visiting a public service doctor, while

having a satellite TV or cable was associated with a 20% decrease in the use of public doctors' services.

Of the variables included in the model, some were not found to be significant. They include household size, head of household education, house ownership, crowding, car ownership, having a flush toilet, and having a radio at home.

The utilisation of private doctors' services:
Regarding the use of private services, compared to the base line group of non users of neither the public nor the private doctors' services, it has been found that from the predisposing factors, being a child living in a household where the head of household's age was between thirty and thirty nine was associated with a 46% increase in the likelihood of a child visiting a private doctor, while the head's age being between forty and forty nine years was associated with increasing the likelihood of a child visiting a private services doctor by 65%. Living in a household where the head's age being between fifty and fifty nine was associated with about 75% increase in the likelihood of the child visiting a private services doctor, but this finding is marginally significant. Living in a household where the head of household had formal education was found to be associated with the children's increased likelihood of using private doctors' services. The head of household's having primary education, preparatory, secondary or diploma and university education was related to a 2.5, 2.3, 4.8 and 3.6 times increase in the likelihood of using private doctor's services, respectively, compared to illiterates.

Regarding the enabling factors, living in the Western or Eastern regions was associated with the increased likelihood of visiting a private doctor by 2.1 and 2.2 times, respectively, while living in the Southern region was associated with a 69% decrease in the likelihood of a child visiting a private doctor, all compared to living in the Central region. Living in an urban area led to a 2.7 times increase in the likelihood of visiting a private doctor, compared to living in a rural area. Living in a house provided by an employer was associated with about a 70% decrease in the likelihood of visiting a private doctor, compared to living in a family that owned the house. Living in a less crowded

home was found to be related to the increased likelihood of visiting a private doctor, with living in a household in the first, second, third and fourth quintile associated with about 3.3, 3, 2.4 and 3 times likelihood of a child visiting a private doctor, respectively, compared to the fifth quintile of crowding. Having a flush toilet at home was associated with more than doubling the likelihood of visiting a private doctor. A family owning a car was associated with about a 50% increase in the likelihood of a child visiting a private doctor, but this finding is marginally significant. Having radio, television, satellite TV or cable was associated with 2, 3.7, and 1.4 times the likelihood of a child visiting a private doctor, respectively.

Factors included in the model but not found to be significant in relation to private doctor service utilisation were gender, household size and head of household occupation.

Regarding children's use of doctors' services, it has been found that, from the predisposing factors, gender, head of household age, household size, head of household education, head of household occupation were significant factors. From the enabling factors, region, urban/rural residence, home ownership, crowding, having a flush toilet, having a family car, having a radio, a television set, satellite TV or cable at home were found to be associated with service use. The extent of need represented by disability due to illness and sickness days were not found to be significant. Other non significant factors include, from among the predisposing factors, age of the child, relationship to the head of household and head of household economic activity. From the enabling factors, type of house, type of floor, main drinking water source and having electricity at home were not significant.

5.3. DISCUSSION

The data regarding the visits to health care resources were gathered if acute illness or injury had been reported in the previous two weeks, which will be briefly described in the following section. Since the dominant response was the consultation of the higher quality doctors' services the factors affecting doctors' services use in particular was explored, using multivariate analysis. In the following, I will briefly discuss the results of the

bivariate associations between the independent variables and the utilisation of doctors' services in the public and in the private sector. This will be followed with a discussion of both public and private services, public services and private services for adults and children, based on the multivariate analysis providing a comparison with the findings of the international literature, where applicable.

5.3.1. Utilisation rate of health services

Regarding the response to acute sickness, it is obvious that the major source of health care was the public doctors' services which approximately 70% of the sick population was referred to for their health care. This reflects mainly the use of GP services in primary health care centres, and not specialist services, since patients should be first seen by a primary health care physician who decides whether a referral to secondary care is required (Khoja et al., 1997). It also includes to a lesser extent visits to emergency departments in public hospitals, which can also refer to specialists' care (Al-Shehri & Al-Shammari, 1991). The second resource of health care was private doctors' services, forming about 18% of the ill and injured population's health care resource. This indicates, mainly, the probability of using higher quality specialist care, since self-referral is sufficient for the use of such services. This was reported by Al-Shammari (1992) in Riyadh city, where he reported that 17% of the sick population in Riyadh city had referred to specialist care in the private sector, while 7% had referred to private GP services. This is contrasted to 47% of the ill population referring to primary health care centre GPs and 4% to specialists in outpatient departments in hospitals. In an urban area in the Abha region, Southern Saudi Arabia, the use of primary care GP services were reported to be 67.7% for both chronic and acute health conditions, while 16.5% of the ill health conditions were treated in outpatient departments in public hospitals, thus reaching a total of 84.2% of care sought in the public sector (Abu-Zeid, 1989). Comparing the use of doctor's services to nurses services and pharmacists consultations, it is obvious that they do not form a major source of health care since only 2.2% consulted nurses and 6.8% had pharmacist consultations for their acute sickness. We can see that the major source of health care in Saudi Arabia is physicians' services, while lower quality paramedical consultation is considered to play a minor role. The use on non-medical

sources of care was also found to be very low, with only 1.3% consulting traditional healers and 1.5% consulting lay persons for their illness. This reflects the Saudi's society vast socioeconomic developments which have provided people with the ability to choose the best qualified modern health care providers. It also reflects the high accessibility of physician's services especially in the public sector.

In comparison with other Arabian Gulf states, it has been found that Saudi Arabia displays a similar pattern of health service utilisation. The percentages of the utilisation of various sources of health care in response to acute sickness are presented in the following table.

Table 5.7. Consultation of various sources of health care in response to acute sickness in the Arabian Gulf countries

Country	Consultation source					
	Public doctor	Private doctor	Nurse	Pharmacist	Traditional healer	Other
Bahrain	60.6%	14.7%	2.2%	8.7%	3%	2.1%
Kuwait	80.6%	10.6%	0.4%	3.1%	1.8%	1.7%
Oman	72.8%	18.8%	2.4%	1.6%	0.7%	1.8%
Qatar	74.2%	15.5%	2%	5%	1.8%	1.5%
United Arab Emirates	71.5%	18.2%	0.9%	2.5%	0.7%	0.8%

Source: Arabian Gulf countries Family Health Surveys, 2000

The utilisation of health services in response to acute sickness in Southeastern Asia took different patterns from what was reported for Saudi Arabia. In Indonesia, Chernichovsky & Meesook (1986) reported that 24,39% of ill persons aged fifteen and above were treated by physicians, 34.65% were treated by paramedics, while 9.14% were treated by traditional healers. Regarding children fourteen years and younger, 29.22% visited physicians, 23% were treated by paramedics and 8% of children visited traditional healers. In rural Indonesia, Berman (1987) reported a high use of traditional care, with 24.8% of the sick population referring to this type of care, while only 16.9% referred to government health facilities, but not indicating the use of doctors' services, and 12.8% referred to private care providers, out of whom 43% were paramedics. Gish (1988)

reported that in Indonesia, government services were used by 16.6% of the sick population, 12.6% used private health service providers of whom only 22.5% were doctors, while the rest were paramedics, and only 7.2% referred to traditional healers. In the Bicol region in the Philippines, Akin et al. (1986) reported that 18% used public services, 31% used private services –not necessarily doctor's services in either case, and 15% used traditional healers' services. In rural communes in Vietnam, Segall et al. (2000) reported low use of modern health care. Only 38% referred to modern health care, 27% were government services and 11% private services. In urban China, Gao et al. (2001) reported that in 1993, 59% saw a doctor and in 1998, 50% saw a doctor for their illness. In rural Gujarat, India, it was found that 35% of the sick went to government centres, 20% went to private doctors, while the majority (67%) went to traditional healers (Vissandjée et al.,1997).

In Africa, Coppo et al. (1991) reported that for a Dogon community 59.6% used modern health care, while a relatively high proportion (31.2%) referred to traditional care. In a peri-urban community in South Africa, even a higher proportion of use of traditional care was reported, making 51% of the sick population, and only 13% used GP and hospital services (Raynal , 1983). In a more recent study of another peri-urban area in South Africa, Hoffman et al. (1997) reported that 70.2% used public services for the reported illnesses while 29.8% used private services. In the North West province of Cameroon, Tembon (1996) found that 48.2% referred to government facilities, forming the main source of health care, 8.9% referred to private care while 11.3% referred to traditional healers. In rural Sierra Leone, Fabricant et al. (1999) reported that 22.2% used government facilities, 1.1% used private hospital or doctor services, 15.2% used other sources of modern health care, and only 4.6% went to traditional healers. In Dar es Salam, Tanzania, Wyss et al. (1996) reported that 35% used government facilities, compared to 41% who used private facilities.

It is worth noting that in developing countries, in general, the use of public or private services does not essentially mean that the patients are seen by doctors, since a significant proportion of the health services in developing countries is provided by paramedical staff.

It is obvious from the previous findings that the situation in Saudi Arabia is quite different from the general pattern in developing countries, with a higher reliance on doctors' services, especially in the public sector, the low dependence on allied medical professionals and the very limited use of traditional healers.

5.3.2. Utilisation of doctors' services

5.3.2.1. The bivariate associations between the independent variables and the utilisation of doctors' services

In this section I will discuss the relationship between the predisposing, enabling and need factors, and the utilisation of the public doctors' services and private doctors' services as found in the cross tabulations which were tested for significance using the chi-square test statistic. This includes adults and children with the focus on significant differences.

a) Adults' utilisation of doctors' services:

Predisposing factors:

It was found that the highest use of public services was for adults in the age group 15-19 years, which may be a result of increased accidents and the fact that they accompany other family members to primary health care centres, followed by adults older than 60 years of age, which may be a result of increased need. The highest use of private services was for adults in the range between 30 and 49 years of age, probably reflecting increased financial accessibility. For non users of doctors' services, adults in the age group 20-39 years displayed the highest percentages of non use of doctors' services.

Regarding age of head of household which is important due to the central role a head of household has in decision making even for adult family members, it was found that living in a household where the head of household's age was 30-59 years was associated with a slight increase in the utilisation of private care, reflecting possibly increased financial accessibility. For the utilisation of public services, there was a small increase in the utilisation of public services with the increase in the age of the head of household. Adults living in households where the head of household was 20-29 years old showed an

increase in the non use of health services, showing less reliance on medical care for adults living in houses where the head of household is younger.

Married individuals displayed more utilisation of the private services, while the divorced and separated showed the most use of the public services, followed by the singles, then the married. Since married individuals are more likely to be older than singles they may have higher financial accessibility for private care, leading to more use of private care. Being separated is also characteristic in younger more modernized individuals who may have lower financial access to private services, thus leading to more utilisation of the public services. Non utilisation of doctors' services was very close in value for individuals with a different marital status.

Being an adult in a household where there were 1-5 or 6-7 individuals living in a household showed less utilisation of health services. Living in a household where there were 1-5, 6-7, or 8-9 individuals living in the household showed more utilisation of private services than adults living in families with a larger number of individuals, which may reflect the availability of more resources to spend on private care and possibly a greater time flexibility with a decrease in social obligations, since larger families are more likely to have a higher proportion of small children.

Regarding education, in general there was a slight decrease in the utilisation of the public services with an increasing level of education, with the illiterates displaying the most use of the public services. Higher education was associated with the non use of health services in response to acute sickness, probably reflecting a high dependence on self-treatment. Having secondary and a higher level of education was associated with more use of private care, compared to lower educational levels, which probably reflects a higher financial accessibility and a higher level of health information, favouring higher quality specialists' care.

For heads of households' education, there was a decrease in the utilisation of public services for adults living in households where the head of household held a secondary or

higher degree, and an increase in the utilisation of private care by adults with the increase in the head of household's education, reflecting possibly higher financial accessibility as education is positively related with income (MOP, 2000).

Other predisposing factors that were tested for their association with the utilisation of health services but were not found to reach a 0.05 level of significance were gender, economic activity and head of household's economic activity.

Enabling factors:
Adults living in the Eastern and Western regions displayed more use of private care, since they were exposed to private care before the establishment of the Ministry of Health. This was followed by the Central region where the capital is situated. A much lower use of private care was displayed by residents in the Northern and Southern regions which are less socio-economically developed than other regions, reflecting lower private care accessibility. Adults living in the Southern and Northern regions displayed more use of public care, which is more equitably distributed compared to private care and is free of charge.

Rural residents depended more on the public services, while urban residents utilised more private services compared to rural residents for the care of acute sickness, reflecting lower accessibility of the private services for rural residents, including both financial and geographical accessibility.

Regarding the proportion of public doctors to the population, an increase in the number of doctors per 10,000 of the population was associated in general with more use of the public services. This possibly reflects higher accessibility of public doctors' services. When there was an increase in the proportion of private doctors to the population there was an increase in the utilisation of private doctors' services in general, and it was found to be associated with the less use of public doctors' services, showing a higher preference for private care where a higher concentration of private doctors' is available. Such

doctors are in turn more likely to practice in areas where there is a higher demand for private care.

Regarding the economic enabling factors as well as the media communication variables including type of dwelling, housing tenure, crowding, floor material, toilet type, main drinking water source, presence of electricity, car ownership, having a radio, having a colour television set and having a satellite TV/cable, it was found that, in general, being better off was associated with the utilistion of higher quality specialists' private care while being less better off was associated with the utilisation of the public services, indicating a higher financial and possibly geographical accessibility of private care for the economically better off individuals. A higher proportion of non users of any health service was found for individuals who do not have flush toilets in their home nor have electricity, possibly reflecting a lower geographical accessibility as these individuals are more likely to live in remote areas. Being less crowded, indicating a better economic status, was found to be associated with the non use of any of the health services, indicating possibly a more dependence on self-treatment. For further details on the cross tabulations refer to the appendix.

Need factors:
Not having a disability due to sickness was found to be associated with not using any health services due to acute sickness, while having a disability due to sickness was found to be associated with the utilisation of public services, which is the most frequent source of care utilised in Saudi Arabia.

In general, increased sickness days were associated with the increase in the utilisation of the health services, and an increase in sickness days was found to be associated with the utilisation of private care except for being sick for seven or more days, where there was a slight fall in the use of private care compared to being sick for 5-6 days.

b) Children's utilisation of doctors' services

Predisposing factors:

It was found that the use of public services increased with a child being older, but the opposite effect was found with regards to the use of private services. This may be due to a higher concern for younger children, leading to the consultation of specialists' care in the private sector.

Regarding age of the head of household, who is most likely to be the father of the child, it was found that public service utilisation by children increased with an increase in the age of the head of household, but being a child in a household where the head's age was 30-39 years was found to be associated with more use of private care. Age of head of household being 20-29 years was found to be associated with the most non use of doctors' services. This probably reflects the different attitudes to health care providers by heads of households with different ages.

A decrease in household size was found to be associated with the utilisation of private services, while the increase in household size was found in general to be associated with the utilisation of public services. This is probably due to the higher financial accessibility of specialist private care for smaller families. Not being a son or a daughter of the head of household was found to be associated with the non use of health services in response to acute sickness.

The utilisation of public services decreased with the increasing levels of heads of households' education, but the utilisation of private services was much higher for children living in houses where the head of household held a secondary or a higher degree. The highest group of non users was children of heads of household who can read but do not hold any educational degrees. The increased utilisation of private services by the highly educated is probably due to the higher economic accessibility and increased level of health information that favour specialists' care over free GP care in primary health care centres.

Children living in households where the head of the household was unemployed or a non salaried employee were more likely to not have used any doctors' services. This possibly reflects, in part, the lower geographical accessibility of health care services for this group of children, since unsalaried employees are more likely to live in remote areas. Children living in households where a head of household is working, doing housework or is a salaried employee was associated with more use of private care. The highest use of public services was for children where the head of household was retired, which may be due to the lower financial accessibility of private care.

The predisposing variable that was not found to be significantly associated with the utilisation of health services for children was gender, indicating no significant differences between males and females in the utilisation of health services.

Enabling factors:
Children living in the Western region were the most utilisers of private care, followed by children living in the Eastern region, then children in the Central region, with the children living in the less socio-economically developed Northern and Southern regions showing much lower utilisation of private care, which is possibly due to lower accessibility of private care, both geographically and financially. On the other hand, children of the Northern and Southern regions displayed more utilisation of public health care services. Children in the Northern and the Southern regions displayed a higher dependence on doctors' services for the care of children's acute sickness compared to other regions. Urban children displayed a higher use of private care compared to rural children while rural children displayed a higher use of public care, reflecting the lower accessibility of private care for rural children. There was no difference between the urban and rural children in the proportion of non service utilisers.

An increase in the proportion of public doctors in an area was found to be associated with an increase in the use of public doctors' services and a decrease in the use of private doctors' services for the fourth and fifth quintiles, while an increase in the proportion of

private doctors was found to be associated with an increase in the use of private doctors' services for the fifth quintile and a decrease in the use of the public doctors' services.

Regarding the economic enabling factors and the media communication variables including type of dwelling, crowding, floor material, toilet type, the main drinking water source, presence of electricity, having a private car, having a radio, having a colour television set and having a satellite TV/cable, in general, being in a disadvantaged position was found to be associated with the utilisation of public services while being in a more advantaged position was found to be associated with the utilisation of private care, reflecting possibly a higher level of financial accessibility for private care for the advantaged, with an additional effect favouring higher quality specialists care due to the effect of health education programmes in the media. The proportion of non utilisers in general was slightly higher for the economically disadvantaged children.

Need factors:
Suffering from a disability due to sickness was associated with the utilisation of health services, and suffering from an acute sickness for more days was associated with the utilisation of health services in the private sector.

5.3.2.2. Factors that affect adults' utilisation of doctors' services
In this section, I will try to briefly go through the factors tested for their effects on the utilisation of public doctors' services and private doctors' services applying the multinomial logistic regression technique. Comparison with the international findings in developed and developing countries, where applicable, will be mentioned.

Looking at the factors that affect doctors' services utilisation, from the predisposing factors, gender has been found to influence the use of public doctors' services only, with males using more services since they have a higher mobility than females and males usually accompany females when they go to see the doctor (Al-Ribdi, 1990; Bakhashwain, 1995). But this does not indicate the presence of a large gap of inequity between the two genders as the difference was not very large in magnitude, especially

since this difference was not established for the higher quality private care, although this shows a disadvantaged position of women in the use of health services. Males constituted a slightly higher percentage of users of primary health care services in Riyadh city (Saeed et al., 2001; Saeed & Mohammed, 2002), in Jeddah city in the Western region (Al-Dogaither & Saeed, 2000), in Abha in the Southern region (Al-Sharif et al., 2000) and in Al-Kharj in Central Saudi Arabia (Siddiqui & Obeigde, 2002).

The excess male use of health services has rarely been reported in other countries, but in the neighbouring Arabian Gulf countries males were reported to have used the public health services in response to acute sickness more than females. This has been reported for Bahrain (Naseeb, et al., 2000), for Kuwait (Alnesef et al., 2000), for Oman (Sulaiman et al., 2000), for Qatar (Al-Jaber & Farid, 2000) and for the United Arab Emirates (Fikri & Farid, 2000). Male excess use of health services was also reported in rural Bangladesh by Feldman (1983), and in Sri Lanka by Pieris (1999). In general, females tend to use more health care than males in developed countries, as reported in the United States by Falik & Collins (1996) and in Canada by Préville et al. (1998). It was also reported in several European countries, such as the United Kingdom, by Blaxter (1985), by Briscoe (1987), by the RCGP, OPCS and DH (1995) and by Smaje & Le Grand (1997), in Norway by Fylkesnes et al. (1992), in Italy by Mapelli (1993), in Denmark by Krasnik et al. (1997), and in the Netherlands by Alberts et al. (1997). Excess female use of health services was also reported for developing countries such as in China by Henderson et al. (1994), in Grenada, West Indies, by Poland et al. (1990), in Mexico by Leyva-Flores et al. (2000) and in Egypt by Ellis et al. (1994).

Being single increased the likelihood of visiting a public health care doctor. This may be due to the fewer social responsibilities put on singles, thus increasing their use of public care. The restrictions due to social responsibilities were reported in the United Kingdom for females by Evandrou et al. (1992) and by Young (1999) and in Norway by Andersen and Laake (1983). But the findings of this study regarding the effect of marital status is different from the findings by Al-Zahrani (1989) in Makkah, where being married was positively associated with the use of government health care facilities. However, his

report on pattern of use included the use of maternal health care visits as well as visits due to chronic conditions, and not only the use of care due to acute illness.

The excess use of primary health care centres was reported previously for singles in the United States population by Holman (2000), and being unmarried in Finland was found to be associated with frequent attendance to public health services (Jyväsjärvi et al., 1998). On the other hand, excess use of private services by the married was reported in South Africa for a peri-urban area, where married women used more private health care facilities than unmarried women (Hoffman et al., 1997).

Education was found to be positively related to the use of private care services. This may reflect the effect of higher incomes, as income increases gradually with education in Saudi Arabia (MOP, 2000), and it may also reflect higher levels of health awareness and concern, thus resorting to private specialist care. Thus, a two tier health care system probably exists in Saudi Arabia, with the better off members of the society utilising private specialist care. As found by many researchers, primary health care, the main source of public health care for acute illness, primary health care has certain problems such as over crowding, leading to long waiting times (El-Shabrawy et al., 1993; Al-Faris et al., 1996), and the language barrier between primary health care centre staff (including doctors) and the Saudi patients was also reported (Al-Faris et al., 1996; Mansour & Al-Osimy, 1996; Al-Khaldi et al., 2002). Added to that is the problem of doctors not explaining the patients' health conditions, which was reported for primary health care doctors (Al-Shammari, 1992; Al-Faris et al., 1996). These problems are generally absent in private care, with the advantage of the ability to self refer to a specialist with early scheduling of appointments, of which primary health care patients would prefer to be treated by them as reported by Al-Faris et al. (1996) and Saeed et al. (2001).

The reported relationship between lower education and the use of GP services was found previously in Italy (Piperno et al., 1990), in Finland (Karlsson, 1994; Jyväsjärvi et al., 1998), in the Netherlands (Van der Meer & Makenbach, 1997), in Australia (Wiggers et al., 1995) and in Canada (Mc Isaac et al., 1997). In developing countries, where the use

of private care is more prevalent, more use of private care by the highly educated was reported in rural Bangladeh by Feldman (1983), for women in Gujarat, India (Vissandjée et al., 1997), in Dakar, Senegal, by Fassin et al. (1988), in Dar es Salam, Tanzania, by Wyss et al. (1996), and in Cairo, Egypt, by Ellis et al. (1994) This is due to the perception of higher quality care of private care sources.

Regarding head of household age, it was related to the increased likelihood of using public health care services as well as private care services for adults living in houses where the head of household was older.This effect may be due to the culture of increased reliance on doctors' services, due to the decreased level of modern self-care health information for the older heads of households. It also reflects the major role a head of household plays in the decision making process in which he is expected to be highly respected, and his opinions to be taken into account before a decision is made. Younger heads of households have a less central role in decision making and are more exposed to health information; thus they may treat minor illnesses themselves and advise family members to do so, knowing that younger age is positively related to higher education (Khoja et al., 2000). A favourable view of the public health care services for the older heads of households may be due to the better treatment of older individuals by primary health care doctors, as they give them more consultation time, compared to younger individuals (Saeed et al., 2001).

Predisposing factors not found to be significant included many factors. Age was not found to be related to health service use. This may be because the use of health services has been recorded in the Saudi Arabia Family Health Survey only if an individual had reported acute illness or injury during the last two weeks, so the only people included were the ones who were actually in need, thus removing the effect of an increased incidence of diseases for the elderly. But since there were no differences in service use according to age, it can be argued that there are no differences in service accessibility or acceptability according to age.

Household size was also not found to be significant with regards to the use of doctors' services. This may indicate that there are no accessibility problems due to decreased family resources, as the household size becomes larger, such as reported previously in rural Cameroon by Tembon (1996), nor is there a positive effect on health service use due to information dissemination regarding where care should be sought for larger households. This positive effect of household size on health services use due to information dissemination was reported previously in Southern Iraq by Habib & Vaugham (1986), in Indonesia by Chernichovsky & Meesook (1986) and in rural Nepal by Subedi (1989).

Head of household's economic activity and the individuals' economic activity did not affect health service use. This is also considered to be a positive sign, with the accessibility of doctors' services not favouring either the working population or others. Unemployment status was reported to be related to more GP visits in the United Kingdom (RCGP, OPCS, DH, 1995; Carr-hill et al., 1996) and in California (Holman et al., 2000). In Cairo, Egypt, Ellis et al. (1994) found that the working population sought more health care than the non-working population, and that students were less likely to use health services compared to non-students. In a peri-urban area in South Africa employment was found to be related to the use of private care (Hoffman et al., 1997). For women, in Gujarat, India, employed women had higher use of health services due to women empowerment, their increased modernization and their better financial status (Vissandjée et al., 1997).

Among the enabling factors, the region of residence was found to be a significant factor in the use of public health care services, the use of private care services and the use of both services. This may be due to differentials in the culture of illness behaviour, types of health problems, and, most importantly, the geographical and financial accessibility of the public and the private health care services. Regional differentials in health services utilisation was reported previously in the neighbouring Arabian Gulf countries which include Bahrain (Naseeb et al., 2000), Kuwait (Alnesef et al., 2000), Oman (Sulaiman et al., 2000), Qatar (Al-Jaber & Farid, 2000) and the United Arab Emirates (Fikri & Farid,

2000). Inter-country variations were also reported previously for other countries, such as Canada (Birch et al., 1993; Dunlop et al., 2000) and rural China (Jianghui et al., 1997).

Urban-rural differences were also found to be significant, with the urban population utilising more private services and the rural population utilising more public services. This can be explained by the relative accessibility of private care in terms of financial and geographical accessibility for the urban population, while the rural population may not have the choice to use private care since public health care services, especially GP services, dominate the services available within their communities and are free of charge.

The excess use of GP services for the urban population compared to the rural population was reported for Canada by Dunlop et al. (2000), which is opposite to what has been reported in the United Kingdom (RCGP, OPCS, DH, 1995). General increased use for modern health services was reported previously for residents in urban areas in Morroco by Hotchkiss & Gordillo (1999) and in Mexico by Leyva-Flores et al. (2001), although this finding did not apply for the use of public health care services in this research. But in Sri Lanka, use of private care was reported to be less among rural populations, as found in the present study (Pieris, 1999).

Media communication facilities, including having a radio, a television set and a satellite TV or cable, were found to be influential in terms of using public care and private care. This emphasises the importance of media in influencing treatment behaviour by individuals, in addition to the indication of the effect of higher incomes, especially for households which have satellite TV or cable, leading to the utilisation of private services. Ownership of a television set was reported previously in Southern Iraq to be related to the use of local health centres (Habib & Vaugham, 1986).

From the enabling factors, it was found that the economic indicators –excluding media communication variables- were not significantly related to the use of doctors' services. These include crowding, type of housing, housing tenure, floor material, having pipe or bottled drinking water, having electricity, having a flush toilet and car ownership. This is

a good indicator of the high accessibility of doctors' services for the general population, rendering these factors non significant. Comparing this to previous findings, in the United Kingdom, housing tenure was reported to influence GP services utilisation (Evandrou et al., 1992; RCGP, OPCS and DH, 1995; Scaife et al., 2000). In an urban area of Ghana, the presence of a toilet and pipe water supply was related to service use (Fosu, 1989). In Gujarat, India, women who have access to tap water and have their own toilets were more likely to use modern health services (Vissandjée et al., 1997). Car ownership was reported to affect health service use in Kingston, Jamaica (Bailey & Phillips, 1990).

Public doctors and private doctors to population ratios were not found to be significant, indicating that the variation in the actual numbers of medical staff is not as important as an access measure. People may tend to tolerate, for example, having to wait for longer times to see doctors and have shorter consultation times without affecting their service use, although the supply of doctors was found to be important in some of the previous research. In Finland, Hakkinenen (1991) found that the supply of doctors was an important determinant of health care use. In Norway, high GP to population ratios and residence in municipalities with referral care were both found to be associated with higher use of specialist care (Fylkesnes, 1993).

Regarding the extent of need indicators, being disabled due to an acute illness or injury was found to be the most significant factor for the use of public care and the use of private care, which shows that increased sickness severity and role limitations, leading to the loss of economic activity, are of major importance. The effect of days spent in bed due to illness or injury on the use of health care services was reported previously by Al-Zahrani (1989) for Makkah city residents. Being sick for five to six days increased the likelihood of using a private doctors' services by more than four times, but the sickness days' effect is marginally significant.

The relationship between limitations of daily activities and use of health services was reported previously in the United Kingdom (Blaxter, 1985; Evandrou et al., 1992; Smaje & Le Grand, 1997; Cornford, 1998), in the Netherlands (Alberts et al., 1997) and in

Denmark (Krasnik et al., 1997). In Italy being sick and confined to bed was also found to be related to more service use than being sick without restrictions (Mapelli, 1993). Being confined to bed for longer periods of time was found to be related to seeking formal treatment in rural China (Jianghui et al., 1997). Having some deviations from normal activity due to illness increased the percentage of people who sought health care in Bolivia (Frerich et al., 1980). Longer illness was reported to be associated with an increased likelihood of health service consultation in Nepal (Subedi, 1989) and in rural Vietnam (Segall et al., 2000).

5.3.2.3. Factors that affect children's utilisation of doctors' services

In this section, I will discuss the relationship between the factors included in the analysis of the utilisation of doctors' services for children applying the multinomial logistic regression model, with a brief overview of the related international literature, where applicable.

Regarding the predisposing factors, being a male child biased toward more both public and private doctors' consultations, and public doctors' consultations. This did not stand true for urban areas where a reversed pattern appears, with a female preference in terms of service use. This shows the effect of modernization where the traditional male preference tends to fade with the residence in urban areas, where people are also more likely to be of higher socioeconomic status. The male child preference was reported before in more traditional, poor societies such as in rural Bangladesh where male children were taken more to private care than females (Levin et al., 2000), and being a male neonate was found to be related to an increased probability of being taken to a trained medical provider (Ahmed et al., 2001).

Household size was found to be significant in relation to the use of both public and private services, with being a child in the smallest household quintile i.e., 1-5 persons are in the household leading to an increase in the likelihood of visiting both public and private care doctors, but living in the fourth quintile i.e., 10-11 persons are in the household leads to the decreased likelihood of visiting both public and private care

providers, comparing to living in the fifth largest household quintile. Although it can be argued that the effect of living in the smallest household quintile may be due to increased family resources and the availability of more free time for adults, due to the decrease in the number of children. Another possible explanation is the inexperience with child care and childhood illnesses for families with a fewer number of children.

It has been reported previously in the United States by Newacheck (1992) that children from smaller families were more likely to be high utilisers of health care, compared to children from larger families; and in New York, Wolfe (1980) reported that a fewer number of children in a household was associated with an increase in physician consultation for children. In Scotland, Campion and Gabriel (1985) reported the same finding. This effect of the existence of a higher number of children and a decrease in children's consultation was also reported in Honduras by DeClerque et al. (1992). But in Grenada, West Indies, increased household size was related to the increase in children's use of health services, which was explained by the contagion effect increasing the number of children needing health care (Poland et al., 1990).

Head of household older age was found to be associated with an increase in the utilisation of both public and private services for the care of children's sickness. This indicates the culture of increased reliance on medical services for older individuals, who reflect their views on children living in their households, and possibly the higher levels of concern for young children by older heads of households and their lower levels of health information regarding the management of children's illnesses.

Increased head of household education was found to be related to an increase in the use of both public and private services and the use of private services for children. This may be due to the relationship between higher education and income which increases the ability and willingness to pay for services and the educated individuals' preference of private care, especially specialist care. Also, it may be due to the increased level of health awareness and health concern.

In the United States, parents who completed some college education had more children making high use of health services, compared with children of parents with less than high school education (Newacheck, 1992). The relationship between increased father's schooling and service utilisation was reported previously in Bangladesh. It was reported by Ahmed et al. (2000) that being a child living in a household where the father had one to five years of schooling was related to the increased propensity to seek medical care for sick children.

Being a child living in a household where the head was a non-salaried employee decreased the likelihood of visiting the public services. This may be due to the lower accessibility and/or lower acceptability of health care services for non-salaried employees, compared to salaried employees, who may live in more remote areas and belong to the lowest socioeconomic segment of the society.

From the predisposing factors included in the analysis, three factors were not found to be significant. These included child's age and his/her relationship to the head of household and head of household economic activity. The absence of a relationship between the child's age and service use may be due to the fact that the children included in the analysis were the one's who suffered from acute sickness, and it is not a measure of the total utilisation of health services, which may have resulted in a significant effect since younger children were reported to suffer from more acute sickness, compared to older children (Khoja et al., 2000). The relationship to the head of household was not found to be significant, indicating that there is no discrimination between children according to their relationship to the head of household. Head of household economic activity was not found to be significant, while being a salaried or a non-salaried employee was. This indicates that the type of employment is more important than being employed or not, indicating that for service use detailed economic activity is needed to verify its effect.

Regarding the enabling factors, region of residence was found to be significant, indicating differences in the culture of treating children's sickness, with the preference of private services for residents in the Western and Eastern regions where they were

exposed to modern health care before the establishment of the Ministry of Health. This effect was reversed for children resident in the Southern region, which is possibly due to differences in service accessibility. Children resident in the Northern region displayed more use of the public health services, compared to the Central region; thus showing a higher dependence on GP services as compared to children resident in the Central region. Regional differentials in children's health service use was reported previously for the child population of the United States (Newacheck, 1992). It was also reported for Jordanian children (Obermeyer et al., 1993). Geographical location was also reported to affect children's service use. Children living in the high lands of Rwanda were found to use less health services (Csete, 1993). This may in part resemble the situation for children living in the Southern part of Saudi Arabia, since it is largely a mountainous area with a high proportion of scattered populations.

Urban children were found to use more private services while rural children seemed to utilise more public services. This may be explained by financial and geographical accessibility factors, where public services are more readily available in rural areas in terms of their geographical accessibility and that they are free of cost including the supply of free medication. While in urban areas private care is geographically accessible and people have higher incomes than those in rural areas thus increasing their ability to pay for health services. In Ontario, Canada, living in an urban area explained use of health services for children (Woodward et al., 1988). Regarding developing countries, Fosu (1994) has found in five African countries that children in urban areas were more likely to have used health services compared to rural children. In Jordan, rural children were found to have a less likelihood of being taken to health services (Obermeyer et al., 1993).This was supported by Delerque et al. (1992) for Honduran children, but this finding was not established for public care use in this research. In Maynamar, children living in urban areas were more likely to have used private care while rural children were more likely to have used public care (Aung et al., 1994). Although this finding is similar to the one reported in this study, it differs in the fact that the public and private services used in Saudi Arabia are doctors' services, which is different from most developing countries.

Some of the economic status indicators were found to be significant with regards to children's use of private care. These factors include home ownership, car ownership, crowding and having a flush toilet at home. Not owning or renting a home was related to less use of private care, while having more space per individual is related to the use of private care, so is having a flush toilet at home and owning a family car. Unexpectedly, owning a car led to a decrease in the use of both public and private care, but the number of users of both services is small so this finding may not be as significant. Household resources were reported previously in Uganda and Togo to affect children's use of services with families having lower resources being related to children's less use of health services (Fosu,1994). In Jordan, more space available per individual was related to more use of pediatric care (Obermeyer, 1993), and the more number of bedrooms a house had in Grenada West Indies, the more was the use of children health services (Poland et al., 1990). In Mexico, car ownership affected the site of choice of medical care (Granich et al., 1998).

Media communication facilities including radio, television and satellite TV or cable had a positive effect with regards to the use of both public and private care services, public services and private services, with differences in type of media communication facilities and the magnitude of the effect. This indicates the effect of health information conveyed through these media channels, favouring doctors' consultations, except for the presence of satellite TV or cable which decreases the use of public services. This may be due to the fact that families who have satellite TV or cable are of higher socioeconomic status and may not rely on public health services as the main source of health care.

From the enabling factors, which indicate the economic status of the family, type of housing, type of floor, pipe or bottled drinking water supply and having electricity at home were not found to be related to children's use of doctors' services during sickness. Since these enabling factors were not found to be significant, and other factors were found to affect private care use only, it can be argued that the level of service accessibility is considered to be high with regards to public health services. Public doctors and private doctors to population ratios were not found to be significant in

relation to service use, indicating that other indicators are better measures of the accessibility of heatlh services in the Saudi Arabia with relation to service utilisation.

The need related factors included in the analysis were not found to be significant with regards to health services utilisation. Disability due to sickness seemed not to affect children's use of services. This may be due to the fact that children's activities are not perceived to be very important to the extent that its disruption leads to consultation. Sickness days were also not found to motivate parents to seek care for their children. This finding indicates that for Saudi children, other acute sickness characteristics influence the parents' decision to seek care for general acute health conditions, such as type of illness conditions and the associated symptoms.

In the United States, Diaz et al. (1986) have found that high utilisers of health services had more disability days and days lost from school. Increased duration of illness was reported previously to have a positive effect in relation to taking health actions for children including medical consultations in Northern India (Berman et al., 1997) and in a high land region in Rwanda (Csete, 1993). In Marakech, the duration of cough was found to be positively related to service use (Maynard-Tucker, 1998) and in Honduras the duration of a diarrhoea episode was reported to be positively associated with service use (DeClerque et al., 1992).

5.4. CHAPTER'S SUMMARY

In an attempt to answer the research question whether need is the major determinant of ambulatory health care utilisation, two multivariate multinomial logistic models were applied, one for adults and another for children with the dependent variable being the use of different sources of doctors' services, compared to a baseline group of non users of doctors' services for the care of acute sickness during a two week retrospective period. For adults, from the predisposing factors gender, marital status, education, head of household age were found to affect doctors' services utilisation. From the enabling factors, region of residence, its urban/rural character and media communication facilities were found to be significant. The need variable disability due to illness was found to be

significant. Factors which were found to affect children's use of doctors' services, from the predisposing factors gender of the child, household size, head of household age, head of household education and head of household occupation were found to influence the use of doctors' services. Enabling factors which were found to be significantly related to service use were region of residence and it urban/rural character, housing tenure, crowding, having a flush toilet at home, car ownership and media communication facilities including having a radio, coloured TV set and a satellite TV or cable at home. Need related variables including disability due to illness and sickness days were not found to be significant, indicating that other illness characteristics play a greater role in the decision to seek medical care, such as type of the illness condition and symptoms. Looking at the findings in general, it can be concluded that need is not the sole determinant of the utilisation of health services for the response to acute sickness since some of the predisposing and enabling factors were found to be significant.

Chapter 6

The Utilisation of Health Services for Children's Diarrhoea and Acute Respiratory Infections

6.1. INTRODUCTION

In the previous chapter, the affect of the predisposing, enabling and need factors on the utilisation of doctors' services was assessed for adults and for children in response to acute sickness episodes. In this chapter, children under five years of age's utilisation of health services in response to diarrhoea and acute respiratory infections is discussed. Bivariate associations between the independent variables and the utilisation of health services are explored and multivariate analysis, assessing the effects of the predisposing, enabling and need factors on service use, is applied with the inclusion of mothers' characteristics, since this information is available for children under five. Comparison with the literature from developing countries –where diarrhoea and acute respiratory infections form a major health challenge- will also be undertaken, although it is found to be scarce with regards to the factors included on the utilisation of medical services for children's diarrhoea and acute respiratory infection episodes. The chapter will start by displaying the results, followed by a discussion of these results, and ending with the summary of the findings of the analysis.

6.2. RESULTS

6.2.1. The utilisation of health services for children's diarrhoea and acute respiratory infections

Regarding the two weeks prevalence of diarrhoea for children younger than five years of age, it was found that 973 (9.1%) of the children have suffered from diarrhoea, while 2997 (28%) have suffered from acute respiratory infections. In response to the children's diarrhoea and acute respiratory infection episodes, during the two week retrospective recall period, several sources of health care were sought.

For the care of diarrhoea, 172 (17.7%) of the children were taken to a public hospital, 371 (38.1%) were taken to a primary health care centre, 113 (11.6%) were taken to a private doctor, for 46 (4.7%) advice was offered by a pharmacist, for 6 (0.6%) advice was sought from a traditional herbalist, and 25 (2.6%) of the children were taken to someone else, with a total of 652 (67%) of children who had care sought for them. The dependent variable included in the analysis is the utilisation of public health services, including both primary health care centres and public hospitals only, the utilisation of private doctor's services only and a baseline group of non-utilisers of either of the services. According to the data, there were 468 children (52.3%) taken to a public health care facility, 81 (9.1%) were taken to a private health care provider and 346 (38.7%) were not taken to either of the health care providers.

In response to acute respiratory infections, 637 (21.3%) of the children were taken to a public hospital, 1482 (49.4%) were taken to a primary health care centre, 455 (15.2%) were taken to a private doctor, for 150 (5.0%) advice was given by a pharmacist, for 20 (0.7%) advice was given by a traditional herbalist, for 48 (1.6%) advice was given by a relative or friend, while for 43 (1.4%) advice was given by someone else, with 2565 (85.6%) of children having care sought for them. The dependent variable was categorized for the utilisation of health services in response to diarrhoea. There were 1855 (68.1%) sick children taken to a public health care provider, 343 (12.6%) were taken to a private health care provider and 524 (19.3%) were not taken to a public facility nor a private health facility for the treatment of acute respiratory infections.

6.2.2. The chi-square analysis for the utilisation of formal health services in response to diarrhoea and acute respiratory infections

In this section the results of the chi-square analysis for the associations between the independent variables and the utilisation of the formal health services in response to diarrhoea and acute respiratory infections are displayed in the following two tables, with the cross tabulations provided in the appendix.

Table 6.1. The chi-square results of the associations between the independent variables and children's utilisation of health services in response to diarrhoea

The variable	Chi-square	df	Significance
Predisposing factors			
Age group	13.45	8	0.097
Gender	0.15	2	0.929
Birth order	25.66	6	0.000
Mother's age	28.39	6	0.000
Head of household's age	17.00	8	0.030
Household size	19.15	8	0.014
Mother's education	70.52	8	0.000
Mother's economic activity	5.29	4	0.259
Head of household education	37.99	10	0.000
Head of household economic activity	0.61	2	0.738
Child's health rating	5.44	4	0.245
Enabling factors			
Region	22.38	8	0.004
Urban/rural residence	35.07	2	0.000
Type of dwelling	44.60	4	0.000
Housing tenure	13.17	4	0.010
Crowding	35.65	8	0.000
Floor material	8.25	2	0.010
Toilet type	31.37	2	0.000
Main drinking water	19.89	2	0.000
Electricity	4.53	2	0.104
Car ownership	0.39	2	0.820
Radio	10.64	2	0.000
Colour TV	4.71	2	0.000
Satellite TV/cable	34.98	2	0.000
Need factor			
Sick days	40.66	6	0.000

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

Table 6.2. The chi-square results of the associations between the independent variables and children's utilisation of health services in response to acute respiratory infections

The variable	Chi-square	df	Significance
Predisposing factors			
Age group	11.41	8	0.179
Gender	0.03	2	0.987
Birth order	62.69	6	0.000
Mother's age	30.60	6	0.000
Head of household's age	60.19	8	0.000
Household size	67.44	8	0.000
Mother's education	254.47	8	0.000
Mother's economic activity	26.10	10	0.000
Head of household education	111.39	10	0.000

Head of household economic activity	11.13	2	0.004
Child's health rating	8.37	4	0.079
Enabling factors			
Region	132.11	8	0.000
Urban/rural residence	137.51	2	0.000
Type of dwelling	67.18	4	0.000
Housing tenure	23.95	4	0.000
Crowding	139.64	6	0.000
Floor material	14.72	2	0.001
Toilet type	67.26	2	0.000
Main drinking water	68.05	2	0.000
Electricity	21.52	2	0.000
Car ownership	17.93	2	0.000
Radio	34.19	2	0.000
Colour TV	48.47	2	0.000
Satellite TV/cable	114.05	2	0.000
Need factors			
Difficulty in breathing	40.30	2	0.000
Sick days	67.50	6	0.000

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

6.2.3. The multivariate model for the utilisation of formal health services in response to diarrhoea

In order to assess the effect of predisposing, enabling and need factors on the utilisation of public or private health services, in comparison to a base line group who did not utilise either of the services in response to children's diarrhoeal episodes during a two week retrospective period, a multinomial logistic regression model was applied for which the following table will display the main results. The likelihood ratio tests for the included variables are provided in the appendix. It is worth noting that the number of diarrhoea days was not recorded for all of the children, leading to a discrepancy between the actual recorded number of utilisation of services in response to diarrhoea and the number of cases included in the multivariate model.

Table 6.3. The multinomial logistic regression results related to the utilisation of health services for the treatment of children's diarrhoea during a two week period

Number of observations: 513, Pseudo R-square: 0.19						
-2 Log Likelihood: 205.060, Chi-Square: 109.600, Significance: 0.000						
	Public services			Private services		
Variable	Beta	exp (B)	S.E.	Beta	exp (B)	S.E.
Mother's education						
Illiterate		1			1	
Literate	-0.058	0.94	0.297	0.070	1.07	0.617
Primary	0.019	1.02	0.290	-0.278	0.76	0.654
Preparatory	-0.190	0.83	0.349	0.732	2.08	0.585
Secondary and above	-0.621	0.54	0.336*	1.829	6.23	0.478***
Urban/rural						
Rural		1			1	
Urban	-0.643	0.53	0.229***	0.530	1.70	0.473
Illness duration						
0-2 days		1			1	
3-4 days	0.843	2.32	0.238***	1.270	3.56	0.459***
5-6 days	1.935	6.93	0.487***	1.644	5.18	0.766**
7+ days	1.138	3.12	0.291***	1.902	6.70	0.493***
***p < 0.01, **p < 0.05, *p < 0.10						

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

Utilisation of the public health services:

In response to children's diarrhoea, compared to a base line group of non-utilisers of either the public or the private health care services, from the predisposing variables, mothers' holding secondary and above degrees was related to a 46% decrease in the likelihood of taking a child to a public health care provider, compared to illiterates. But this finding is marginally significant. From the enabling factors, living in an urban area was related to a 47% decrease in the likelihood of taking a child to public health care in response to diarrhoea, compared to children living in a rural area. The need variable included, which is diarrhoea days, was found to be significant. A child suffering from diarrhoea for 3-4 days, 5-6 days and seven or more days was related to a 2.32, 6.93 and 3.12 times more likelihood of being taken to the public services, respectively, compared to children suffering from diarrhoea for two or less days.

Utilisation of the private health services:

Compared to a baseline group of non-utilisers of either the public or the private services, it has been found that, from the predisposing factors, mothers' holding secondary or above degrees was related to a 6.23 times increase in the likelihood of a child suffering from diarrhoea to be taken to a public health care provider. A child being sick for 3-4 days, 5-6 days and seven or more days was related to a 3.56, 5.18, and 6.70 times increase in a child's likelihood of being taken to private care, respectively, compared to a child sick for two days or less.

Other factors tested for their effects and not found to be significant include, out of the predisposing factors, a child's age, gender, birth order, health status rating and household size, in addition to mothers' age and economic activity. Head of household's age, education and economic activity were also not found to be significant. From the enabling factors, region of residence and economic indicators were not found to be significant. These include type of housing, housing tenure, type of floor, availability of a flush toilet, car ownership, availability of electricity and pipe or bottled water supply. Besides, media communication variables, including having a radio, a colour television set, and satellite TV/ cable, were not found to be significant.

6.2.4. The multivariate model for the utilisation of formal health services in response to acute respiratory infections

In order to assess the effects of the predisposing, enabling and need factors on the utilisation of the public services and the utilisation of the private services, compared to a baseline group of non-utilisers of either services, a multinomial logistic regression was applied in which a parsimonious model was reached. The basic characteristics of the model obtained are shown in the following table. The likelihood ratio tests for the included variables are presented in the appendix.

Table 6.4. The multinomial logistic regression results related to the utilisation of health services for the treatment of children's acute respiratory infections during a two week period

Number of observations: 2670, Pseudo R-square: 0.21						
-2 Log Likelihood: 3588.166, Chi-Square: 639.574, Significance: 0.000						
	Public services			Private services		
Variable	Beta	exp (B)	S.E.	Beta	exp (B)	S.E.
Mother's age						
15-24 years		1			1	
25-34 years	-0.117	0.89	0.148	-0.334	0.72	0.217
35-44 years	0.457	1.58	0.195**	0.971	2.64	0.287***
45+ years	-0.154	0.86	0.315	0.640	1.90	0.535
Head of household age						
20-29 years		1			1	
30-39 years	0.451	1.57	0.170***	0.315	1.37	0.236
40-49 years	0.437	1.55	0.193**	-0.103	0.90	0.292
50-59 years	0.525	1.69	0.230**	0.300	1.35	0.355
60+ years	0.141	1.15	0.225	-0.503	0.61	0.386
Mother's education						
Illiterate		1			1	
Literate	-0.252	0.78	0.164	-0.365	0.69	0.303
Primary	-0.050	0.95	0.162	0.630	1.88	0.264**
Preparatory	-0.091	0.91	0.204	1.011	2.75	0.296***
Secondary and above	-0.624	0.54	0.202***	1.231	3.43	0.280***
Mother's economic activity						
Doing housework		1			1	
Working	0.358	1.43	0.238	-0.168	0.85	0.285
Other	0.597	1.82	0.259**	0.376	1.46	0.348
Region						
Central region		1			1	
Eastern region	0.231	1.26	0.173	1.060	2.89	0.237***
Western region	0.053	1.06	0.148	0.835	2.31	0.215***
Northern region	0.263	1.30	0.214	-0.171	0.84	0.405
Southern region	0.192	1.21	0.174	0.064	1.06	0.340
Urban/rural						
Rural		1			1	
Urban	-0.198	0.82	0.338	1.410	4.10	0.320***

Crowding						
Fifth quintile		1			1	
First quintile	-0.129	0.88	0.180	0.945	2.57	0.352***
Second quintile	-0.048	0.95	0.181	1.110	3.04	0.348***
Third quintile	0.239	1.27	0.178	1.017	2.76	0.353***
Fourth quintile	0.085	1.09	0.175	0.207	1.23	0.386
Electricity						
Do not have electricity		1			1	
Have electricity	0.542	1.72	0.232**	-0.194	0.82	0.601
Car ownership						
Do not own a car		1			1	
Own a car	0.380	1.46	0.155**	0.600	1.83	0.282**
Colour TV						
Do not have a colour TV set		1			1	
Have a colour TV set	0.356	1.43	0.161**	1.495	4.46	0.423***
Difficulty in breathing						
Did not have difficulties in breathing		1			1	
Had some difficulties in breathing	0.621	1.86	0.126***	0.978	2.66	0.172***
Illness duration						
0-2 days		1			1	
3-4 days	0.441	1.55	0.147***	0.895	2.45	0.257***
5-6 days	0.875	2.40	0.206***	1.070	2.91	0.338***
7+ days	0.959	2.61	0.146***	1.555	4.74	0.249***
***p < 0.01, **p < 0.05, *p < 0.10						

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

The utilisation of the public health services:

For the treatment of acute respiratory infections for children under five, compared to a base line group of non-utilisers of either the public or the private health services, it has been found that, from the predisposing factors, mothers' being 35-44 years old was related to a 1.58 times increase in the likelihood of a child being taken to a public health care provider, compared to mothers aged 15-24 years. Head of household's being 30-39, 40-49 and 50-59 years old was related to a 1.57, 1.55 and 1.69 times increase in the likelihood of a child being taken to public care, respectively, compared to heads of household aged 20-29 years old. Mothers' holding a secondary or above degrees was related to a 46% decrease in the likelihood of using the public services, compared to illiterate mothers. Mothers' not working nor doing household work as their main occupation was related to a 1.82 times increase in the likelihood of a sick child being taken to the public services, compared to mothers who do housework as their main activity.

From the enabling factors, having electricity at home was related to a 1.72 times increase in the likelihood of a child having an acute respiratory infection being taken to public care services, while a family owning a car was related to 1.46 times increase in the likelihood of a child being taken to the public services, and having a colour television set was related to a 1.43 times increase in the likelihood of a sick child to be taken to a public health care provider.

Among the need factors, a child suffering from difficulties in breathing was related to 1.86 times increase in the likelihood of a child's being taken to a public health care provider. Being sick for 3-4 days, 5-6 days and seven or more days was related to 1.55, 2.40, and 2.61 times increase in the likelihood of a child being taken for care at a public health care provider, respectively, compared to children who are sick for two or less days.

Factors included in the model and not found to affect the utilisation of public services in response to acute respiratory infection are region, its urban/rural character and crowding.

The utilisation of the private health care services:

Compared to a base line group of non users of either the public nor the private health care services, it has been found that, from the predisposing factors, mothers' age being 35-44 years old was related to a 2.64 times increase in the likelihood of a child suffering from an acute respiratory infection being taken to a private doctor, compared to mothers who were 15-24 years old. Mothers' holding a primary degree, a preparatory degree and a secondary or a higher degree was related to a 1.88, 2.75, 3.43 times increase in the likelihood of a child being taken to private care, respectively, compared to illiterate mothers.

Out of the enabling factors, living in the Western region and living in the Eastern region was related to a 2.31 and a 2.89 times increase in the likelihood of a child's being taken to private care, compared to living in the Central region. Living in an urban area was associated with a 4.1 times increase in the likelihood of a child being taken to a private health care provider, compared to living in a rural area. Being in the first, second and third quintile of crowding was related to a 2.57, 3.04 and 2.76 increase in the likelihood of a child being taken to a private doctor, respectively, compared to the most crowded families in the fifth quintile. Having a family car was related to a 1.83 times increase in the likelihood of using private care, and having a colour television set at home was related to a 4.46 times increase in the likelihood of seeking private care for a child's acute respiratory infection.

A child suffering from difficulties in breathing was related to a 2.66 times increase in the likelihood of a child being taken to private care. Being sick for 3-4 days, 5-6 days and seven or more days was related to a 2.45, 2.91, and 4.74 times increase in the likelihood of a child being taken to a private doctor, respectively, compared to a child being sick for two or less days.

Factors that were included in the model and not found to affect the utilisation of private care in response to acute sickness are heads of households' age, mothers' economic activity and the availability of electricity at home.

Factors included in the analysis and not found to be significant include, out of the predisposing factors, a child's age, gender, birth order and the rating of his/her health status and family size. Head of household's education and economic activity were also not found to be significant. From the enabling factors, type of housing, housing tenure, floor material, availability of a flush toilet, pipe or bottled drinking water, having a radio at home and having a satellite TV/cable were not found to be significant.

6.3. DISCUSSION

6.3.1. The utilisation of health services for children's diarrhoea

6.3.1.1. The percentage of health service utilisation for children's diarrhea:

It was found that in response to diarrhea, 17.7% of children were taken to a public hospital, 38.1% were taken to a public health centre, 11.6% were taken to a private doctor, for 4.7%, 0.6%, 2.6% advice was sought from a pharmacist, traditional herbalist and other than the above mentioned sources, respectively, with a total of 67% having care sought for them. With regards to the total of children treated in health care facilities, Qadri et al. (1992) have reported that in the Eastern region of Saudi Arabia 60% of the children who suffered from diarrhoea were treated in health care facilities. Consultations in response to diarrhoea in neighbouring Arabian Gulf countries were reported in the family health surveys reports are as follows.

Table 6.5. Utilisation of health services in response to diarrhoea in the Arabian Gulf countries

Country	Public health centre	Public hospital	Private doctor	Pharmacist	Traditional herbalist	Other	Total sought care
Bahrain	14.5%	34.4%	14.9%	5.6%	4.5%	4.9%	57.3%
Kuwait	24.4%	40.8%	10.2%	1.1%	0.6%	2.8%	68.3%
Oman	40.4%	30.2%	12.5%	2.0%	0.8%	1.7%	72.8%
Qatar	18.7%	33.6%	15.6%	2.8%	1.5%	4.6%	42.5%
United Arab Emirates	65.8%	41.5%	21%	15%	1.8%	0.8%	65.8%

Source: Arabian Gulf countries Family Health Surveys, 2000

It can be observed that in Saudi Arabia, as well in other Arabian Gulf States, the major provider of care for children's diarrhoea episodes is -as for acute sickness in general- is the public sector, with Saudi Arabia, the United Arab Emirates and Oman residents relying more on primary health care centres than public hospitals. They have close percentages in terms of utilising private doctors' services, being the other main provider, except for the United Arab Emirates which shows approximately double the percentage of children taken to a private doctor compared to Kuwait and Saudi Arabia. Other sources of care play a minor role, indicating a high dependency on the higher quality doctors' services in the Arabian Gulf countries, in addition to the close percentages of the children for whom help was sought for the care of their diarrhoea episodes, except for Qatar which has the lowest percentage of children taken to health care providers in response to diarrhoea.

In other developing countries it has been found that in Tlaxcala, Mexico, 66% of the children who suffered from diarrhoea were taken to a medical facility (Pérez-Cuevas et al., 1996). In Suleja, Nigeria, it was reported that 50.6% of the children with diarrhoea were taken to health workers or health facilities, and 17.9% were taken to traditional healers (Babaniyi et al., 1994). In rural Northern Thailand it was reported that 34.6% were taken to local health centres, 19.2% of children suffering from diarrhoea were taken to private clinics, 9.8% were taken to hospitals, and for 25.1%, consultation was given by drug store sellers (Varavithya et al., 1989). In an urban slum in India private practitioners were the main providers of care for children's diarrhoea, with the governmental dispensaries and hospitals playing a minor role (Mishra et al., 1990). In rural Bangladesh, for neonates who suffered from diarrhoea, 88% were cared for by medically unqualified persons, 18% were cared for in private facilities and 10% were cared for in governmental facilities (Ahmed et al., 2001). It should be noted that in Saudi Arabia, as in developed countries, consulting a health care facility for illness means that the child is being seen by a doctor, not by an allied medical staff, as in other developing countries. There is a higher dependence on public services, unlike what was mentioned, for example, by Mishra et al. (1990) in urban India. The dependence on drug stores is much less than that reported for rural Thailand and for rural Nigeria, and dependence on traditional healers is almost non

existent in Saudi Arabia, while it is quite prevalent in other developing countries such as Nigeria.

6.3.1.2. The bivariate associations between the independent variables and the utilisation of health services in response to diarrhoea

In this section I will briefly discuss the significant associations between the independent variables and the utilisation of health services in response to diarrhoea, including the predisposing, enabling and need factors.

a) Predisposing factors:

It was found that being of a lower than the sixth birth-ordered child was associated with a higher utilisation of the private services while being a sixth or above ordered child was associated with the highest utilisation of the public services, and the highest proportion of the non-utilisers of any of the health services, which possibly indicates a lower financial accessibility of private care for families of larger sizes and possibly an experience in the care of children's illnesses for the sixth and above birth-ordered children. A similar effect of the birth order was found for the household size.

It was found that a mother's age 35-44 years was associated with the utilisation of more public health care services for children with diarrhoea, and children of mothers 25-34 years displayed the lowest use of health services, reflecting possibly more reliance on home management strategies. Mothers' higher education was found to be associated with an increased utilisation of private health care services and a less utilisation of public health care services, which may be due to a higher financial accessibility of private care and to a higher level of health information, favouring specialists' care in the private sector. Non-utilisation of the health services in response to children's diarrhoea was found to be higher among preparatory and higher degree holders which may reflect their better knowledge of home management strategies.

Age of head of household's being 30-39 years was associated with the children's increased utilisation of the private services, while being older than 39 years was

associated with the children's utilisation of the public services, which possibly reflects general attitudes to different health care providers. As for mothers' and head of household's higher education, in general it was found to be associated with the children's use of private care and less use of public care.

The predisposing factors that were not found to reach a 0.05 level of significance in their association with the utilisation of health services in response to diarrhoea were a child's age, gender, health status rating, and mothers' and heads of household's economic activity.

b) Enabling factors:
Children living in the Western region showed the highest levels of the utilisation of private care, followed by children living in the Eastern region, followed by the Central region, with the lowest utilistion of private services displayed by residents in the less socio-economically developed Northern and Southern regions. On the other hand, the Northern and Southern regions' children displayed a higher use of public services, which may be due to the lower accessibility of specialists' private care both financially and geographically. The highest proportion of non users was for children of the Eastern and Central region, possibly reflecting a higher dependence on home management strategies.

Urban children displayed a much higher level of utilistion of private care, compared to rural children, while rural children displayed higher levels of utilisation of public care services, which may be due to the increase in the accessibility of the public services, being more equitably distributed and free of charge. Urban children displayed a higher proportion of non use of health services, compared to rural children, which possibly indicates the increased resorting to home management strategies by urban carers.

Regarding the economic indicators and the media communication variables, it was found that the type of dwelling, floor material, drinking water, type of toilet, having a radio, a colour TV and a satellite/ cable TV were significantly associated with the utilisation of health services in response to children's diarrhoea. Being more advantaged was

associated with the utilisation of private services and being less advantaged was found to be associated with the utilisation of public services, reflecting differences in the accessibility of the different types of health services.

c) Need factor:
Increased number of diarrhoea days in general was found to be associated with an increase in the utilisation of the public and private services, since longer illness duration raises parents' concerns of the diarrhoea not being cured, leading to the utilisation of health services.

6.3.1.3. The multinomial logistic regression model

In order to find out if need is the major determinant of the use of health services in response to diarrhoea there should be no difference in the use of health services due to the predisposing and enabling factors. In this section I will briefly go through the effects of the factors included in the multivariate analysis on the use of public and private services, comparing this to the developing countries findings where diarrhoea forms a major health threat to children, although they are scarce with the regards to the factors tested for in the thesis. In addition, the reasons for taking a child to a health care provider as reported by respondents will be mentioned in brief.

Of the predisposing factors, mothers' having secondary or higher levels of education, compared to illiterates, was related to the increase in the likelihood of a child being taken to a private doctor, who is most likely to be a pediatrician. This indicates the perception of higher quality of private care for the highly educated and possibly a higher level of financial accessibility. In Honduras, DeClerque et al. (1992) found that mothers with no education were less likely to consult for their children's diarrhoea, but this is not the exact case in Saudi Arabia, since education does not make a difference in the use of the public services which seem to be highly accessible to the general population. The education of the head of household, who is in 91% of the cases the child's father, is not found to be significant. This is possibly because the mothers are the principal care takers, and they are more likely to decide when and where the child should be taken to a doctor.

Other predisposing parents' characteristics were not found to be significant. These include age and economic activity, while in Honduras children of working women were more likely to have been taken to a health care provider, compared to non-working women. This was explained by the fact that working women had higher educational levels and a higher level of access to health services (DeClerque et al., 1992).

Children's characteristics were not found to affect the likelihood of medical consultation. A child's age is one factor not found to affect service use. But in Kuwait it was reported that younger children were more likely to be taken to health services when they suffered from diarrhoea (Alnesef et al., 2000). The same was reported for Oman (Sulaiman et al., 2000) and Qatar (Al-Jaber & Farid, 2000), although in all the cases the differences were not large and were not tested for significance. In Honduras, a child's younger age was also related to the increased likelihood of the occurrence of a consultation (DeClerque et al., 1992). No differences were found between males and females in terms of consultation in Saudi Arabia. Male preference was reported for children in Bahrain (Naseeb et al., 2000), in Qatar (Al-Jaber & Farid, 2000) and in the United Arab Emirates (Fikri & Farid, 2000). In Kuwait, females were more likely to be taken to a public health care provider while males were more likely to be taken to a private health care provider (Alnesef et al., 2000), while in Oman females were more likely to be taken for care (Sulaiman et al., 2000). However, in all the Gulf countries the differences between male and female use were small and were not tested for significance. Children's birth order, family size and their perceived health status by their mothers were not found to be significant. This is in part a positive indicator of the family dynamics during children's illness, since children with a higher birth order and children in larger families are not disadvantaged in terms of their service use, indicating less care available for them.

Regarding the enabling factors, rural residence was found to be related to the increased likelihood of children being taken to a public health care provider. This is due to the increased geographical accessibility and financial accessibility of the public services for rural residents. In Oman, urban children were more likely to be taken to private care when suffering from diarrhoea, compared to rural children (Sulaiman et al., 2000). The

same finding was reported for the United Arab Emirates (Fikri & Farid, 2000). In Honduras, DeClerque et al. (1992) reported that rural children were less likely to be consulted for during diarrhea, which is not the case for the utilisation of the public services in Saudi Arabia. Regional differentials were not found to be significant in this study, although in neighbouring Gulf countries regional differentials were reported in percentages. This includes Bahrain (Naseeb et al., 2000), Kuwait (Alnesef et al., 2000), Oman (Sulaiman et al., 2000), Qatar (Al-Jaber & Farid, 2000) and the United Arab Emirates (Fikri & Farid, 2000).

None of the economic indicators and media communication variables were found to be significant. These include type of housing, housing tenure, crowding, floor material, availability of a flush toilet, owning a family car, availability of electricity, pipe or bottled water supply, having a radio, a colour television set and a satellite TV or cable at home. This indicates a high level of accessibility and acceptability of the health services for children in different economic strata, with the absence of the effect of media communication on the consultation behaviour for children with diarrhoea.

Regarding the need variable included, which is the duration of the diarrhoea episodes, it has been found that the increase in the diarrhoea days was related to the increased likelihood of a medical consultation for both the public and the private sector. It has a stronger effect with regards to the use of private services, especially when the diarrhoea episode extends for a week or more, raising the parents' concerns with the causes and seriousness of their children's condition and urging them to consult specialists. In a high land region of Rwanda it was reported that longer episodes were treated more actively, compared to shorter ones (Csete, 1993), while in Honduras it was reported that more serious episodes were more likely to be consulted for (DeClerque et al., 1992), which was also the case in Mexico (Pérez-Cuevas et al., 1996).

Before coming to a conclusion about the utilisation of ambulatory health services for the care of children's diarrhoea, it is worth mentioning that of the non users of health services -who responded to the question of the reasons for not taking a child to a health care

provider- the perception of the mildness of illness was reported to be the cause of 45.3% of parents' not consulting anyone for their children's diarrhoea. This indicates the prominent role need plays in the decision to seek care. It was also found that 24.8% of respondents did not consult anyone for the children's diarrhoea because they thought that the diarrhoea did not need the attention of health care providers. This is probably due to their reliance on their home treatment, especially when most of the medications, including antibiotics can be obtained without the need for medical prescriptions. Regarding the types of treatment given to children, it was reported that 52.1% had received oral rehydaration packet solutions, 1% had solutions prepared by their carers. 23.9% had received antibiotics, 8.3% had been given antidiarrhoeals and 2.6% had been given home remedies.

In addition to the above mentioned reasons for not taking a child suffering from diarrhoea to a health care provider, it was also reported that fathers' and mothers' being busy was the reason mentioned for 18.8% of the children not taken to health care facilities; thus indicating the role of social obligations and time constraints on minimizing the chances for seeking care for young children, while only 1.7% of non users indicated that the reason for not taking a child to a health care facility was that there were no facilities that they could take their children to. These respondents may live in remote areas where the geographical distance is considered to be a barrier for use, but it is still a small proportion of the non users.

In short, referring to the effect of the predisposing and enabling factors on the use of public and the private care services, it has been found that there does not seem to be any obstacles affecting the utilisation of the public services in response to diarrhoea, indicating a high level of accessibility and acceptability of the public services for the treatment of childhood diarrhoea. But with regards to the private services, the highly educated seem to have made better use of the private higher quality specialist services - who can be consulted without the need for referral, as in the public sector; thus indicating a favoured position held for the children who have mothers with high educational levels,

but increased need as measured by longer illness duration is still a highly significant factor for the use of health services.

6.3.2. The utilisation of health services for children's acute respiratory infections

6.3.2.1. The percentage of health service utilisation for children's acute respiratory infections

It has been found that in Saudi Arabia 21.3% of the children who suffered from acute respiratory infections, in the retrospective two week period before the survey, had received care from public hospitals, 49.4% had received care from primary health care centres, and 15.2% had received care from private doctors. It was found that 5%, 0.7%, 1.6% and 1.4% had received advice from pharmacists, traditional herbalists, relatives or friends and other sources of advice, respectively. In total, 85.6% of the children had been consulted for during their acute respiratory infections. The consultation in response to acute respiratory infections in other Arabian Gulf countries is presented in the following table.

Table 6.6. Utilisation of health services in response to acute respiratory infections in the Arabian Gulf countries

Country	Public hospital	Primary health care centre	Private doctor	Pharmacist	Traditional herbalist	Relative or friend	Total sought care
Bahrain	12.3%	49.5%	19.8%	11.4%	3.7%	5.5%	76.9%
Kuwait	33.8%	53.6%	14.6%	3.8%	2.3%	3%	89.5%
Oman	46.5%	35.3%	10.3%	0.7%	0.3%	0.9%	83.2%
Qatar	28%	53.9%	23.7%	6.8%	2.4%	3%	85.6%
United Arab Emirates	51.1%	29%	19%	3.6%	0.8%	0.8%	83.2%

Source: Arabian Gulf countries Family Health Surveys, 2000

It can be observed that the percentage of children with acute respiratory infection for whom advice was sought in Saudi Arabia is very similar to the other Arabian Gulf States, with the public sector being the major source of medical advice, followed by the private sector, while other sources of care seem to play a minor role.

In Malaysia, it was reported that 79% of mothers sought treatment for their children's acute respiratory infection, with most of them having sought Western treatment, either at government hospitals or at private doctors (Lye et al., 1994). In Myanmar, private practitioners were reported to be the main source of care in urban areas, while in rural areas government health facilities were the main source of care, with the reference to traditional medicine for 3-8% of the children, depending on the place of residence (Aung et al., 1994). In rural Haryana, India, it was reported that primary health care centres were the most frequent place for acute respiratory infections treatment (Saini et al., 1992). In a rural district in Ghana a high percentage of children with acute respiratory infections had care sought for them in hospitals or clinics, and about 30% of them had herbalists consulted for them (Amofah et al., 1995). In rural Marrakech it was reported that traditional healers were the first choice of care, while physicians' care was sought when other treatments failed (Maynard-Tucker, 1998). The high dependence on traditional healers was also reported in the Bohol Province in the Philippines where traditional healers were the main source of consultation, followed by health workers and health centres (McNee et al., 1995). It should be noted that resorting to modern health facilities in most developing countries does not mean referring to doctors, as in Saudi Arabia and other Arabian Gulf States, but it may also include other health workers.

Of the above mentioned countries, Malaysia seems to fall into a similar category with Saudi Arabia when it comes to the care of acute respiratory infections. Compared to the other above mentioned rural regions, it has been found that there is less reference to traditional healers (herbalists) in Saudi Arabia.

6.3.2.2. The bivariate associations between the independent variables and the utilisation of health services in response to acute respiratory infections

In this section I will briefly discuss the significant associations between the independent variables and the utilisation of health services in response to children's acute respiratory infections.

a) Predisposing factors:

It was found that an increase in the child's birth order was associated with the utilisation of the public services, while a decrease in a child's birth order was found to be associated with the utilisation of the private services, which possibly reflects the increased financial accessibility of private care for smaller families, as found for household size, in addition to the higher levels of experience with the childhood illness for higher birth ordered children, leading to a lower level of health concern; thus not referring to specialist private care.

Children of mothers in the age group 35-44 years displayed a higher utilisation of the public services and the lowest proportion of non use of health services, while children of mothers in the age group 15-24 years displayed a higher utilisation of the private services, which possibly reflects different attitudes to health care providers by different age groups.

Age of head of household was also found to be significant with children who lived in houses where the head of household -who is for more than 90% of under five children is the father- was younger was associated with the increased use of private care. In general, if he was older, this was associated with a higher utilisation of the public services, reflecting possibly different perceptions about health care and possibly less experience with child care for younger heads of households, leading to the consultation of specialists in the private sector. The highest proportion of non-utilisers was for children of heads of households 20-29 years old, displaying possibly a higher reliance on home management strategies.

Higher mothers' education in general was associated with an increased utilisation of the private services and a less utilisation of the public services for the care of children's acute respiratory infections, indicating possibly a higher financial accessibility of the private sector for mothers with higher educational levels. They are more likely to come from more privileged families, and highly educated mothers may have higher levels of health concern, leading to the consultation of specialists in the private sector.

Working mothers were found to utilise more private care for their sick children, indicating possibly a higher financial accessibility to private care. Mothers who did not hold a formal job nor did housework as their main activity showed a higher level of consultation of the public sector, since financial and time constraints are minimized for the use of the public services, as public services are free of charge, and they have a lower level of social obligations compared to other mothers.

Children of non working heads of households were found to depend more on the public services for the care of acute respiratory infections than working heads of household. Children of working heads of households showed more than double the use of the private sector, indicating the differences in the financial accessibility of higher quality specialists' care.

From the predisposing variables, a child's age, gender and health rating were not found to be significantly associated with the utilisation of health services at a 0.05 level of significance.

b) Enabling factors:
It was found that children of the Western and Eastern regions displayed a higher utilisation of the private services, compared to other regions, while children of the Northern and the Southern region displayed a higher utilisation of the public services. These differences are possibly due to the introduction of modern health services by the private sector in the Eastern and Western regions before the establishment of the Ministry of Health and to the lower financial and geographical accessibility of private care for residents in the Southern and Northern regions. This difference in accessibility was also reflected in the higher urban children's utilisation of private care and the higher rural children's utilisation of public care. The lowest proportion of non users was that of children in the Eastern region, showing a higher reliance on health services for the care of children's acute respiratory infections.

Regarding the enabling economic indicators and media communication variables, including crowding, floor material, toilet type, main drinking water, electricity, radio, colour TV and satellite/cable TV, holding an advantaged position with regards to these variables was found to be associated with the utilisation of the private services, and holding a disadvantaged position with regards to these variables was found to be associated with the utilisation of the public services, indicating their higher accessibility to the disadvantaged population in Saudi Arabia. Owning a family car was found to be related to the utilsation of both the public and the private services, since cars are the main method of transportation in Saudi Arabia. Not having electricity in the child's family home was also found be associated with not using any medical services, which is possibly due to the fact that the areas where electricity is not supplied are most likely to be remote areas where health care facilities may not be easily accessible.

c) Need factors:

Suffering from difficulties in breathing was found to be associated with the utilisation of the public and the private services. In general, increased sickness days were found to be associated with the utilistion of the public and the private health care services. This is a logical consequence of the perceived seriousness of the health problem. But when illness extends to seven or more days there seems to be a decrease in the utilisation of the public services, since children's care takers may perceive the health problem to be serious, needing attention of a specialist in the private sector.

6.3.2.3. The multinomial logistic regression model

In assessing if need is the principal determinant of ambulatory health care utilisation for the care of children's acute respiratory infections, a multinomial logistic regression was applied to find out if the predisposing and enabling factors had an effect on the public and the private services use. The results of the final model are discussed in this section

Of the predisposing factors, mother's age being 35-44 years was found to be related to the increased likelihood of consulting public services as well as private services, indicating a high dependence on doctor's services for mothers of this particular age

group. This may indicate a common health culture due to common health education exposure for the same age group. Increased head of household's age was associated with the increased likelihood of taking a child suffering from an acute respiratory infection to a public service doctor, indicating a high reliance of older individuals on public health services and the possible lower reliance on home medication.

Maternal higher education was related to the increased likelihood of taking a child with an acute respiratory infection to a private doctor, while mothers' holding secondary or higher degrees was related to the decrease in the use of public services. This probably reflects the perception of high quality private specialist care, compared to GPs public health services, with the increased levels of knowledge and possibly health concern for the educated mothers leading to the use of private services. This is accompanied with the probability of having a higher level of financial accessibility, since educated mothers are more likely to come from richer families.

Mothers who do not hold formal jobs nor do housework as their main activity were found to be more likely to take their children to public health services, indicating possibly excess free time, in addition to the services being free of charge, thus minimizing both time and financial constraints.

Neither age of the child, gender, birth order nor the rating of his/her health status were found to be significant, and neither was household size. This indicates that for children suffering from an acute respiratory infection doctor's consultation is not affected by the child's own predisposing factors, which is a positive sign of equity of the care for sick children in Saudi families. It was reported in Bahrain that the percentage of younger children taken for medical care was higher (Naseeb et al., 2000). In some neighbouring Arabian Gulf States, being a male child increased the use of health services in response to acute respiratory infections, as was previously reported in Kuwait (Alnesef et al., 2000) and in the United Arab Emirates (Fikri & Farid, 2000). They were also more likely to be taken to private care in Bahrain (Naseeb et al., 2000) and in Qatar (Al-Jaber & Farid,

2000), although these differences were not tested for significance and were only presented as percentages, and they were not large in magnitude.

From the enabling factors, living in the Eastern or Western regions was associated with the increased likelihood of consulting a private doctor, indicating a higher dependency of residents in these areas on private care. This possibly reflects the health culture of private service use in these areas. These regions are relatively more socioenomically developed, compared to the Southern and Northern regions, but they have less concentration of high quality non-Ministry of Health public services, compared to the Central region, which may have contributed to the high dependence on private care. In addition, in these regions private care was referred to for health care before the establishment of the Ministry of Health. Regional differentials were reported previously in Kuwait (Alnesef et al., 2000), in Oman, favouring the capital (Sulaiman et al., 2000), in Qatar, favouring the capital, especially with regards to private service use (Al-Jaber & Farid, 2000) and in the United Arab Emirates (Fikri & Farid, 2000).

There were no urban/rural differences in terms of the use of public services for children's acute respiratory infections, which indicates a good level of accessibility and acceptability of the public health services in rural areas. But living in an urban area was related to the increased likelihood of taking sick children to a private health care provider, which probably reflects the higher levels of geographical and financial accessibility of private services for urban residents. This increased urban use of the private services for the care of acute respiratory infections was also reported previously in Oman (Sulaiman et al., 2000). In Myanmar it was reported that private practitioners were the main source of care in urban areas, while in rural areas government facilities were the main source of care (Aung et al., 1994).

Of the economic indicators, being a child living in a house with more available space was related to the utilisation of private services, probably indicating differences in the financial accessibility of private care. Having electricity at home was related to the increased likelihood of using public services, but, surprisingly, the effect was not

reported for the use of private services. Owning a family car was related to the increased likelihood of the use of both public and private services, since private cars are the major means of transport, and they are cheaper in terms of direct costs faced by the public transport users, especially for the poorer 12% of the families who do not own cars. The other economic indicators, including type of housing, housing tenure, floor material, presence of a flush toilet, and pipe or bottled drinking water supply, were not found to be significant.

Of the media communication variables, having a colour television set at home was associated with an increased likelihood of using public and private services, although it had a stronger effect on the use of private care. This is probably due to increased health information conveyed through television, possibly favouring specialized pediatric care, since GPs are generally not the ones who are interviewed in health programmes. In addition, families who have television sets at home are generally more modernized and may thus be more familiar with the quality of options of available care, and they may be financially better off. Having a radio or a satellite TV/cable at home were not found to have a significant effect, indicating the probability of a difference in the level of health information conveyed regarding children's respiratory illness.

Regarding the need variables, having difficulty in breathing, an indicator of seriousness of the condition, and increased cough days were related to the increased likelihood of using public and private services, indicating the important role of the perception of need for medical care in the decision to seek such care. Severity of acute respiratory infections was reported previously to be related to the consultation of medical care in India (Kapoor et al., 1990) and in Ghana (Amofah et al., 1995).

With regards to need, mothers were asked about the symptoms which would lead to medical consultation, and it was reported that a child having a fever was the reason for 90% of the respondents to this question to seek consultation, indicating a high level of awareness of the health dangers associated with fever. A blocked nose was seen as a reason to seek help for 44.4% of the respondents, while difficulty in breathing, trouble in

sleeping/eating and breathing fast were mentioned by 35.6%, 23.3% and by 11% to be reasons for consultation, respectively. In addition, long illness duration was mentioned by 18% of the respondents to be reason for medical consultation, which was confirmed by the multivariate analysis.

In order to deal with acute respiratory infections in children, 90% of the children were given some sort of medication, indicating that acute respiratory infections were considered to require some sort of treatment, even if a doctor was not consulted. 83.6% were given cough mixtures, 46.5% were given antibiotics, 1.9% were given an injection, 9.2% were given other tablet/syrup, only 1.4% were given herbal remedies, indicating the low dependence on traditional treatments, and 7.5% were given some other type of medication.

In short, it was found that from the predisposing factors, mother's age and older head of household age were related to service use. Besides, mother's higher education and her economic activity were also found to have an influence. Other predisposing factors, including the child's own characteristics, did not influence health service utilisation.

Of the enabling factors, Western and Eastern regions residence and urban residence were associated with the use of private care. Of the economic indicators, less crowding, ownership of a car and having electricity at home have an influence on service use. Having a colour television set was associated with an increase in health service utilisation. Need as represented by sick days and having difficulties in breathing were found to be highly significant.

Since some of the predisposing and enabling factors were found to have an effect on health service use for the management of children's acute respiratory infections and that certain groups seem to make more use of private care, compared to using the public services, it can be inferred that need is not the only determinant of health services utilisation, although increased need is still found to be highly significant.

6.4. CHAPTER'S SUMMARY

In order to assess whether need is the principal determinant in the utilisation of ambulatory health care in response to children's diarrhoea and acute respiratory infections, multinomial logistic regression was applied having a base line group of non-utilisers of either of the services. For diarrhoea, need seems to dominate the differences in the use of public health services, indicating a high level of accessibility and acceptability of the public health services, although the urban population seems to be less dependent on public care. For the use of private care in the case of diarrhoea, need still plays the most significant role. But mothers of higher educational levels were more dependent on private care.

For acute respiratory infections, of the predisposing factors, mothers' age, education and economic activity were found to affect children's health service utilisation. So did head of household's age. Of the enabling factors, region of residence, its urban/rural character, crowding, having electricity at home, owning a private car and having a colour television set at home were found to be significant, with different factors affecting the use of public and private care; thus, having different indications, especially in terms of service accessibility. Need, as represented by the seriousness of the condition and its duration, was found to be of great importance in the utilisation of public and private health services.

Although need seems to play an important role in the use of public and private health care services for the care of children's diarrhoea and acute respiratory infections, some predisposing and enabling factors remain to be significant, indicating that need is not the only determinant of health service utilisation. But it is worth noting that for diarrhoea, need seems to dominate the utilisation of health services since most of the factors were found to be insignificant. For the public services, no advantage was shown to be held by more privileged groups, compared to the utilisation in response to acute respiratory infections, indicating different approaches to treating different childhood illness conditions. In addition, there is a lower reliance level on health facilities care for diarrhoea. This may be due to the conception of the increased seriousness of acute

respiratory infections, compared to diarrhoea, especially in the winter months when the survey was conducted.

Chapter 7

Preventive Services

Utilisation: Prenatal Care and Infants' Full Immunisation

7.1. INTRODUCTION

In this chapter, the effects of the predisposing factors, enabling factors and the presence of certain medical conditions on the utilisation of prenatal care services will be explored, using the data of the mothers' prenatal care use for the live births during the last three year period before the survey. Bivariate analysis results and multivariate analysis results will be displayed and discussed, emphasizing the effects of the significant variables on the utilisation of prenatal care versus non-utilisation, the initiation of prenatal care, the number of prenatal care visits, in addition to the results of the analysis of the effects of the enabling factors, including direct accessibility variables, on choice of the place of the last prenatal care checkup. This is applied to the data for women who were pregnant at the time of the survey. The chapter also includes the analysis of the effects of the predisposing and enabling variables on one-year old infants' full immunisation. International comparisons are also included in the chapter, and a synopsis of the utilisation of preventive services is provided before the end of the chapter, followed by the chapter's summary.

7.2. RESULTS

In this section of the thesis, the numbers and percentages of the prenatal care utilisation variables are displayed, in addition to one-year old infants' full immunisation status. This will be followed by the results of the bivariate analysis and the multivariate analysis for the utilisation of prenatal care services versus non-utilisation, the early initiation of prenatal care, the frequency of prenatal care visits, the place of the last prenatal care checkup and, lastly, the infants' full immunisation.

7.2.1. The utilisation of prenatal care services and infants' immunisation

It has been found that for the live births during the previous last three year period, 6029 (92.8%) of mothers had received at least one prenatal checkup, while only 471 (7.2%) of mothers did not receive any prenatal checkups during their pregnancy. Regarding the initiation of prenatal care, 4649 (79.3%) of the mothers received their first antenatal checkup during the first trimester of pregnancy -as recommended by the Ministry of Health- while 983 (16.7%) of the mothers started to have their antenatal checkups during the second trimester, and 230 (4%) of the mothers had their first antenatal checkup during the third trimester. For mothers who received antenatal care, only 1372 (26.64%) made the recommended twelve or more antenatal care visits. Most of the mothers reported having made more than two prenatal care visits, 5283 (87.8%) and 3623 (74.6%) made five or more and seven or more prenatal care visits, including mothers who made too many visits to remember. The detailed number of prenatal care visits was presented previously in the methodology chapter. Regarding the usual place of antenatal checkups, 2922 (48.6%) of mothers reported that a primary health care centre was the usual place of checkups, 2182 (36.3%) of mothers reported that a public hospital was the usual source of care, while 910 (15.1%) reported that a private health facility was the usual source of care, and only seven women and three women reported that home and another place, respectively, was the usual place of the antenatal checkups.

Regarding the immunisation status of infants 12-13 months old, 1746 (79.5%) were reported to be fully immunized, while 451 (20.5%) infants were not reported to be fully immunised. This is based on the information reported in the immunisation cards and the information reported by the infants' mothers.

7.2.2. The bivariate associations between the independent variables and the dependent variables

In this section the results of the chi-square analysis for the associations between the independent variables and the dependent variables are displayed, including the utilisation versus non-utilisation of prenatal care services, the early initiation of prenatal care, the

choice of the last source of prenatal care checkup and infants' full immunisation. The cross tabulations are presented in the appendix.

Table 7.1. The chi-square results of the associations between the independent variables and the utilisation versus non-utilistion of prenatal care services

The variable	Chi-square	df	Significance
Predisposing factors			
Mother's age	7.65	3	0.054
Father's age	21.49	4	0.000
Birth order	18.12	4	0.000
Household size	15.56	4	0.004
Mother's education	105.62	4	0.000
Mother's economic activity	18.48	2	0.000
Father's education	41.06	4	0.000
Enabling factors			
Region	18.40	4	0.001
Urban/rural residence	18.87	1	0.000
Type of dwelling	56.29	2	0.000
Housing tenure	12.55	2	0.002
Crowding	78.67	4	0.000
Floor material	35.08	1	0.000
Toilet type	58.92	1	0.000
Main drinking water	14.13	1	0.000
Electricity	44.67	1	0.000
Car ownership	9.87	1	0.002
Mother's daily radio listening	15.63	1	0.000
Mother's TV watching	63.95	1	0.000
Mother's weekly newspapers/magazine reading	3.65	1	0.056
Medical problems			
Severe breathlessness	27.81	1	0.000
Vaginal bleeding	15.16	1	0.000
High blood pressure	10.11	1	0.001
Swelling of face or body	8.51	1	0.004
Severe headache	19.25	1	0.000
Convulsions	0.58	1	0.445
Pain in the upper abdomen	15.32	1	0.000
Diabetes	0.50	1	0.479
Painful urination	15.31	1	0.000

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

Table 7.2. The chi-square results of the associations between the independent variables and the early initiation of prenatal care

The variable	Chi-square	df	Significance
Predisposing factors			
Mother's age	18.30	3	0.000
Father's age	23.63	4	0.000
Birth order	41.55	4	0.000
Household size	25.00	4	0.000
Mother's education	35.96	4	0.000
Mother's economic activity	7.35	2	0.025
Father's education	16.21	4	0.003
Enabling factors			
Region	44.93	4	0.000
Urban/rural residence	17.61	1	0.000
Usual place of checkup	21.75	2	0.000
Type of dwelling	2.67	2	0.262
Housing tenure	8.24	2	0.016
Crowding	33.43	4	0.000
Floor material	12.30	1	0.000
Toilet type	8.65	1	0.003
Main drinking water	1.12	1	0.293
Electricity	15.89	1	0.000
Car ownership	0.18	1	0.672
Mother's daily radio listening	0.59	1	0.441
Mother's TV watching	24.53	1	0.000
Mother's weekly newspapers/magazine reading	0.36	1	0.551

Source: Analysis of the Saudi Arabia Family Health Survey

Table 7.3. The chi-square results of the associations between the independent variables and the choice of the source of the last prenatal care checkup (public versus private)

The variable	Chi-square	df	Significance
Enabling factors			
Region	104.21	4	0.000
Urban/rural residence	51.91	1	0.000
Type of dwelling	50.29	2	0.000
Housing tenure	30.65	2	0.000
Crowding	64.61	4	0.000
Floor material	11.03	1	0.000
Toilet type	37.57	1	0.000
Main drinking water	33.00	1	0.000
Electricity	4.57	1	0.033
Mother's daily radio listening	0.38	1	0.54
Mother's TV watching	8.60	1	0.003
Mode of travel	14.34	1	0.000
Traveling time	2.028	2	0.363
Waiting time	15.12	2	0.001

Satisfaction with care	5.74	1	0.017

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

Table 7.4. The chi-square results of the associations between the independent variables and infants' full immunisation

The variable	Chi-square	df	Significance
Predisposing factors			
Gender	0.29	1	0.593
Birth order	3.35	3	0.341
Mother's age	5.49	3	0.139
Head of household's age	3.21	4	0.523
Household size	0.61	4	0.962
Mother's education	19	4	0.000
Mother's economic activity	3.06	2	0.216
Head of household education	9.67	5	0.085
Head of household economic activity	0.81	1	0.368
Child's health rating	1.35	2	0.509
The early initiation of prenatal care	2.21	1	0.137
Number of prenatal care checkups	8.90	3	0.030
Enabling factors			
Region	18.48	4	0.001
Urban/rural residence	10.10	1	0.001
Type of dwelling	4.07	2	0.131
Housing tenure	6.14	2	0.050
Crowding	5.40	4	0.249
Floor material	0.03	2	0.871
Toilet type	3.40	1	0.065
Main drinking water	8.37	1	0.012
Electricity	0.78	1	0.323
Car ownership	0.038	1	0.846
Radio	2.03	1	0.154
Colour TV	0.35	1	0.557
Satellite TV/cable	5.87	1	0.015

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

7.2.3. The utilisation of prenatal care versus non-utilisation

In order to assess the role predisposing and enabling factors and medical conditions played in prenatal care utilisation for the previously pregnant mothers, a multivariate logistic regression model was applied. The results of the parsimonious model are summarized in the following table.

Table 7.5. The results of the logistic regression model related to the utilisation versus non-utilisation of prenatal care for the live births in the last three year period

Number of observations: 4902			
Dependent variable: Having had at least one prenatal checkup. No = 0, Yes = 1			
-2 Log Likelihood: 2009.107			
Hosmer and Lemeshow significance: 0.226			
The independent variable	Significance	Odds ratio	95% confidence interval
Mother's education	0.002		
Illiterate		1.00	
Read only	0.174	1.28	0.897-1.830
Primary	0.007	1.64	1.142-2.350
Preparatory	0.067	1.53	0.970-2.401
Secondary and above	0.000	2.58	1.590-4.175
Father's education	0.007		
Read only		1.00	
Primary	0.027	1.66	1.061-2.606
Preparatory	0.000	2.58	1.527-4.346
Secondary or diploma	0.009	2.01	1.193-3.379
University	0.009	2.26	1.228-4.144
Region	0.001		
Central region		1.00	
Eastern region	0.208	0.78	0.536-1.146
Western region	0.426	0.88	0.637-1.210
Northern region	0.701	0.92	0.595-1.417
Southern region	0.000	3.05	1.892-4.913
Crowding	0.003		
Fifth quintile of crowding		1.00	
First quintile of crowding	0.000	2.34	1.559-3.734
Second quintile of crowding	0.026	1.57	1.079-2.380
Third quintile of crowding	0.009	1.78	1.151-2.738
Fourth quintile of crowding	0.008	1.67	1.146-2.443
Car ownership	0.038		
Family does not own a car		1.00	
Family owns a car	0.038	1.50	1.022-2.198
Mother's TV watching	0.001		
Mother does not watch TV		1.00	
Mother watches TV	0.001	1.71	1.230-2.383
Severe breathlessness	0.000		
No severe breathlessness		1.00	

Had severe breathlessness	0.000	1.73	1.284-2.319
Vaginal bleeding	0.024		
No vaginal bleeding		1.00	
Had vaginal bleeding	0.024	2.59	1.136-5.906
Constant	0.416	1.31	

Source: Analysis of the Saudi Arabia Family Health Survey, 1996.

Applying the logistic regression model for the use versus non use of prenatal care, it has been found that of the predisposing variables, mothers' education and fathers' education were significant. Mothers holding a primary degree were 1.64 times more likely to seek prenatal care during pregnancy, and mothers holding a secondary or higher degree were 2.58 times more likely to seek prenatal care, compared to illiterates. Mothers holding a preparatory degree were 1.53 times more likely to seek prenatal care compared to illiterates, but this finding is marginally significant. Fathers holding a primary degree, a preparatory degree, a secondary degree and a university degree had wives with an increased likelihood of seeking prenatal care by 1.66, 2.58, 2.01, and 2.26, respectively, compared to the ones who can read but do not hold any educational degrees.

Of the enabling factors, mothers residing in the Southern region were about three times more likely to seek antenatal care, compared to mothers residing in the Central region. Being in the first quintile, second quintile, third quintile and fourth quintile of crowding was related to 2.34, 1.57, 1.78 and 1.67 increase in the likelihood of mothers seeking antenatal care, respectively, compared to the fifth quintile. Owning a family car was associated with 1.50 increases in the likelihood of mothers seeking antenatal care compared to mothers in families that do not own a car. Of the media communication variables, mothers watching television were 1.71 times more likely to seek antenatal care, compared to mothers who do not watch television.

Of the medical problems, having suffered from severe breathlessness was related to a 1.73 times increase in the likelihood of receiving some antenatal care, while having vaginal bleeding was related to a 2.59 times increase in the likelihood of mothers attending at least one antenatal care session.

Other variables included in the analysis but not found to be significant, among the predisposing variables are mothers' age, fathers' age, household size, mothers' economic activity, and a child's birth order. Of the enabling factors, urban/rural residence, type of housing, housing tenure, floor material, availability of a flush toilet, pipe or bottled drinking water, availability of electricity at home, daily radio listening and reading newspapers and magazines on a weekly basis were not found to be related to the attendance of at least one antenatal session. Among medical problems, suffering from high blood pressure, having a swelling of the face or body, a severe headache, convulsions, pain in the upper abdomen, diabetes or painful urination were not found to be related to having made at least one visit to antenatal care.

7.2.4. The early initiation of prenatal care

In order to assess whether the predisposing and enabling factors play a role in the initiation of prenatal care during the first trimester, a logistic regression model was applied. The results of the final parsimonious model are displayed in the following table.

Table 7.6. The results of the logistic regression model related to the early initiation of prenatal care for the live births in the last three year period

Number of observations: 5824			
Dependent variable: Initiated prenatal care visits in the first trimester. No = 0, Yes = 1			
-2 Log Likelihood: 5793.194			
Hosmer and Lemeshow significance: 0.100			
The independent variable	Significance	Odds ratio	95% confidence interval
Mother's education	0.065		
Illiterate		1.00	
Read	0.045	1.23	1.004-1.507
Primary	0.614	1.05	0.868-1.271
Preparatory	0.093	1.24	0.965-1.596
Secondary and above	0.017	1.32	1.050-1.649
Child's birth order			
First ordered birth		1.00	
2-3 ordered birth	0.001	0.65	0.502-0.829
4-5 ordered birth	0.002	0.67	0.519-0.829
6-7 ordered birth	0.000	0.59	0.454-0.771
8+ ordered birth	0.000	0.54	0.416-0.703
Region	0.000		
Central region		1.00	
Eastern region	0.000	1.78	0.868-1.271
Western region	0.000	1.37	1.154-1.637

Northern region	0.001	1.51	1.173-1.933
Southern region	0.011	1.30	1.063-1.590
Urban/rural residence	0.026		
Rural		1.00	
Urban	0.026	1.21	1.022-1.421
Usual place of care			
Primary health care centre		1.00	
Public hospital	0.000	0.75	0.645-0.867
Private health facility	0.401	0.91	0.726-1.137
Mother's TV watching			
Mother does not watch TV		1.00	
Mother watches TV	0.001	1.37	1.141-1.641
Constant	0.000	3.185	

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

Regarding the model's findings, among the predisposing factors, mothers being able to read was associated with a 1.23 times increase in the likelihood of initiating antenatal care in the first trimester, compared to illiterates. Holding a secondary degree or above was related to a 1.32 times increase in the likelihood of the early initiation of antenatal care, compared to illiterates. A marginally significant finding is that mothers with preparatory education were 1.23 times more likely to initiate prenatal care in the first trimester, compared to illiterates. Another significant predisposing factor was the child's birth order, with mothers pregnant in their 2-3rd births, 4-5th births, 6-7th births and 8th or more births being associated with a 35%, 33%, 41%, and 46% decrease in the likelihood of the early initiation of prenatal care, respectively, compared to the first born child.

Among the enabling factors, living in the Eastern region, Western region, Northern region and Southern region was associated with a 1.78, 1.37, 1.51 and 1.3 increase in the likelihood of initiating antenatal care in the first trimester, respectively, compared to the Central region. Urban residence was found to be related to a 1.2 times increase in the likelihood of the early initiation of antenatal care, compared to rural residence. Having a public hospital for the usual place of antenatal care was related to a 25% decrease in the likelihood of the early initiation of antenatal care, compared to having a primary health

care centre as the usual source of care. Of the media communication variables, mothers watching television were found to have a 1.37 times more likelihood of initiating antenatal care in the first trimester, compared to women who did not watch television.

Other factors included in the analysis but not found to be significant among the predisposing factors are mother's age, father's age, father's education, mother's economic activity and household size. From the enabling factors, type of housing, tenure of the household, crowding, floor material, presence of a flush toilet, pipe or bottled drinking water, availability of electricity supply, car ownership, daily radio listening and weekly newspaper and magazine reading were not found to be related to the time of initiation of prenatal care.

7.2.5. The frequency of prenatal care visits

In order to assess the contribution of the predisposing and enabling factors and medical conditions to the number of prenatal sessions attended by mothers during their pregnancies which ended in having live births in the previous three year period, a Poisson regression modeling technique was applied. The components of the resultant parsimonious model are presented in the following table.

Table 7.7. The results of the Poisson regression model related to the frequency of prenatal care visits for the live births in the last three year period

Number of observations: 3031				
-2 Log Likelihood: -7447.7871				
LR chi^2: 791.55, Significance: 000				
The independent variable	IRR	Std. error	Significance	95% confidence interval
Mother's age				
15-24 years	1.00			
25-34 years	1.03	0.017	0.127	0.993-1.061
35-44 years	1.08	0.028	0.002	1.031-1.139
45+ years	1.01	0.086	0.876	0.859-1.196
Birth order				
First ordered birth	1.00			
2-3 ordered birth	0.95	0.180	0.007	0.916-0.986
4-5 ordered birth	0.93	0.020	0.001	0.888-0.967
6-7 ordered birth	0.92	0.023	0.000	0.870-0.961
8+ ordered birth	0.96	0.029	0.156	0.903-1.017
Time of the first				

checkup				
After the first trimester	1.00			
During the first trimester	1.51	0.028	0.000	1.456-1.566
Region				
Central region	1.00			
Eastern region	1.12	0.020	0.000	1.083-1.163
Western region	0.98	0.169	0.278	0.949-1.015
Northern region	0.98	0.023	0.508	0.940-1.031
Southern region	0.93	0.021	0.001	0.887-0.970
Urban/rural residence				
Rural	1.00			
Urban	1.06	0.199	0.001	1.024-1.102
The usual place of checkup				
Primary health care centre	1.00			
Public hospital	1.03	0.015	0.066	0.998-1.057
Private facility	1.02	0.018	0.353	0.982-1.052
Mother's TV watching				
Mother does not watch TV	1.00			
Mother watches TV	1.04	0.024	0.080	0.995-1.090
Mother's weekly magazine or newspapers reading				
Mother does not read newspapers or magazines	1.00			
Mother reads newspapers or magazines	1.06	0.015	0.000	1.034-1.094
Severe breathlessness				
No severe breathlessness	1.00			
Had severe breathlessness	1.03	0.014	0.054	0.999-1.052
Swelling of face or body				
No swelling of	1.00			

face or body				
Had swelling of face or body	1.04	0.021	0.075	0.996-1.078

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

Looking at the above mentioned table, we find that from the predisposing factors mothers age being 35-44 years was associated with a 1.08 times increase in the average number of prenatal care visits, compared to mothers 15-24 years old. Being a child of birth order 2-3, 4-5 and 6-7 was associated with a 5%, 7% and 9% decrease in the average number of prenatal care visits, compared to the first born child. Having initiated prenatal care before the end of the first trimester was associated with a 1.5 increase in the average number of prenatal care visits.

Of the enabling factors, living in the Eastern region was associated with 1.12 times increase in the average number of prenatal care visits, compared to the Central region. Living in the Southern region was found to be associated with a 7% decrease in the average number of prenatal care visits, compared to the Central region. Living in an urban area was related to a 1.06 times increase in the average number of prenatal care visits, compared to living in rural areas. Having a public hospital as the usual source of prenatal care was associated with a 1.03 times increase in the average number of prenatal care visits, compared to having a primary health care centre as the usual source of care, but this finding is marginally significant. Mothers' watching television was found to be associated with 1.04 times increase in the average number of prenatal care visits, but this finding is marginally significant. Weekly newspaper or magazine reading was found to be associated with 1.06 times increase in the average number of prenatal care visits.

Of the medical problems included, severe breathlessness was found to be associated with 1.03 times increase in the average number of prenatal care visits. Suffering from swelling of the face or body was associated with a 1.04 times increase in the average number of prenatal care visits, but this finding is marginally significant.

Other variables included in the analysis but not found to be significant include, from the predisposing factors, fathers' age and education, mothers' economic activity and

household size. From the enabling factors, type of dwelling, crowding, housing tenure, type of floor, availability of a flush toilet, pipe or bottled drinking water supply, availability of electricity and daily radio listening were not found to be related to the number of antenatal sessions attended. From the medical problems included in the analysis, having suffered from vaginal bleeding, high blood pressure, convulsions, pain in the upper abdomen, diabetes, a severe headache and painful urination were not significantly related to the number of prenatal visits.

7.2.6. The effect of the enabling factors on the choice of the last source of prenatal care

In order to assess the effect of enabling factors, i.e., factors that either promote or impede the use of health services, on the choice of public or private services, a logistic regression model was applied. It tested the effect of various enabling factors on the choice of place of the last antenatal session attended by currently pregnant females, with the addition of satisfaction with the services. The parsimonious model characteristics are shown in the following table.

Table 7.8. The results of the logistic regression model related to the choice of a private versus a public health facility for the last prenatal checkup

Number of observations: 1076			
Dependent variable: Private versus public care for the last prenatal care visit. Public = 0, private = 1			
-2 Log Likelihood: 788.998			
Hosmer and Lemeshow significance: 0.897			
The independent variable	Significance	Odds ratio	95% confidence interval
Region	0.000		
Central region		1.00	
Eastern region	0.000	6.25	3.274-11.910
Western region	0.000	7.84	4.462-13.771
Northern region	0.003	3.07	1.471-6.418
Southern region	0.711	0.84	0.325-2.153
Urban/rural residence	0.002		
Rural		1.00	
Urban	0.002	2.45	1.390-4.322
Women's economic activity	0.000		
Doing housework		1.00	
Working	0.041	1.93	1.072-3.502

Other	0.000	3.73	2.033-6.854
Type of dwelling	0.007		
Traditional house		1.00	
Apartment or duplex	0.008	2.02	1.207-3.393
Villa	0.003	2.48	1.374-4.484
Crowding	0.001		
Fifth quintile of crowding		1.00	
First quintile of crowding	0.000	3.79	1.868-7.691
Second quintile of crowding	0.023	2.22	1.071-4.579
Third quintile of crowding	0.122	1.75	0.832-3.698
Fourth quintile of crowding	0.060	2.00	0.938-4.264
Drinking water source	0.009		
Non pipe nor bottled water		1.00	
Pipe or bottled water	0.009	1.81	1.160-2.824
Mode of transportation	0.001		
Other than a private car		1.00	
Private car	0.001	3.03	1.614-5.692
Traveling time	0.001		
1-15 minutes		1.00	
16-30 minutes	0.003	1.97	1.239-3.117
31+ minutes	0.005	2.28	1.308-3.984
Waiting time	0.000		
0-29 minutes		1.00	
30-60 minutes	0.008	0.62	0.424-0.906
61+ minutes	0.000	0.24	0.129-0.449
Satisfaction	0.033		
Not satisfied		1.00	
Satisfied	0.033	2.74	1.087-6.916
Constant	0.000	0.001	

Source: Analysis of the Saudi Arabia Family Health Survey, 1996

According to the logistic regression model obtained, it has been found that living in the Western region, Eastern region and the Northern region was associated with a 7.84, 6.25 and 3.07 times increase in the likelihood of having visited private care versus public care for the last prenatal checkup, respectively, compared to the Central region. Urban

residence was found to be associated with about 2.45 times increase in the likelihood of having visited private care, compared to rural residence.

Women's having jobs and women's not doing housework nor having a formal job were related to a 3.73 and 1.93 times increase in the likelihood of having visited private care versus public care, respectively, compared to women doing housework. Living in a villa or in an apartment/duplex was found to be associated with a 2.48 and 2.02 times increase in the likelihood of having visited private care, respectively, compared to living in a traditional house. Being in the first and the second quintile of crowding was related to 3.79 and 2.22 times increase in the likelihood of private care being the place of the last visit, compared to the fifth quintile. Being in the fourth quintile of crowding was found to be related to a two time increase in the likelihood of having a private health care facility as the place of the last checkup, compared to the fifth quintile, but this finding is marginally significant. Having pipe or bottled drinking water supply was related to a 1.81 times increase in the likelihood of having private care as the place for the last prenatal visit.

Regarding the direct accessibility variables, having a private car as a mode of transport to the health facility was related to the tripling in the likelihood of having visited a private source of care. Having traveled for a longer time was related to the use of private care, with the traveling time being between 16 and 30 minutes and more than 30 minutes related to 1.97 and 2.28 times the likelihood of the place being traveled to being a private source of care, compared to a traveling time of less than 15 minutes. Waiting for a longer time seems to be characteristic of public health services, since waiting for 30 minutes to one hour and waiting for more than hour was associated with 38% and 76% decrease in the likelihood of the place visited being private care, compared to a base line waiting time of less than 30 minutes.

When it comes to the satisfaction with services, users of private health facilities were 2.74 times more likely to be satisfied with the services, compared to users of the public health facilities.

Of the variables included, some were not found to be significant. These include tenure of the household, type of floor, availability of a flush toilet, availability of electricity, television watching and daily radio listening.

7.2.7. The full immunisation of one year old infants

In order to assess the effects of the predisposing and enabling factors on the immunisation status of one year old infants, a logistic regression model was applied. The final parsimonious model characteristics are displayed in the following table.

Table 7.9. The results of the logistic regression model related to the full immunisation status of one year old infants

Number of observations: 1910			
Dependent variable: Infant is fully immunised. Not fully immunised = 0, fully immunised = 1.			
-2 Log Likelihood: 1873.419			
Hosmer and Lemeshow significance: 0.353			
The independent variable	Significance	Odds ratio	95% confidence interval
Mother's education	0.020		
Illiterate		1.00	
Read	0.872	0.97	0.671-1.403
Primary	0.602	0.92	0.655-1.277
Preparatory	0.030	0.65	0.440-0.959
Secondary and above	0.004	0.61	0.441-0.855
Number of prenatal visits	0.013		
1-5 visits		1.00	
6-8 visits	0.002	1.75	1.224-2.493
9-11 visits	0.014	1.57	1.095-2.251
12+ visits	0.07	1.46	1.069-2.004
Region	0.032		
Central region		1.00	
Eastern region	0.240	0.81	0.564-1.154
Western region	0.597	0.92	0.684-1.244
Northern region	0.012	1.90	1.155-3.140
Southern region	0.966	0.99	0.677-1.452
Urban/rural residence	0.048		
Rural		1.00	
Urban	0.048	0.74	0.548-0.997
Constant	0.000	4.05	

Source: Analysis of the Saudi Arabia Family Health Survey, 1996.

Regarding compliance with the infants' immunisation schedules, from the predisposing factors, mothers holding preparatory degrees and mothers holding secondary or above degrees were found to have infants that were less likely to be fully immunised by 35% and 39%, respectively, compared to illiterates. Mothers' attending more antenatal visits was found to be related to the increased likelihood of infants being fully immunised. Mothers attending 6-8 , 9-11 and 12 or more antenatal sessions was associated with a 1.75, 1.57 and 1.46 times the likelihood of an infant being fully immunised, respectively, compared to mothers attending 1-5 antenatal sessions.

With respect to the enabling factors, living in the Northern region was associated with almost the doubling of the likelihood of the infants being fully immunised, compared to the Central region, while living in an urban region was related to a 26% decrease in the likelihood of an infant being fully immunised, compared to living in the rural region.

The variables included in the analysis and not found to be significant, include from the predisposing factors, mothers' and head of household's age, mothers' and head of household's economic activity, head of household's education, household size, children's birth order, children's health status rating and mothers' early initiation of prenatal care. Out of the enabling factors, type of housing, crowding, housing tenure, type of floor, having a flush toilet, pipe or bottled drinking water, having electricity, having a car, a radio or a colour television set and satellite television or cable were not found to be associated with infants being fully immunised.

7.3. DISCUSSION

In this section, a discussion of the utilisation of prenatal care, the resultant multivariate models and the effect of the variables included in the analysis will be provided. This is followed by the discussion of the infants' full immunisation status and the effect of factors included in the analysis. Comparisons with the findings of international literature are also included in the discussion. In the last part of the discussion, a synopsis of the factors affecting utilisation of the preventive services is provided.

7.3.1. The utilisation of prenatal care versus non-utilisation

7.3.1.1. The percentage of prenatal care utilisation

Regarding the attendance of prenatal care sessions, it has been found that most of the mothers who had live births in the previous three years had some prenatal care; that represents approximately 93%, leaving only about 7% who did not seek any prenatal care. Comparing this to the previous surveys carried out in Saudi Arabia, it was found that in the 1991 Saudi Maternal and Child Health Survey prenatal service use was 86.8% (Al-Mazrou et al., 1993), which shows an improvement in the prenatal service use during the five years period between the two studies. In the 1995 Vaccination Coverage Survey prenatal care utilisation was reported to be 94%, which is slightly higher than that reported in the Saudi Arabia Family Health Survey. This may be due to methodological differences, although there is only a 1% difference. Comparing this finding to the other Arabian Gulf States it has been found that the prenatal care utilisation was 97% in Bahrain (Naseeb et al., 2000), 95% in Kuwait (Al-Nesef et al., 2000), 98% in Oman (Sulaiman et al., 2000), 92% in Qatar (Al-Jaber & Farid, 2000) and 97% in the United Arab Emirates (Fikri & Farid, 2000). This indicates that Saudi Arabia, although relatively close to other Gulf States, falls within the lower boundaries of prenatal care coverage. This may be attributed to the great differences in terms of the population size and land size of Saudi Arabia, compared to the other small Gulf countries, making it more difficult to reach the same amount of coverage.

In other developing countries, it was found that in Turkey 34% of women did not receive any antenatal care (Celik, 2000). In Jordan, Obermeyer and Potter have reported that 42% did not have any antenatal care; while in Vietnam Swenson et al. (1993) have reported that 60% did not receive any prenatal care. In Guatemala, Pebley et al. (1996) have found that 27.3% did not have any prenatal care. In Ecuador it was found that 28% did not receive any prenatal care (Eggleston, 2000). In Papua New Guinea, Karel and Rasmussen (1994) have reported that 15% did not receive any prenatal care, and in rural Ethiopia, Materia et al. (1993) have reported that 74% did not receive any prenatal care. Thus, Saudi Arabia holds a highly advantaged position, compared to the above mentioned developing countries, which have lower prenatal care utilisation.

7.3.1.2. The bivariate associations between the independent variables and the utilisation versus non-utilisation of prenatal care

In this section I will briefly discuss the significant associations between the independent variables and the utilisation versus non-utilisation of prenatal care.

a) Predisposing factors

It was found that the highest utilisation of prenatal care was for mothers 15-24 years old and the lowest utilisation of prenatal care was for mothers 45 years and older. This may indicate that younger generations are more aware of the importance of prenatal care and are thus less likely be non-utilisers of prenatal care services. This also applied to fathers' age, with a father's age 20-29 years being associated with the highest utilisation of prenatal care and a father's age 60 or above years being associated with the lowest utilisation of prenatal care. But this lowest utilisation is reported for fathers of older age, who are in most cases not expected to have additional future children, and it was found to be significant at the level of 0.054.

Birth order did not have a big effect, but it still favoured lower ordered births, which may be explained by the acquaintance of mothers with pregnancies and their perception of having experience; thus not perceiving the need for prenatal care. Household sizes of 1-6 and 7-8 individuals were associated with a better utilisation of prenatal care, compared to larger families, which may be explained partly by the time pressure on mothers with more children living in the household.

Regarding education, in general a higher level of mothers' and fathers' education was associated with an increase in the utilisation of prenatal care services, which can be explained in part by an increase in the level of health information and possibly a higher level of income. But this may have a smaller effect since prenatal care services are provided in primary health care centres and in public hospitals free of charge.

Mothers' economic activity was also found to be significant, with working mothers showing a higher level of utilisation of prenatal care, which is possibly due to the

presence of available means for transport, a higher level of education for working mothers and possibly due to the dissemination of health information in the work place, especially since Saudi women are more likely to be working in educational or health care settings.

b) Enabling factors

The highest levels of utilisation of prenatal care services was in the Southern region, followed by the Eastern region, the Central region, while the least utilisation of prenatal care was for residents in the Northern and Western regions. These differences may stem from differences in the health care staff activities, such as health education activities, and differences in the health culture of different regions. Urban mothers were found to have a slightly higher utilisation level of prenatal services than rural mothers, reflecting possibly differences in health information levels and time availability to attend prenatal care sessions.

For the enabling economic indicators, including type of dwelling, crowding, floor material, main drinking water source, toilet type, having electricity at home and car ownership, holding an advantaged position was found to be associated with the utilisation of prenatal care services. This indicates that the advantaged groups of the population make a better use of the prenatal care services available even when they are free of charge. Housing tenure was the only factor not found to be significantly associated with prenatal care utilisation.

Regarding the media communication variables, daily radio listening, watching television and weekly newspapers and magazine reading were found to be associated with prenatal care utilisation, reflecting both a higher level of health information through the media and, possibly, economically advantaged position.

c) Medical problems

Suffering from severe breathlessness, vaginal bleeding, high blood pressure, swelling of face or body, a severe headache and painful urination were found to be associated with

the utilisation of prenatal care, which possibly reflects the perceived need to receive treatment for these medical conditions leading to the utilisation of health care. The only medical conditions that were not found to be significantly associated with prenatal care utilisation were diabetes and convulsions.

7.3.1.3. The logistic regression model for the utilisation of prenatal care versus non-utilisation

When applying the multivariate logistic regression model, various predisposing, enabling and medical problem variables were included, of which only the significant ones were kept in the final model. I will briefly go through all the variables tested for in the analysis and compare the finding of this study to findings from international literature, where applicable.

Out of the predisposing factors, fathers' higher educational levels and mothers' higher educational levels were found to be associated with the increased likelihood of the attendance to at least one antenatal care session. But father's education had a stronger effect. These results may be due to the higher levels of health awareness, with an emphasis on the husband's role in the decision to seek care and to accompany females to the source of care. The positive effect of mothers' education was reported previously in the Saudi Maternal and Child Health Survey for mothers with basic education, compared to illiterates, though the effect was not large in magnitude. But the fathers' education was not found to be significant (Al-Mazrou et al., 1993). In the 1995 Vaccination Coverage Survey, the mothers' utilisation of prenatal care services was found to rise slightly with the rising level of education, with the biggest difference being between illiterates and educated mothers, while the father's higher education level was related to the rise in the percentage of mothers receiving antenatal care. This was true in cases of fathers' education up to the preparatory and above levels, which was also a cut-off point in the increase of maternal use of prenatal services, beyond which the effect remains the same (Al-Mazrou et al., 1997).

Internationally, education is one of the most important variables with respect to prenatal care use. In the United States, lower educational attainment was found to be related to the non receipt of antenatal care (Cooney, 1985; Melnikoe et al., 1991; Mor et al., 1995). In the Arabian Gulf states, the percentage of attendance of antenatal care clinics was found to rise with the increasing educational levels, as reported for Bahrain (Naseeb & Farid, 2000), for Kuwait (Alnesef et al., 2000) and for Qatar (Al-Jaber & Farid, 2000). This positive relationship between education and antenatal care utilisation was reported previously for various countries around the world. In Southeastern Asia, this relationship was reported in Thailand (Raghupathy, 1996), in the Philippines (Becker et al., 1993), in Vietnam (Swenson et al., 1993), besides other African countries like Benin (Bichman et al., 1991). It was also reported in India (Chandrashekar, 1998), in Bangladesh (Rahman, 2000), in Jordan (Abbas & Walker, 1986), in Turkey (Celik, 2000; Celik & Hotchkiss, 2000), in Northern Transval (Uyirworth et al., 1996), in Peru (Elo, 1992) and in Guatemala, where, in addition, husbands' education was also found to be related to prenatal care use (Pebley et al., 1996).

Other predisposing factors were not found to be significantly related to the receipt of prenatal care. This includes mother's age, which was found to be related to prenatal care use in other countries. For example, in the United States younger age was found to be related to the less likelihood of using prenatal care (Melnikow et al., 1991; Mor et al., 1995). This was also reported in an earlier study in France (Blondel et al., 1980). In developing countrie, older age was found to be associated with antenatal care use. Such examples would include Jordan (Abbas & Walker, 1986), Turkey (Celik, 2000) and Peru (Elo, 1992). In some poor countries with a high percentage of rural population, being older is related to the less use of prenatal care. This was reported in Vietnam (Swenson et al., 1993) and in the Karnataka State in India (Chandrachekar, 1998). In addition to the insignificance of mother's age, father's age was also not found to be related to prenatal care use.

Household size was not found to be significant with regards to antenatal care use. Neither was a child's birth order, indicating that the increased responsibility, due to the existence

of children at home, does not deter women from having at least one prenatal visit. With regards to birth order, although it is not found to be statistically significant, 11.7% of the women did not receive antenatal care due to their perception of their previous experience with pregnancy. In the 1995 Saudi Vaccination Coverage Survey there was a reporting of a slight deterioration of having used prenatal care with increased parity, but multivariate analysis was not applied. Higher parity or increased birth order is one of the most important factors related to the decrease in the utilisation of antenatal services in other countries. In the United States, higher parity was found to be related to the decrease in the chances of attending antenatal sessions (Poland et al., 1987; Melnikow et al., 1991; Mor et al., 1995). Lia-Hoagberg et al. (1990) and Aved et al. (1993) reported that children needing care at home was seen as a barrier for seeking prenatal care. In an earlier study, in France Blondel et al. (1980) also reported the increased probability of obtaining prenatal care for nulliparous women, compared to the multiparous.

In developing countries, nulliparous women were also found to be more likely to seek antenatal care. Such examples would be Turkey (Celik, 2000; Celik & Hotchkiss, 2000), Guatemala (Peblely et al., 1996) and Northern Transval (Uyiworht et al., 1996). Low parity explained use versus non use of prenatal care in Vietnam (Swenson et al., 1993), and in rural South India (Nielsen et al., 2001). In the Philippines, the increased number of preschool children was found to be related to the decrease in the use of prenatal care (Wong et al., 1987). In Jordan, Abbas and Walker have reported that women with low parity (1-3) and high parity (7 and over) were significantly less likely to use antenatal care than women with 4-6 parity value. The effect of parity on decreasing the chances of obtaining prenatal care may be due to the mothers' perception of their high level of experience, less need for care. It is also probably due to the increased childhood responsibilities they have.

Maternal economic activity was not found to be significantly related to prenatal care use, indicating that doing housework, working outside home or being a student, retired or doing nothing does not affect women's propensity or ability to seek prenatal care. Differences in prenatal care use were previously reported for women living in other

Arabian Gulf countries but without the application of multivariate models. Working women were reported –as percentages- to be more likely to seek prenatal care in Bahrain (Naseeb et al., 2000), in Kuwait (Alnesef et al., 2000), in Qatar (Al-Jaber et al., 2000) and in the United Arab Emirates (Fikri & Farid, 2000).

Regarding the enabling factors, living in the Southern region was found to be an advantage in terms of obtaining some prenatal care. This probably reflects the efforts of health care providers to encourage women to obtain such care in their attempts to reduce maternal, perinatal and neonatal mortality in the region. It was noted in the 1991 Maternal and Child Health Survey that the Central and the Eastern regions showed the highest percentages of antenatal care use, while the Southern region showed the lowest rate of prenatal care use, with a difference of about 10%. In 1995, in the Saudi Vaccination Coverage Survey, the Western region showed the lowest levels of prenatal care coverage while other regions displayed similar rates to each other. In an early study in a hospital in the Aseer Province, Southern region, it was reported that 49% of the women admitted for labor did not attend any prenatal care sessions (Hartley, 1980), which reflects the vast improvements in prenatal care attendance in the Southern region through the years.

Regional differentials in prenatal care utilisation were reported for other Arabian Gulf States, including Bahrain, favouring the capital (Naseeb et al, 2000), Kuwait (Alnesef et al., 2000), Oman (Sulaiman et al., 2000), Qatar (Al-Jaber et al., 2000) and United Arab Emirates (Fikri & Farid, 2000). Regional differentials were also previously reported in Turkey (Celik, 2000; Celik and Hothchkiss, 2000), in Vietnam (Swenson et al., 1993) and in Peru, favouring the Capital (Elo, 1992).

Urban/rural residence in this analysis was not found to be significant with relation to antenatal care use. This indicates a high level of accessibility and acceptability of prenatal care for the rural population, although it was indicated by 5.6% of the non users of prenatal care that the reason for their not using prenatal care services was the unavailability of services; most of them were rural mothers. This may be due to the lack

of knowledge of the availability of the services, which was reported in the United States by Aved et al. (1993). This finding is consistent with the 1995 finding by Al-Mazrou et al. (1997), where there was no reported urban/rural differential in antenatal care use. This finding does not support the common notion that in developing countries there is a disadvantaged position regarding the accessibility of health care for the rural populations. In other Arabian Gulf States, slight urban/rural differentials were reported, favouring urban women in Oman (Sulaiman et al., 2000) and in the United Arab Emirates (Fikri & Farid, 2000). Living in rural areas was found to be related to the less likelihood of using formal prenatal care in Jordan (Obermeyer & Potter, 1991), in Turkey (Celik, 2000), in the Philippines (Becker et al., 1993), in Vietnam (Swenson et al., 1993), in Peru (Elo, 1992) and in Guatemala (Pebley et al., 1996).

From the enabling economic indicators, only crowding and owning a family car were found to be significant. Mothers who had more living space were more likely to use prenatal care, compared to the most crowded fifth quintile of the variable, indicating that living in larger houses is a sensitive indicator of the use of prenatal care. Owning a family car was also found to be related to the increased chances of using prenatal car, since not owning a car is an indicator of a low economic status, in addition to the fact that a car is the major means for reaching health care facilities. In Turkey, it was reported that living in a household that owned a car increased the chances of receiving antenatal care (Celik, 2000; Celik & Hotchkiss, 2000).

Other economic indicators were not found to be related to the use of antenatal care. These variables include type of housing, housing tenure, floor material, availability of a flush toilet, pipe water supply and of electricity at home. This finding indicates a high level of accessibility of prenatal care in general terms. In Turkey, it was found that having a flush toilet at home was related to the use of prenatal care (Celik, 2000; Celik and Hotchkiss, 2000), while in rural areas women who lived in houses with wooden floors were more likely to obtain prenatal care (Celik, 2000). In Vietnam, villages where electricity was available women were more likely to seek prenatal care (Swenson et al., 1993).

From among the enabling media communication variables, only watching television was found to have a positive effect on the attendance of antenatal care sessions, while listening to radio and reading newspapers and magazines on a weekly basis were not found to be related to the use of prenatal care. This emphasizes the type of health information conveyed in different media channels, reflecting the positive role that television health programmes and doctors' interviews play in the health conceptions and health behaviour of women. Watching television on a daily basis in Guatemala was found to be related to the use of prenatal care (Pebley et al., 1996), and having television in the Metro Cebu, the Philippines, was found to be associated with the use of prenatal care (Becker et al., 1993).

Regarding medical problems included in the analysis, only severe breathlessness and vaginal bleeding were found to be related to the increased likelihood of receiving some antenatal care. Other medical problems included in the analysis and not found to be significant include pain in the upper abdomen, having convulsions, a severe headache, swelling of the face or body, painful urination, diabetes and hypertension. In Florida, the United States, having medical problems was found to be related to the receipt of antenatal care (Clarke et al., 1999).

It was indicated in the 1996 Saudi Arabia Family Health Survey by Khoja et al. (2000) that 30% had sought prenatal care, due to the presence of a health complaint, and not as a regular checkup, as indicated by the remaining 70%. It was also indicated that 58% of the mothers' not receiving any prenatal care was due to the fact that they had no complaint, while 11.7% thought that they had a previous experience and this did not need prenatal care. This raises a concern about the women's perception of the importance of prenatal care, indicating the need to have an active education effort aimed at married women in the child bearing years regarding the importance and benefits of prenatal care. Al-Nasser et al. (1994) found that 92.6% of the respondents in Al-Baha semi-rural and rural areas believed that antenatal care was important, but these respondents were chosen from primary health care users; thus the sample was biased toward users of primary care

services. It was reported that primary care was the main source of antenatal care in Saudi Arabia (Khoja et al., 2000).

7.3.2. Time of initiation of prenatal care

7.3.2.1. Time of initiation of prenatal care rate

It has been found that 79.3 % of women had started to attend antenatal sessions in the first trimester, while the remaining 20.7% had initiated prenatal care after the first trimester. These values coincide with the findings of the 1991 Saudi Maternal and Child Health Survey (Al-Mazrou et al., 1993).

In Europe, Delvaux et al. (2001) reported that the late initiation of prenatal care was reported to be 3.1% in Finland, 4.2% in Italy. In Belguim, Germany, Norway and Sweden late initiation rates were between 6.9 and 9.4%. In Greece, Hungary, Ireland, Portugal and Scotland the percentage of late initiation of prenatal care was found to be between 17.7%-29.2%. In Hawaii, Mor et al. (1995) reported that over 25% of pregnant women did not initiate prenatal care in the first trimester.

In Jordan, Obermeyer and Potter (1991) have reported that 49.5% of pregnant women did not initiate their prenatal care visits in the first trimester. In Ecuador, it was reported that 72% initiated prenatal care in the first trimester (Eggleston, 2000). In Kenya, Magadi et al. (2000) found that the average month of initiation of prenatal care was the fifth month of pregnancy. It should be pointed out that most developing counties did not focus on the issues regarding the initiation of antenatal care.

Comparing Saudi Arabia to the above mentioned countries, we find that Saudi Arabia falls within the lower range of the poorer European countries mentioned by Delvaux et al. (2001) with regards to the early initiation of prenatal care.

7.3.2.2. The bivariate associations between the independent variables and the early initiation of prenatal care

In this section, I will briefly discuss the significant associations between the independent variables and the early initiation of prenatal care.

a) Predisposing factors:

Mothers' being 15-34 years old showed an earlier initiation of prenatal care, indicating possibly a higher level of health information for younger mothers. Fathers' younger age in general was also found to be associated with the earlier initiation of prenatal care, with the highest level of early initiation of prenatal care being for wives of fathers' who were 30-39 years old. A higher level of mothers' and fathers' education in general was found to be associated with the early initiation of prenatal care, which may be explained by a higher level of health information and concern.

As for attending at least one prenatal care session, a lower birth order of the child, a smaller family size and being a working mother were found to be associated with the early initiation of prenatal care.

b) Enabling factors:

Living in the Eastern region was found to be associated with the early initiation of prenatal care, followed by living in the Northern region, the Western region and the Southern region; holding the worst position was the Central region. This may reflect the different levels of health information held by mothers living in different regions. Urban mothers held an advantaged position in terms of the early initiation of prenatal care, compared to rural mothers, which may also be explained in terms of the level of health information and time availability.

Regarding the usual place of prenatal care, it was found that having a private facility as the usual place of care was associated with the early initiation of prenatal care, compared to having a primary health care centre or a public hospital as the usual place of care. This can be explained in terms of a high level of health concern, since users of the private

services have to pay out of their pockets in order to receive prenatal care from their preferred obstetrician, instead of attending free prenatal care sessions at the public health care facilities.

From the enabling economic indicators, crowding, floor material, type of toilet and availability of electricity were found to be associated with the early initiation of prenatal care, with the advantaged being more likely to have started prenatal care in the first trimester. Dwelling type, main drinking water source and car ownership were not found to be significant.

From the media communication variables, only TV watching was found to be associated with the early initiation of prenatal care, reflecting possibly the positive effect of television health programmes. Daily radio listening and weekly newspaper and magazine reading were not found to be significant.

7.3.2.3. The logistic regression model for the early initiation of prenatal care

In this section I will briefly go through the variables included in the multivariate analysis and its effects on the early initiation of prenatal care, with the inclusion of findings from international literature where applicable.

Regarding the predisposing factors, mother's education was found to be significant. Mothers' being literate and mothers' holding a secondary or higher degree was found to be associated with the improved likelihood of seeking prenatal care within the first three months of pregnancy, compared to the illiterates. But this relationship is not robust nor is it consistent through all the education levels, although it may still indicate a better conception and level of health information for women who can read. In ten European countries, Delvaux et al. (2001) have reported that lower educational levels were associated with the late initiation of antenatal care. In Campania, Italy, Ouagliata et al. (1991) have reported the same finding, so did Cooney (1985) in New York.

In developing countries, higher educational attainment was found to be related to an earlier first prenatal checkup in the Philippines (Wong et al., 1987; Becker et al., 1993) and in Ecuador (Eggleston, 2000). While mothers' education was found to affect the time of initiation of prenatal care, fathers' education did not. This may be because mothers are the ones who identify the signs of pregnancy and report that to their husbands; thus husbands may not know about the pregnancy at an early stage, or they leave the decision of prenatal care initiation to their wives. But in the Philippines it was reported that increased husbands' education was related to the early initiation of antenatal care (Becker et al., 1993).

Higher birth order was found to be associated with a decrease in the likelihood of the early initiation of prenatal care, compared to the first order births. This is possibly due to the mothers' perception of their experience as when to start having antenatal checkups. In the United States, it was reported that higher parity is associated with the late initiation of prenatal care (Poland et al., 1987; Roberts et al., 1998). The same finding was reported in Delvaux et al.'s (2001) study of ten European countries and in an earlier study in France carried out by Blondel et al. (1980). In Kenya, Magadi (2000) found that late initiation of antenatal care was related to higher order births.

Other predisposing factors that were not found to be significant include mothers' and fathers' age, indicating that knowing when to start prenatal care and the accessibility of services do not differ according to age. In contrast, Delvaux et al. (2001) in their study of ten European countries reported that, for pregnant women, being under twenty years of age was associated with the late initiation of prenatal care. This was also reported in an earlier study in France by Blondel et al. (1980).

In addition to age, mother's economic activity and household size were not found to be related to the early initiation of prenatal care, which indicates that social obligations for women do not affect their timing of the first prenatal care visit, nor are knowledge about when to initiate care and the ability to seek care related to the mothers' having work outside home or not.

Regarding the enabling factors, region of residence was found to affect the time of the initiation of prenatal care, indicating, probably, differences in the perception of when to start prenatal care visits. This is very likely to be influenced by the health care staff and the health education efforts in each region. Urban mothers were found to be advantaged in terms of early initiation of care, although the difference is not big, indicating probably a privileged position in terms of health information in addition to fewer difficulties in accessing the health services at the right time.

Among the media communication enabling variables, watching television was found to be related to the early initiation of prenatal care, which emphasizes its positive role in providing health information. But daily listening to radio and weekly newspaper or magazine reading do not seem to have the same effect.

It has been found that none of the wealth indicators was related to the early initiation of prenatal care. These include type of dwelling, housing tenure, crowding, owning a family car, having a flush toilet, pipe or bottled drinking water and availability of electricity. This indicates that there is no difference in terms of the knowledge of the timing of antenatal care according to the level of economic well-being. But in Jordan Obermeyer & Potter (1991) reported that there was a relationship between higher standards of living and the timeliness of antenatal care.

7.3.3. Frequency of prenatal care utilisation

7.3.3.1. Number of prenatal care visits

It was reported that for Saudi women most of the births in the preceding three year period were for mothers who had at least two antenatal care visits. 87.8% of them received five or more checkups, and 74.6% of them received seven or more checkups, including mothers who made too many visits to remember. Comparing this to other Arabian Gulf States, most of the births were to mothers who attended at least two checkups. In Bahrain, 57% of women received five or more checkups and 52% received seven or more checkups (Naseeb & Farid, 2000). In Kuwait, 77% received five or more checkups while

two thirds received seven or more checkups (Alnesef et al., 2000). In Oman, two thirds received four or more checkups while two fifths received seven or more checkups (Sulaiman et al., 2000). In Qatar, 83% received five or more checkups while two fifths had seven or more checkups (Al-Jaber & Farid, 2000). In the United Arab Emirates, 50% received five or more checkups and two fifths received seven or more checkups (Fikri & Farid, 2000). Looking at the above mentioned values, we find that Saudi Arabia has the highest rates of prenatal care visits, compared to other Arabian Gulf states.

Comparing the findings of the number of prenatal care visits and their adequacy with other countries is difficult. There are different programmes which have different components and procedures; thus they do not recommend the same number of visits nor do they have the same procedures regarding scheduling.

7.3.3.2. The Poisson regression model for the frequency of prenatal care visits

In this section I will briefly go through the effects of the modeled factors on the average number of prenatal visits, with reference to international literature where applicable.

Three predisposing factors were found to be significant. One of them was mothers' age. Being 35-44 was found to be associated with an increase in the average number of prenatal care visits, compared to the youngest 15-24 year old mothers, reflecting possibly a greater need for care. Comparing this to other countries' findings, in a study of ten European countries Delvaux et al. (2001) it was found that women's very young age was associated with a decrease in the number of prenatal visits. This was also reported earlier in France by Blondel et al. (1980). The same finding was reported in the African country of Kenya (Magadi et al., 2000). Older women's age was found to be related to better use of antenatal care in Jordan (Abbas & Walker, 1986; Obermeyer & Potter, 1991). In Southern India, older women's and their husbands' older age were found to be related to more antenatal care visits (Nielsen et al., 2001). This positive effect was partly explained by the accumulation of knowledge of health care and value based on medicine. Although this is possibly applicable in Saudi Arabia, it is more likely that increased scheduling of older mothers by the health care providers is the main reason, leading to the increase in

the number of visits. Fathers' age in this study was not found to be significant with regards to the number of prenatal care visits.

Higher birth order was related to a decrease in the average number of visits, compared to the first ordered births, reflecting mothers' perception of less need for care, due to their previous experience with pregnancy, although in Saudi Arabia it was reported that higher birth order was related to an increase in risk of complications which necessitated careful monitoring; hence, an increase in the need of antenatal sessions (Al-Meshari et al., 1996). Higher order births were found to be associated with a decrease in number of prenatal visits in the United States (Sable et al., 1990; Melnikow et al., 1991; Clarke et al., 1999). The same finding was also reported in a study of ten European countries by Delvaux et al. (2001). In Jordan Abbas & Walker (1986) and Obermeyer & Potter (1991) have found that increased parity was associated with less adequate prenatal care. In Southern India, nulliparous women were found to receive more care than multiparous women (Nielsen et al., 2001).

The other predisposing factor found to be significant was the early initiation of prenatal care, which is related to the increase in the average number of visits. This finding is in part a logical consequence of the available time for scheduling before the end of term, which would probably lead to the increased value of prenatal care sessions held by mothers who initiated care at an earlier stage.

Mothers' and fathers' education was not found to influence the number of antenatal sessions attended. This shows that if a mother attends her first antenatal session, education does not play a role in the compliance with the antenatal care scheduling. This is a good indicator of the women's perceptions of the importance of antenatal care once they have contacted the health professionals. It also indicates their equal ability to keep up with appointments and that, in terms of scheduling, there is no bias towards the highly educated women who may have better communication abilities, health information, a better economic status and prestige.

In the United States, higher educational level was found to be related to more prenatal care visits (McDonald et al., 1988; Lia-Hoagberg et al., 1990; Melnikow et al., 1991; La Viest et al., 1995; Clarke et al., 1999). In Delvaux et al. (2001)'s study of ten European countries lower educational level was related to less prenatal care visits. This was also reported for the Campania region in Italy by Ouagliata et al. (1991). In developing countries, more years of schooling was found to be associated with more prenatal care visits in Jordan (Obermeyer & Potter, 1991), in the Philippines (Wong et al., 1997), in Southern India (Nielsen et al., 2001), in Bangladesh (Rahman, 2000), in Peru (Elo, 1992) and in Ecuador (Eggleston, 2000). Husbands' higher education was also found to be associated with the attendance of more prenatal care sessions in Metro Cebu, the Philippines (Becker et al., 1993), in Southern India (Nielsen et al., 2001) and in Peru (Elo, 1992).

Household size and women's economic activity were not found to be related to the average number of prenatal care visits, which is a positive finding with regards to the equal accessibility of services for women with varying household responsibilities, and women who work outside home and women who do not.

Regarding the enabling factors, regional differentials and urban rural differentials were found to be significant. These differences favour the Eastern region and disfavour the Southern region, compared to the Central region. This probably reflects differences in the perception of the value of antenatal sessions, or is due to different scheduling practices in different regions and sources of care. It might indicate difficulties in accessibility for residents of the Southern region. Urban mothers were found to make more prenatal visits on average, compared to rural mothers. The urban advantage in terms of the number of antenatal visits was reported previously by Al- Mazrou et al. (1993). This possibly reflects a higher value placed on keeping scheduled appointments and on the importance of prenatal care. It may also reflect differences in accessibility between urban and rural areas.

In the neighbouring Arabian Gulf countries, regional differentials were reported for Bahrain (Naseeb & Farid, 2000), Kuwait (Alnesef et al., 2000), Oman (Sulaiman et al., 2000), the United Arab Emirates (Fikri & Farid, 2000) and Qatar (Al-Jaber & Farid, 2000). Urban rural differentials favouring the urban areas were reported for Oman (Sulaiman et al., 2000), the United Arab Emirates (Fikri & Farid, 2000) In the State of Maine in the United States, rural women were found to make less prenatal visits than urban women (McDonald et al., 1988).

The usual place of care was found to be significant, favouring hospital visitors, possibly reflecting an increase in need for more visits, since high risk cases are usually monitored in public hospitals rather than at primary health care centres. But this finding is marginally significant.

Economic indicators were not found to be significant. These include type of housing, housing tenure, crowding, type of floor, availability of a flush toilet, pipe or bottled drinking water, availability of electricity and car ownership. This may be due to the small role played by the wealth status in terms of the accessibility and acceptability of prenatal care.

Among the media communication variables, reading newspapers or magazines on a weekly basis was found to be associated with the increased likelihood of making more prenatal visits, indicating the positive role reading has on keeping prenatal care appointments, possibly through providing health information about the value of close and regular pregnancy monitoring . Watching television was found to be marginally significant, and listening to the radio on a daily basis was not found to be significant.

Regarding the reported medical problems, severe breathlessness and swelling of the face or body were found to be related to an increase in the likelihood of making more prenatal care visits, although the second finding was marginally significant. This is due to the actual increase in the need for medical care and careful monitoring, because of the possibility of the occurrence of complications. Other medical problems included in the

analysis were not found to have a direct influence on the average number of prenatal visits. These include vaginal bleeding, high blood pressure, convulsions, pain in the upper abdomen, a severe headache and painful urination. This is possibly due to the high number of the standard required visits, reaching twelve or more visits, thus not necessitating more visits for the care of medical problems. In the United States, Clarke et al. (1999) reported that having medical problems was related to the increase in the number of antenatal visits, and in Sweden it was found that the number of complications during pregnancy was related to an increase in prenatal care visits (Berglund & Lindmark, 1998).

7.3.4. The utilisation of public versus private care as the place of the last checkup

7.3.4.1. Percentage of use of public and private services as a usual source of care

It has been found that 36.3% of mothers who had live births during the last three-year period had received their prenatal care from public hospitals, while 48.6% received their care from primary health care centres, adding up to 84.9% of mothers having received their care from the public sector, while only 15.1% received their prenatal care from the private sector.

Comparing this to other Arabian Gulf States for the pregnancies that ended with live births in the previous three year period, it was found that in Bahrain 31%, 58% and 11% received their care from government hospitals, primary health care centres and private facilities, respectively (Naseeb et al., 2000). In Kuwait, 38%, 23% and 29% of mothers received their prenatal care from public hospitals, primary health care centres and the private sector, respectively (Alnesef et al.,2000). In Oman, 65%, 33% and a little over 1% received their care from public hospitals, primary health care centres and the private sector, respectively, as reported by Sulaiman et al. (2000), making a minimum use of the private sector. In Qatar 66%, 28% and 5% of mothers received their care from public hospitals, primary health care centres and private health care facilities, respectively (Al-Jaber & Farid, 2000). Lastly, in the United Arab Emirates 82% of mothers received care from public hospitals, 5% from public health centres and 11% from private health care facilities. Thus, it is evident that in the Arabian Gulf countries public care is the main

source of prenatal care, as in Saudi Arabia, with a different combination of the public sources and the lowest utilisation rates of private services in Oman, followed by Qatar, with Saudi Arabia having the second highest percentage of users of private care.

Reliance on public services as the main source of prenatal care was not reported for several countries such as in Campania, Italy, where it was found that 73% received their prenatal care from private clinics, while 22% received care from public clinics and 5% received care from both (Ougaliata et al., 1991). In Turkey, it was reported that 39.4% and 14.9% received their care from the private sector and the public sector, respectively, while 34% did not receive any formal care. In an earlier study in Jordan, Abbas & Walker (1986) reported that 49.5% did not receive any care, 20.3% went to private doctors, 15.9% went to maternal health clinics and 12.7% went to other government agencies. In the Philippines, it was reported that 38.7% went to the public services, 15.4% went to the private services and 34.2% resorted to traditional care (Wong et al., 1987).

7.3.4.2. The bivariate associations between the independent variables and choice of the source of the last prenatal care checkup

It was found that women in the Western region and in the Eastern region showed the highest utilisation of the private services, which is possibly due to the acquaintance with private care as the high quality source of care. These were followed by women in the Central region and the Northern region, with the least utilisation of private care by women in the Southern region, indicating the difficulties in the accessibility of private care for women in this region. Urban women were three times more to have had their last source of prenatal care a private one compared to rural women, indicating the difficulties in accessibility of the private services for rural residents.

Working women relied more on private care, followed by women not holding a formal job nor doing house work as their main activities, with the least utilisation of private care for women who did housework as their main activity, indicating the possibility of having differences in the accessibility of private care for these women.

Holding an advantaged position with regards to the economic indicators, including crowding, floor material, toilet type main water drinking source and having electricity, were found to be associated with a much higher utilisation of the private services as the last source of prenatal care, which reflects a higher financial accessibility of private care for the economically advantaged. The exception was housing tenure where women who lived in rented houses and not owned by them showed the highest utilisation of private care. Watching television was found to be associated with the utilisation of private care, while daily radio listening was not found to be significantly associated with the last source of prenatal care.

From the direct accessibility factors, having a private car as the method of transportation was associated with more than doubling in the use of private care. This can be attributed to the increase in the financial and geographical accessibility since private health care services are not distributed equitably as the public services, which may necessitate traveling for longer distances. Shorter waiting times were found to be associated with the utilisation of private care, while traveling time was not found to be significant.

Regarding Satisfaction with care women who utilised the private services were more satisfied with the care provided compared to women who utilised the public services. This is logical since women choose the private health care provider that they find provide satisfying care. In addition, practitioners in the private sector try to please their patients in order to keep them as usual clients.

7.3.4.3. The logistic regression model for the use of public versus private care as the place of the last checkup

Based on the multivariate analysis, it has been found that private care was more likely to be used if the women lived in the Western or Eastern regions and, to a lesser extent, if the women lived in the Northern region, compared to the Central region. This may indicate the high dependency on private care especially in the Western and Eastern regions, compared to the Central region, while there is a high dependency on public services for residents of the Central region. This is probably due to the fact that the major

governmental institutions, other than the standard Ministry of Health facilities, have their high quality health facilities concentrated in the capital, which is situated in the Central region, thus attracting many users who were to choose private care if these facilities were not available. In addition, private care was established before the Ministry of Health facilities in the Eastern and Western regions.

Urban women were more likely to have used private care than rural women. This can be explained in terms of increased geographical and financial accessibility of private care for the urban population, compared to the rural population. Women who lived in modern houses, were less crowded and had pipe or bottled drinking water supply were more likely to have used private care. These results indicate that wealthier women may have higher accessibility to the private sector.

Women who did not do housework as their main activity showed a higher dependence on private care. This is probably because working women have a higher economic capability, thus are more able to pay for the services, in addition to their increased decision making power. Having a formal job can also lead to receiving advice from colleagues on the quality of care provided by certain private obstetricians. Also working women are more likely to be highly educated and seek higher quality of care. Being a wife and not doing housework may indicate a higher economic status, since these women would have maids who do their housework, which is quite prevalent in Saudi Arabia. Therefore, they have an increased ability to pay, compared to wives who have to do their housework themselves.

Of the immediate accessibility variables, traveling by a private car was found to be associated with the likelihood of the use of private care. This reflects the higher economic ability of private car users; hence, their ability to pay for the services. It also reflects the ability to travel for long distances at a lower cost in terms of time and money in order to reach the private health facilities, which are not distributed in a geographically equitable way, compared to the public health facilities.

Longer traveling time was found to be associated with the use of private services. This indicates the higher geographical accessibility of public services, increasing the likelihood of a public health facility being close to the residents. Longer waiting times was associated with the likelihood of the use of public services, which may be partly due to the high number of users of public health facilities, who constitute the majority of the population, in addition to the possibility of staff shortages.

Regarding satisfaction with the provided services, users of private care were more satisfied than users of public care. This is expected since the users of private care have chosen the specific health care provider they prefer, and if not satisfied they go to another health care provider for whose services they are willing to pay. Such choice is not available to the public health care users. Besides, doctors working in private health care facilities would often put more effort in satisfying their service users in order to retain them as regular patients.

Factors included in the analysis and not found to be significant were house ownership, having a flush toilet, having electricity and the media communication variables, including watching television and daily listening to radio.

7.3.5. Infants' full immunisation

7.3.5.1. The percentage of fully immunised one year old infants

The percentage of infants aged 12-13 months who were fully immunised was about 80%. Comparing this value to other Arabian Gulf States, this percentage is the same as that found in Qatar, where the percentage of fully immunised infants is about 80% (Al-Jaber & Farid, 2000), and is close to Bahrain where 83.6% of the infants are fully immunised (Naseeb et al., 2000). It is higher than that reported for Kuwait (70.4%) by Fikri & Farid (2000) and that reported for the United Arab Emirates (71.1%) by Alnesef et al. (2000). But Oman seems to have an outstanding percentage, with 97% of one year old infants being fully immunised (Sulaiman et al., 2000).

In the United States, Herrara et al. (2001) have reported that, for different ethnic groups, for children aged 19-35 months full immunisation status ranged between 68% to 80%, depending on a pooled data from the National Immunisation Survey 1996-1999. Stokley et al. (2001) have reported that for rural children full immunisation status was 80%, while for semi-urban and urban children it was 79% and 77%. For Jordan, the percentage of infants aged 12-23 months being fully immunised was 63.5% (Obermeryer et al., 1993), while for Guatemala, 38.7% of the one year old infants were fully immunised (Pebley et al., 1996). For the Morobe Province in Papua New Guinea, only 11% of infants 12-24 months were fully immunised (Karel & Rasmussen, 1994). These values show that Saudi Arabia holds an advantageous position, compared to most of the above mentioned countries.

7.3.5.2. The bivariate associations between the independent variables and infants' full immunisation

Regarding the bivariate associations between the independent variables and infants' full immunisation status, most of the independent variables were not found to be significantly associated with infants' full immunisation. These include, from the predisposing factors, a child's gender, birth order, health status rating, mothers' and heads of household's age, household size, mother's and heads of household's economic activity, heads of household's education and mother's early initiation of prenatal care. From the enabling factors, almost all of the economic indicators were found to be insignificant. From the media communication variables, having colour television and radio were also not found to be significant.

Mothers' lower educational level was unexpectedly found to be associated with a better immunisation status for infants. A worse immunisation status was found for infants' who had mothers that attended 1-5 prenatal care visits only.

From the enabling factors, infants in the Northern region, followed by the Southern regions displayed a better immunisation status than infants in other regions, which may reflect the health care providers' efforts to have a high immunisation coverage. This

holds true for rural areas where infants were more likely to be fully immunised than infants in urban areas.

Being an infant living in a house provided by an employer was found to be associated with a worse immunisation status. Not having the main drinking water source as pipe or bottled water and not having a satellite TV/cable were found to be associated with a better immunisation status.

7.3.5.3. The logistic regression model for the full immunisation of one year old infants

In this section I will discuss the effect of the predisposing and enabling factors that were tested for by the logistic regression modeling technique, comparing the results with international findings where applicable.

Regarding predisposing factors, mothers' high education level was related to the decrease in the likelihood of an infant being fully immunised, compared to illiterates.
This does not agree with the notion that higher education is associated with higher levels of health concern and awareness, leading to better compliance. But since the incidence of the diseases for which these infants are immunised against is very low (Khoja et al., 2000, MOH, 2001), educated mothers may not view the compliance with the immunisation schedules as necessary, although they are eventually immunised, since children can not have their official birth certificates nor enter schools without being fully immunised. In the 1991 Saudi Maternal and Child Health Survey a similar finding was reported. Immunisation coverage was found to be highest for infants of mothers with basic education while the illiterate mothers and mothers with preparatory and above education had infants with the same immunisation rate (Al-Mazrou et al., 1993). But in Al-Shammari et al. (1992) study of Riyadh city they found that increased mothers' education was related to an infant being immunised as scheduled. However, the sample was from utilisers of primary health care centres.

In Bahrain, illiterate mothers had the same proportion of fully immunised infants, as did mothers holding university degrees (Naseeb et al., 2000), while in Kuwait, illiterate

mothers were reported to have the highest proportion of their infants fully immunised, compared to mothers holding educational degrees (Alnesef et al., 2000). But in Qatar mothers' education was related to the better immunisation status of infants (Al-Jaber & Farid, 2000). A positive relationship between mothers' education and children being immunised as scheduled was reported in Jordan (Obermeyer et al., 1993), in the Philippines (Becker et al., 1993), in Guatemala (Pebley et al., 1996), in Guinea (Cutts et al., 1990) and, in an earlier study, in Nigeria (Akesode, 1982), as expected since higher educational level was associated with higher levels of health awareness and health information. Regarding head of household education, it was not found to be significant, while in Guatemala even fathers' increased education was found to be related to the probability of a child being fully immunised (Pebley et al., 1996).

Mothers' having made more than five prenatal care visits was found to be related to the increased likelihood of an infant being fully immunised. Having a positive relationship between prenatal care session attendance and the infants' immunisation status is itself an indicator of these mothers' involvement in preventive care activities, thus emphasizing the importance of the joint effort that should be put into trying to achieve a higher rate of understanding of these preventive health care activities, since it was noted by the respondents that 18.9% of infants' not being fully immunised was due to the perception that the child was too young, and 3.7% of the infants were not fully immunised due to parents' unawareness of the need for immunisation.

In the United States, a positive relationship was reported between having made adequate prenatal care visits and the better immunisation status of infants (Butz et al., 1993; Swigonski et al., 1995; Kogan et al., 1998). In Iran, Nasseri et al. (1990) have reported that prenatal care utilisation was positively related to increased immunisation coverage.

While the number of prenatal visits was found to be associated with the infants immunisation status, the timing of the prenatal care initial visit was not found to be related to the infant's immunisation status, although in the United States, Stevens-Simon

et al. (1996) have found that late initiation of prenatal care was related to the infant's incomplete immunisation.

Other predisposing factors included in the analysis were not found to be significant. These include gender of the infant, in which there were no significant differences between males and females immunisation status. In Jordan, Obermeyer et al. (1993) have reported that females had a better immunisation status than males, while in an earlier study in Nigeria, Akesode et al. (1982) reported that boys were more likely to be fully immunised than girls. Birth order was also not found to be significant. It was found to be associated with the children being fully immunised in the United Kingdom (Li & Taylor b, 1993). It was also found to be related to the children's immunistion status in Guatemala (Pebley et al., 1996). Family size was also not found to be significant. Increased family size was found to be related to the decrease in immunisation uptake in the United Kingdom (Li & Taylor a, 1993), in New Zealand (Kljakovic et al., 1997) and in Australia (Bond et al., 1999). In Nigeria, Akesode (1982) had found that small family size was found to be related to the children being fully immunised.

Mother's and head of household's economic activity was not found to be significant. But in Guatemala, Pebley et al. (1996) found that mothers' employment was associated with the completeness of childhood immunisation. The same finding was reported in Guinea by Cutts et al. (1990). Mother's and head of household's age –who is the father for 91% of the children under five included in the survey- was not found to be related to the infants' immunisation status. In New Zealand, incomplete children's immunisation was related to the mothers and fathers being younger than thirty years old (Kljakovic et al., 1997). In Nigeria Akesode (1982) found that fully immunised children were children of younger mothers, who are probably more modernized.

Regarding the enabling factors, residence in the Northern region and residence in rural areas were positively associated with the increased likelihood of an infant being fully immunised, indicating a higher level of success of vaccination programmes in the Northern region and in rural areas, compared to other regions and the urban areas. The

Northern region advantage was reported previously in the 1991 Saudi Maternal and Child Health Survey (Al-Mazrou et al., 1993) and in the 1995 National Vaccination Coverage Survey (Al-Mazrou et al., 1997). Rural advantage also coincides with the previous findings in both the 1991 Saudi Maternal and Child Health Survey (Al-Mazrou et al., 1993) and the 1995 Saudi Vaccination Coverage Survey (Al- Mazrou et al., 1993).

In Qatar, regional differentials were reported, favouring the capital (Al-Jaber & Farid, 2000). Regional differentials were also reported in Bahrain (Naseeb et al., 2000), in Kuwait (Alnesef et al., 2000) and in the United Arab Emirates, in which rural areas were also reported to have higher rates of fully immunised infants, compared to urban areas (Fikri & Farid, 2000). In Iran, Nasseri et al. (1990) reported that rural areas had better immunisation coverage than urban areas, which was partially accredited to the mobile immunisation units operating in rural areas. In the Metro Cebu region in the Philippines, better rural immunisation coverage was also reported (Becker et al., 1993), while in Guatemala, Pebley et al. (1996) found that immunistion coverage was better in urban areas.

Other enabling factors included in the analysis were not found to be significant, which is a positive indicator of service accessibility and acceptability. These include the economic indicators: type of dwelling, housing tenure, crowding, type of floor, having a flush toilet, having electricity and pipe or bottled water drinking supply and car ownership. In Jordan, Obermeyer et al. (1993) found that higher standard of living was associated with the completion of the immunistion schedule. In the Philippines, Becker et al. (1993) reported that if the family was more crowded there was less probability for a child to be fully immunised, while having a toilet at home was positively associated with a child's chance of being fully immunised. Media communication variables were not found to be significant, including a family having a radio, a television set and a satellite television or cable.

Thus it has been found that for infants' immunisation only few factors affected the likelihood of an infant being fully immunised, which indicates the high level of

accessibility and acceptability of childhood immunisation. But health education programmes should be active in educating parents of the age at which immunisation should take place, since it was reported in the survey that 18.9% of the infants' not being completely immunised was due to the perception of their very young age, and of the importance of the timeliness of immunisation, for 47.8% of respondents reported that they intended to do it but did not keep their infants immunised as scheduled. Accessibility problems should also be explored, since the fact that 13.8% of the infants were not fully immunised was reported to be due to the place of immunisation being too far away.

7.3.6. A synopsis of the utilisation of preventive health care services

It has been found that the prenatal care utilisation in Saudi Arabia had reached a value of 93%, which is high compared to other developing countries, with the public health services being the major provider of prenatal care. Regarding the early initiation of prenatal care, Saudi Arabia falls within the range of the poorer European countries, which can be also considered to be an achievement. When it comes to the frequency of prenatal care visits it is difficult to compare the adequacy of visits to other countries due to the differences in prenatal care programme arrangements. For one year old infants, full immunisation status is comparable to the full immunisation rates in the United States for older children, which may also be considered of significance.

With regards to the effects of various predisposing and enabling factors and the effect of medical conditions on the utilisation of prenatal care, some factors were found to have an effect and some did not. In this section I will briefly summarize the effect of the variables included in the analysis on the utilisation of preventive care services.

It has been found that maternal and paternal education are of paramount importance, indicating probably higher levels of health awareness and knowledge about the importance of prenatal care, especially when prenatal care services are available free of charge in all primary health care centres and in public hospitals. This positive effect of education has been reported for both developed and developing countries, as mentioned

above. This may be a result of greater financial accessibility of services, or is due to the increased acceptability of modern services in some developing countries, in contrast to traditional services. But a factor that is shared universally is the health awareness and information that increases with higher educational attainment, especially when the health service utilisation in concern is preventive. Unexpectedly, however, education did not play a role in determining the frequency of prenatal care visits in Saudi Arabia. This probably indicates the positive role health care providers play in providing health information to less educated expectant mothers, which may in part balance the health information advantage associated with increased education.

Another important determinant of prenatal care use was birth order, with the first born child holding the advantaged position. This may be due to the perception of experience and knowledge of previously pregnant mothers, leading to the late initiation of prenatal care and attending fewer antenatal sessions. This negative effect of parity was reported in both developed and developing countries, as previously mentioned, where the perception of experience with previous pregnancies seemed to be a shared factor.

As expected, the early initiation of prenatal care was related to making more prenatal care visits, which is a logical consequence of having more available time for scheduling before the end of term. It may also reflect the higher value placed on having proper prenatal care, starting with having an early prenatal care visit. This finding supports what Al-Shammari et al. (1994) reported in Riyadh city.

Age was reported to be an important determinant of prenatal care use in many developed and developing countries, as mentioned above. However, it was not found to have any effect for Saudi mothers except for the age group 35-44, who made more prenatal care visits. This is probably associated with an increase in need for more visits, since mothers in this age group are more likely to have higher risk pregnancies. Since there was no difference between the utilisation versus non-utilisation among mothers in different age groups, high level of accessibility and acceptability of prenatal care services for Saudi women of different ages is possibly implied. Mothers belonging to younger groups were

shown to hold a disadvantaged position in some studies carried out in the United States, Europe and some developing countries, as mentioned before. This may be due to their decreased levels of accessibility or knowledge and concern about prenatal care. For Vietnam, it was reported that older women used less modern prenatal care (Swenson et al., 1993) and so did older women in the Karnataka State, India (Chandrechekar, 1998). This can be partly explained by the unfamiliarity with modern care for these poor, mostly rural populations.

Other predisposing factors which were not found to have an effect on prenatal care use include household size and mothers' economic activity. It was reported in other Arabian Gulf States that working women were more likely to seek prenatal care in Bahrain, Kuwait, Qatar and the United Arab Emirates in their 1996 family health surveys, although these findings were not confirmed by applying multivariate analysis.

Regional and urban/rural differentials were reported in Saudi Arabia, favouring the least socioeconomically developed region in the country, the Southern region, for having attended at least one prenatal care session. This indicates a high success of the maternal health care programme, especially when it was reported by Al-Mazrou et al. (1993) that this region held the worst position in prenatal care utilisation, compared to other regions of the country. But the Southern region still shows a disadvantaged position in terms of the early initiation of prenatal care and the frequency of attendance of prenatal care sessions, which is partly due to difficulties in geographical accessibility since this region is mountainous with a high proportion of a scattered rural population. Regarding the early initiation of prenatal care and the frequency of attendance to prenatal care sessions, mothers in the Eastern region held the best position. This is probably due to a higher level of health knowledge and value placed on prenatal care, since preventive health care activities were initiated before the establishment of the Ministry of Health by the oil producing company ARAMCO.

There were no differences between urban and rural residents with regards to the receipt of some prenatal care. This is consistent with the results reported previously by Al-Mazrou

et al. (1997). It is considered to be advantageous for the Saudi population, indicating a high level of accessibility and acceptability of prenatal care services, which is not the case for other developing countries, as mentioned above. Urban mothers were more likely to initiate prenatal care visits early in pregnancy and make more prenatal care visits. This probably reflects the higher levels of health awareness and knowledge held by urban mothers and the possibility of increased household responsibilities and time pressure put on rural mothers, who are more likely to have more house duties compared to urban mothers. This urban advantage in terms of the number of prenatal care visits was reported previously in other countries, such as in Oman (Sulaiman et al., 2000) and in the United Arab Emirates (Fikri & Farid, 2000). It was also reported in an earlier study in Maine, in the United States (Mc Donald et al., 1988).

The usual place of prenatal care checkups was found to have an affect on prenatal care use. Mothers attending prenatal care sessions at primary health care centres were more likely to have their first prenatal care visit at an early stage in pregnancy, indicating the positive role health education efforts play in these health care centres and, possibly, the higher accessibility of primary health care centres, compared to obstetricians in public hospitals.

Regarding the economic indicators, more living space was found to be related to the receipt of some prenatal care, thus favouring the richer segments of the population. Owning a private car, which in addition to being a wealth indicator -where only the poor 12% of the Saudi families do not own one- is the major means of transportation in Saudi Arabia, was associated with the increased probability of receiving some prenatal care. This positive relationship between the economic standing and the utilisation of prenatal care is probably due to a better understanding and a higher level of health information with regards to prenatal care. It may also be associated with accessibility difficulties especially for mothers whose families do not own a private car. In Turkey, it was reported that owning a private car increased the chances of receiving some prenatal care (Celik, 2000; Celik & Hotchkiss, 2000). Also having a flush toilet at home was found to be associated with prenatal care use (Celik, 2000; Celik & Hotchkiss, 2000).

Among the media communication variables, watching television played an important and positive role with regards to the receipt of some prenatal care and the early initiation of care. This reflects the importance of health information provided via television channels, familiarizing the audience with the available services, which is not true for radio listening. In addition, television watching indicates more family modernization, thus a better attitude to preventive health care activities, compared to highly conservative families who do not allow television to be brought into their homes, and having television at home may reflect an economic advantage. Reading newspapers and magazines on a weekly basis was related to making more prenatal care visits, since female readers are more likely to have a higher level of general information, including health information, placing a greater value on pregnancy monitoring. Watching television was found to be associated with prenatal care use in Guatemala (Pebley et al., 1996) and in the Metro Cebu, the Philippines (Becker et al., 1993). However, the effect of media communication variables on prenatal care use has not been widely explored.

Regarding the medical problems included in the analysis, having vaginal bleeding or severe breathlessness were associated with receiving some prenatal care. These conditions seem to trigger medical consultation out of health concerns. In addition, having severe breathlessness was associated with the increase in the number of prenatal care visits. Other medical problems included were not found to be significant. This is possibly due to the fact that most mothers receive prenatal care and that there is a required ideal twelve visits scheduling for pregnant women; thus not needing to increase the number of visits in order to monitor some health problems. Having multiple health problems may lead to the early termination of pregnancy; thus this group of high risk mothers was not included in the analysis since the analysis was done for the pregnancies which ended in live births, and if they did have live births the shorter gestation period would not have led to an increase in the total number of prenatal care visits. A positive relationship between medical problems and prenatal care utilisation was reported previously for the United States (Clarke et al., 1999) and for Sweden (Berglund & Lindmark, 1998). The role of medical problems and their relationship with prenatal care visits do not usually seem to be variables of concern in developing countries.

A part of the analysis included in the chapter was the effect of the enabling factors on the choice of place of the last prenatal care checkup. It was found that living in the Western region and living in the Eastern region and living in the Northern region were associated with more dependence on private care, compared to the Central region. This is probably due to the high concentration of high quality public non Ministry of Health facilities in the Capital, which is situated in the Central region. Urban residence was also found to be related to the greater use of private care, compared to rural residence, which is due to increased geographical and financial accessibility.

Out of the wealth indicators, living in a modern house, having more living space, having pipe or bottled drinking water supply were all related to the use of private care, which is considered to be a logical consequence of being more able to pay for the services. Women who have their own income from work and women who do not carry out their household duties themselves are more likely to have sought private care, compared to women who do their own housework as their main occupation. This also indicates a higher ability to pay for the services for women who have their own jobs or have maids to help them at home.

From the direct accessibility factors, having a private car as the transport method to reach a health care facility, compared to other means, was linked to the use of private care, which can be explained in terms of the increased ability to pay for the services and having the means to reach the far away private health care facilities. Shorter traveling time was associated with the use of public services, which is an indicator of higher geographical accessibility, compared to private care. But increased waiting time was associated with the use of public services, which is probably due to the higher number of users of public care, the major source of health care in Saudi Arabia.

Regarding satisfaction with the services provided, private care users were more satisfied with the services provided. This is probably due to the women's free choice of the

services of the satisfying obstetrician and to the effort put by private doctors to satisfy their patients in order to keep them as regular clients.

The last part of the chapter included an analysis of the effect of the predisposing and enabling factors on one year infants' full immunisation. It was found that mothers' higher educational level was surprisingly related to a decrease in the probability of an infant being fully immunised. This is probably due to the mothers' knowledge of the low risk their infants have in acquiring the immunised against diseases, thus may be less compliant with the schedules. The disadvantaged position of children of mothers with higher education was reported previously by Al-Mazrou et al. (1993). This finding is contradictory to the findings in other developing countries, as mentioned above, where there was a positive association between education and children's immunisation status, including, in some instances, fathers' education, which in this study was not found to be significant. However, in neighbouring Bahrain and Kuwait there was a negative relationship reported between the mothers being highly educated and their infants being fully immunised, as reported in these countries family health surveys.

Mothers' having made more than five prenatal care visits when pregnant with the child under concern was found to be related to the increased likelihood of a child being fully immunised. This probably reflects the knowledge and value placed on preventive health care activities. This positive relationship between infants' immunisation and prenatal care use is similar to the findings reported to in the United States (Butz et al., 1993; Swigonski et al., 1995; Kogan et al., 1998). Also in Iran Nasseri et al. (1990) reported a positive relationship between prenatal care use and increased immunisation coverage. But the presence of this relationship was not generally tested for in developing countries. Although the number of prenatal care visits was found to be significant the time of initiation of prenatal care was not found to be significant.

An infant's gender was not found to be significant, indicating the absence of male preference in infants' immunisation. Birth order was also not found to be significant, but it was reported to have a negative effect in the United Kingdom (Li & Taylor b, 1993)

and in Guatemala (Pebley et al., 1996). Family size was not found to affect infants' immunisation status, which was reported to have a negative effect of children's immunisation in the United Kingdom (Li & Taylor a, 1993), in New Zealand (Kljakovic et al., 1997) and in Australia (Bond et al., 1999). The same finding was also reported in an earlier study in Nigeria (Akesode et al., 1982). This effect may be due to time constraints or a decrease in preventive activities health concern for higher order births and for larger families.

Age of mothers and heads of household – most likely the fathers- was not found to be related to the completeness of infants' immunisation series, while it was found in New Zealand that younger parents had children with a worse immunisation status (Kljakovic et al., 1997), which is probably due to a decrease in the level of health information and the inexperience with child care. In an earlier study in Nigeria, it was reported that younger mothers were more likely to be modernized and have a higher proportion of fully immunised children (Akesode et al., 1982).

The economic activity of either mothers or heads of household -who are 91% of the time the fathers of the children- was not found to affect the infants' immunisation status. But it was reported in Guatemala (Pebley et al., 1996) and in Guinea (Cutts et al., 1990) that women's employment was related to a better children's immunisation status, since those women are more likely to be empowered by their work status and have higher mobility and income, especially in the relatively, poorly developed societies, where this finding was reported for.

Comparing the effects of the predisposing variables on the one year infants' full immunisation status to other countries, Saudi infants are considered to be fairly advantaged in terms of the minor effects these factors play in their receipt of the full immunisation series, with an unexpectedly negative association between higher education and having the infants' fully immunised, contradicting the findings of the literature in other countries, except some neighbouring Arabian Gulf States, which are culturally similar to Saudi Arabia.

Regarding the enabling factors, Northern region residence and rural residence were found to be associated with a better infants' immunistion status, indicating a higher success rate of the immunisation programmes in the Northern region and in rural areas. These findings coincide with the findings of the 1991 and the 1995 Saudi surveys which included immunisation in its cross tabulations. Regional differnatials were also reported in Bahrain (Naseeb et al., 2000), in Kuwait (Alnesef et al., 2000) and in the United Arab Emirates for which, in addition, rural infants had a better immunisation status, compared to urban infants (Fikri & Farid, 2000). In Iran, it was reported that rural areas had better immunistion coverage than urban areas, which was explained in part by the presence of mobile immunisation units in rural areas (Nasseri et al., 1990). But in Guatemala better immunisation coverage was reported in urban areas (Pebley et al., 1996).

All of the economic indicators and the media communication variables were not found to affect infants' full immunisation status, which is a positive indicator of the high levels of accessibility and acceptability of immunisation services in Saudi Arabia. Although the effect of the economic indicators on the infants' full immunisation status has not been generally explored in international literature it was reported in Jordan that higher standards of living were related to the children's complete immunisation schedules (Obermeyer et al., 1993). In Metro-Cebu, the Philippines, Becker et al. (1993) found that more crowded families had children who were less likely to be fully immunised.

7.4. CHAPTER'S SUMMARY

Regarding the utilisation of prenatal care services and infants' immunisation levels in Saudi Arabia, it is considered to be much better than in developing countries and is, in some instances, comparable to the findings of developed countries. The variables that were found to influence the use of prenatal care are, in general, similar to what was reported in the international literature. Several predisposing and enabling factors were found to have an effect on the use versus non-use of prenatal care, although prenatal care utilisation rate of 93% suggests that being pregnant, i.e., the need indicator, is the major determinant of using prenatal care services. Some predisposing and enabling factors were found to affect the early initiation of care and the number of visits, rendering some

mothers more likely to receive and have better prenatal care. This indicates that the elimination of the differences due to these factors would contribute to achieving better prenatal care utilisation. It is worth noting that economic variables seem to have minimal or no effects, indicating a high level of accessibility of prenatal care services. Regarding infants' full immunisation, the situation seems to be very good in comparison with other countries, since only four variables are found to be significant, while most of the factors included in the analysis did not show a significant effect, although they were reported to do so in other countries. Thus, need as indicated by being an infant, is the major determinant of the utilisation of infants' full immunisation.

Chapter 8

Research Summary and Recommendations

8.1. INTRODUCTION

As this is the final chapter of the thesis I will provide a summary of the findings of the analyses performed. This is followed by the policy implications and recommendations, the study limitations and the conclusions of the thesis.

8.2. SUMMARY OF THE RESEARCH FINDINGS

In the thesis, the research question that was investigated was whether need was the principal determinant of ambulatory health care utilisation for Saudi nationals in Saudi Arabia. In order to answer the research question, multivariate analysis was carried out testing for the effects of the predisposing, enabling and need related factors on the utilisation of health services for acute sickness in general and for children under five diarrhoea and respiratory infections. In addition, the effect of predisposing, enabling factors and need on the utilisation of preventive services, including prenatal care and infants' full immunisation, was also tested.

It is worth noting that, regarding the use of curative health services during acute sickness for adults and for children, the predominant form of services used was doctors' services while other paramedical staff and traditional medicine played a very minor role. Thus Saudi Arabia is considered similar to developed countries with regards to the type of health services utilised, especially when the major form of doctors' services utilised was public doctor services, where GPs in primary health care centres are the main providers of health care. It is also worth mentioning that, with respect to preventive service utilisation, prenatal care utilisation in Saudi Arabia has reached approximately 93%, much higher than that in other developing countries, except for the other Arabian Gulf countries, with public services being the major source of care. Early initiation of prenatal care was found to be 80%, falling within the range of the poorer European countries. Infants' full immunisation rate was found to be 80%, comparable to the immunisation

rate in the United States. In Saudi Arabia, the immunisation rate is expected to reach higher values as infants become older, since birth certificates are not issued until a child has been fully immunised, and it was reported by the WHO data base that the proportion of fully immunised children in Saudi Arabia in 1999 was 92%. These values indicate the success of the maternal and child health care programmes in Saudi Arabia, which can be considered an important achievement of the Saudi health care system.

According to the multivariate analysis of the utilisation of health services, it was found that several predisposing, enabling and need related factors were found to affect utilisation. In the following section I will go briefly over the significant effects, with the variables arranged as predisposing, enabling and need related factors.

8.2.1. The predisposing factors

Among the predisposing factors, it was found that being an adult *male*, compared to being an adult female, was associated with the increase in the utilisation of the public doctors' services –most likely GP services in primary health care clinics- for the care of acute sickness. This is likely to be a result of the higher level of male mobility, since women are not allowed to drive in Saudi Arabia and transportation by private car is the dominant transportation means. However, this difference does not appear for the utilisation of private doctors' services –which is most likely to be specialist services- indicating the possibility of a greater level of need, minimizing the gender effect, and possibly that the female utilisers of private care have available means of transportation, since a large proportion of abler Saudi families, who are more likely to rely more on private services, employ drivers who are responsible for transporting women and children. *Son* preference was found to be significant in rural areas for the utilisation of both public and private services and the utilisation of the public services for the care of acute sickness, indicating a higher level of care provided for males in these more traditional societies, while this effect was reversed in urban areas. This probably indicates the daughters', especially older ones', higher tendency to somatise and to better report their symptoms to their parents, raising parents concern, thus leading to an increase in

medical consultation. Son preference was also reported previously in some developing countries, as indicated in the literature review and the discussions of Chapter Six.

Being *single,* compared to being married, was found to be associated with an increase in the utilisation of public doctors' services –most likely GP services in primary health care centres- for the care of acute sickness. This is probably due to the lower levels of social obligations, giving the singles extra free time to go for medical consultation, and since singles are more likely to be younger and have lower income they tend to use the public services, which is the main source of health care in Saudi Arabia.

Age of head of household was found to be positively associated with the adult family members utilising more public doctors' services in response to acute sickness, but the individual adult's age was not found to be significant. This indicates that families who have older heads of household show a higher dependence on doctors' services and less reliance on home medication. The fact that head of household's age was significant while the individuals' own age was not points out to the essential role a head of household plays in decision making in Saudi families. Being an adult member in a family where the *head of household was between forty and fifty nine years old* was associated with an increase in the utilisation of private doctors' services in response to acute sickness, compared to families where the head of household was twenty to thirty years of age. This is possibly due to the higher income of middle aged heads of household and the increased reliance on doctors' services by families of older heads of household.

Heads of household's age being fifty and above was found to be associated with an increase in children's utilisation of both public and private doctors' services in response to acute sickness. This possibly reflects their higher levels of concern about children's illnesses. This may be partly due to their lower levels of information about modern home care practices, and it possibly reflects less confidence in their skills in child illness management. In addition, they possibly expect rapid cure after consulting one source of medical care, since fifty and older heads of households are more likely to have lower educational levels, compared to younger heads of household; thus, they are less likely to

be health informed. Increased *age of heads of household*, who are fathers in the case of more than 90% of the children, was found to be associated with the increase in the utilisation of the public services in response to children's respiratory infections, compared to the youngest heads of households.

Mother's age of 35-44 years was found to be associated with an increase in children under five's utilisation of public as well as private services for the care of acute respiratory infections, compared to the youngest mothers. This indicates the higher dependence of mothers of this age group on the medical services and their less reliance on home medication or the replication of previous management strategies suggested in the previous medical consultations. This age group of mothers was also found to be associated with an increased likelihood of attending more prenatal care sessions, compared to the youngest mothers. This is possibly due to the increased likelihood of having high risk pregnancies with an increased likelihood of having higher parity. Thus they are possibly scheduled for more visits, and it may possibly be due to this age group's higher value of medical care; thus they are more compliant with scheduled visits. Older mothers were not found to be disadvantaged in prenatal care use, as reported in some developing countries, and very young mothers were not found to be disadvantaged in terms of receiving some prenatal care or in their early start of prenatal care, as reported in other research settings including developed countries. This puts Saudi Arabia in an advantaged position in terms of the low significance of age, compared to both developed and developing countries.

Higher birth order, compared to the first born child, was found to be associated with the late initiation of prenatal care and a decrease in the number of prenatal care visits. This is probably due to the perception of experience and knowledge about pregnancy by previously pregnant mothers. This corresponds to the findings of the international literature.

Smaller family size was found to be positively related to children's utilisation of both public and private services for the care of acute sickness. This probably reflects a higher

level of care given to the children in smaller families, and it is possibly due to parents' less experience in child care and familiarity with the common diseases in childhood. This effect of small family size on health service utilisation has been documented in both developed countries and in some developing countries.

Regarding the effect of education, *higher levels of education,* compared to illiteracy, were found to be associated with the increase in the utilisation of private care for the care of acute sickness, which is more likely to be higher quality specialist care. *Heads of households with higher education,* compared to illiterates, were found to be associated with an increase in children's utilisation of private doctors' services and the utilisation of both public and private doctors' services for the care of acute sickness.

Mother's secondary and above education was found to be associated with children under five's utilisation of private services for the care of diarrhea, and mothers' secondary and above education was found to be associated with the decrease in the utilisation of the public services for the care of children's respiratory infections. Compared to illiterates, *mothers having primary and higher levels of education* were found to be associated with the monotone increase in the utilisation of private care for children's acute respiratory infections.

The preference of the better educated for private care can be explained from different perspectives. Having a higher educational level indicates a higher level of health information, thus a higher level of health concern leading to the preference of higher quality specialist care in the private sector, compared to GP services in the public sector. Higher levels of education, especially for the male population who are most likely to be working, are also correlated with higher levels of income; thus they have a greater ability to pay for private care. Women with higher levels of education, even if they do not hold formal jobs, are more likely to come from more socioeconomically advantaged families, since these families are more likely to be more modernized and encourage female education. The highly educated were not found to utilise more public health services, which is a positive indicator of the accessibility and acceptability of the public services

for the persons with various educational levels. Higher educational levels were found to be associated with the utilisation of private and specialist care in both the developing and developed countries, which is consistent with the research findings. But in developing countries education affects the utilisation of the health care services, including the public sources of health care, which is not found to be significant in Saudi Arabia.

For the utilisation of prenatal care services, *education*, including both *maternal and paternal,* was found to be an important determinant of seeking some prenatal care. This may reflect the higher levels of health information and knowledge about prenatal care and its benefits and, to a lesser extent, a higher socioeconomic status, since prenatal care service is provided free of charge by the public health facilities. Maternal education was also found to be associated with the early initiation of prenatal care, since mothers are the ones who experience the signs of pregnancy and can identify them, thus reflecting the higher levels of health knowledge and concern of the educated mothers. Education had no effect on the number of prenatal care visits, reflecting possibly the positive role health care providers play in providing health information to expectant mothers and the trust mothers put in health care personnel, thus complying with the scheduled visits. Higher educational levels were found to be positively related to prenatal care utilisation in both developed and developing countries.

Unexpectedly, and contrary to the international findings –except for some neighbouring Arabian Gulf States- *mothers' higher educational level* was associated with the decrease in the probability of an infant being fully immunised. This is probably due to these mothers' knowledge of the low risk of their infants in acquiring the diseases concerned, thus perceiving no harm in delaying their immunisation.

Being a child in a household where the *head of household was an unsalaried employee,* which represents 27% of heads of households, was found to be related to less use of public doctors' services by children. This is probably due to the increased probability of living in isolated areas where the health services are less accessible and to their lower degree of familiarity with the health care system. It may also be reflective of a lower

socioeconomic status for some of the unsalaried employees who are more likely to have lower levels of health concern. *Mothers who do not have formal jobs* nor *do housework as their main activity* were found to be more likely to have taken their children to public services in response to children's acute respiratory infections. This is possibly due to the increased free time available to these mothers, in addition to the fact that public services are free of charge; thus both time costs and financial costs are minimised.

Other predisposing factors that were found to be significant in relation to preventive service utilisation included the *early initiation of prenatal care visits* and its positive association with an increase in the number of visits. This is due to the time availability for scheduling more appointments and, possibly, the higher levels of health awareness, higher value put on prenatal care visits by mothers who initiated early prenatal care visits and their better compliance with the prenatal schedule. Having made *more prenatal care visits* was found to be associated with an increase in the likelihood of an infant being fully immunised as scheduled. This indicates a high value placed on preventive health care activities by these mothers. This finding was reported previously in the literature from the United States where this variable was tested for its effects.

8.2.2. The enabling factors

Rural residence in general was found to be associated with an increase in the utilisation of public heath services while *urban residence* was found to be associated with the increase in the utilisation of private services. This is a positive indicator of the high levels of geographical accessibility and financial accessibility of the public health services for rural residents, since services and medication are free of charge for all users in the public sector. This indicates the high levels of accessibility and acceptability of modern health care in rural areas, since the base line group for comparison was the non-utilisers of either the public or the private doctors' services. Urban residents' increase in the utilisation of the private services probably reflects the higher levels of geographical accessibility and ability to pay for private care, compared to rural residents.

Urban residence was not found to be associated with the utilisation of some prenatal care services, compared to *rural residence,* which is an indicator of the success of the maternal health care programme in its rural population coverage, leaving them in a position comparable to the urban population. This is different from the better urban coverage that was reported in several developing countries, as indicated in the literature review. But urban residence was found to be associated with early initiation of prenatal care and to a slight increase in the number of prenatal care visits. This probably reflects the higher levels of health information and knowledge that urban residents have, and it is possibly related to the increased household duties and responsibilities of rural mothers, thus placing a greater time constraint on them. As for curative services, the urban mothers were found to have visited a private care facility for their last prenatal care checkup, compared to rural mothers. For infants' full immunisation, living in a rural area was associated with an increase in the likelihood of an infant being fully immunised. This indicates the success of the immunisation programme in reaching the expectedly underserved remote areas, including the application of door to door immunisation, as reported previously in some of the research settings.

Regional differentials were found to be significant. In general, living in the *Eastern and Western regions* was found to be associated with the utilisation of private services for the care of acute sickness and for the care of children under five's acute respiratory infections, compared to the Central region where the capital is situated. These regions were exposed to modern medicine before the Central region and before the establishment of the public health care system. *Residents in the Southern region,* which is considered to be inferior to the above mentioned regions in terms of its socioeconomic development, showed less dependence on private services compared to the Central region, reflecting possibly difficulties in accessibility, both geographically, since the population is scattered in a large mountainous area, and financially, since residents of this region are of lower socioeconomic status. Being an adult resident in the *Northern region* was also associated with the less likelihood of using private care for acute sickness. Children resident in the *Northern region* were more likely to have been taken to a public doctor, compared to

children in the Central region. This probably reflects the higher reliance on public doctor's services for treating children's illnesses, compared to the Central region.

Regarding the utilisation of preventive services for prenatal care utilistion, it was found that living in the *Southern region* was associated with the highest prenatal care utilisation versus non utilisation, compared to the Central region. This indicates the success of the maternal health care programme in increasing its coverage in the Southern region, since it was reported previously by Al-Mazrou et al. (1993) to have had the lowest levels of prenatal care coverage. But the frequency of attendance of prenatal care sessions was lowest in the *Southern region*, displaying a disadvantaged position. This position reflects geographical accessibility difficulties in reaching health care facilities. The region which showed the most advantaged position with regards to early initiation of prenatal care and number of prenatal care visits was the *Eastern region*. This is probably due to the early exposure of the residents of this region to preventive health activities and modern health care in general, through the health programmes of ARAMCO -the oil producing company- before the establishment of the Ministry of Health; thus residents of this region have a higher level of inherent knowledge about prenatal care, leading to their advantaged position. *Residents of the Eastern and Western regions* and, to a lesser extent, residents of the *Northern region* were found to have a high proportion of women who used private source of care for their last prenatal care instead of a public source, compared to the Central region. This is probably due to the existence of a high proportion of non-Ministry of Health high quality public prenatal care sources in the capital, which can substitute for private care in other regions. Regarding infants' full immunisation, living in the *Northern region* was found to be associated with the increase in the likelihood of an infant being fully immunised, compared to the Central region, while other regions were not found to differ significantly from the Central region.

Regional differentials in health service utilisation have previously been reported in the literature, and it differs according to the research settings, reflecting both aspects of the health services organisation, distribution and the individual level determinants of health services utilisation.

The *usual place of prenatal care checkups* was found to be associated with the early initiation of prenatal care. Having a *primary health care centre* as the usual place of prenatal care checkups was related to the early initiation of prenatal care visits. This is probably due to the positive effect of health education activities in primary health care centres and to the effect of the high accessibility of primary health care centres, compared to other sources of prenatal care; strengthening this effect mothers being acquainted with primary health care services and have it as a regular source of care. This variable's effect has not, to my knowledge, been explored in other research settings.

The enabling *economic indicators* –excluding the media communication indicators- were not found to significantly affect adult utilisation of health services in response to acute sickness nor the children under five's utilisation of health services in response to diarrhoea. In other developing countries similar economic indicators showed a significant positive effect, favouring the advantaged segments of the population. But for children living in a *less crowded house,* indicating a larger living space –which is highly favoured by Saudi families- was found to be associated with the utilistion of private doctors' services in response to acute sickness and with the children under five's utilisation of private services in response to acute respiratory infections. Having a *flush toilet at home* was associated with the increase in the likelihood of a child being taken to private doctor when acutely sick, and living in a *house provided by an employer,* compared to living in a family owned house, was found to be associated with the less likelihood of the utilisation of private care for children's acute sickness. Having *electricity* at home was found to be associated with the utilisation of public services for children's acute respiratory infections. *Not having a family private car* was found to be associated with the decrease in the utilisation of the public and the private services for the care for childrens' acute respiratory infections. It is worth noting that a private car is the main vehicle of transportation in Saudi Arabia, and only 12% of the sample participants belonged to families who did not own their cars, indicating a socioeconomically disadvantaged position; thus they are less able to pay for private care. Also these disadvantaged families, in addition to having accessibility difficulties and being less able to pay for private care, may have less knowledge about the need to consult a doctor for the care of children's

acute respiratory infections. The insignificance of the economic indicators in relation to the utilisation of public services in response to acute sickness indicates a good level of accessibility of the public health services for the various segments of the population who differ in their economic status. Whether there is a disadvantaged position held by the utilisers of public health services compared to the utilisers of private services depends mainly on the effectiveness of the GP services provided in primary health care clinics, in terms of the outcomes of their medical consultations. If the services provided in primary health care centres are highly effective and are comparable to the services provided by specialists – which can be achieved for a large proportion of acute ailments- then there is no advantage in using specialist services for the care of acute sickness.

Regarding the utilisation of preventive health services, being a mother from a family that *does not own a private car* was found to be associated with not seeking prenatal care. This may reflect accessibility problems, or it may be due to the lack of health information for this disadvantaged segment of the population. *Living in a less crowded house* was also found to be related to the increased likelihood of using some prenatal care. Other *economic indicators* were not found to be significant with relation to prenatal care utilisation, which probably indicates the strong effect of service inaccessibility for mothers whose families do not own private cars.

The low significance of the economic indicators in general indicates that there is a high level of accessibility of the prenatal care services for mothers from different socioeconomic strata, although *media communication variables,* including *watching television* and *reading newspapers and magazines*, which are activities not characteristic of the very poor segment of the population, were found to be significant. In other developing countries economically advantaged women showed a better utilisation of prenatal care. In this study the economically advantaged mothers were found to have utilised more private care in their last prenatal care visit. *Living in a modern house, having more living space and having pipe or bottled drinking water supply* were found to be associated with the utilisation of private care. Women who have higher incomes as indicated by their *employment* or *do not have to do housework* as their main activity,

indicating the presence of domestic help -which is prevalent in Saudi Arabia- were found to be associated with the utilisation of private care. This is probably due to the obstetricians' choice available in private care and, possibly, the role of a better structural quality of some of the private health care facilities and the better medical attention paid to private patients, thus offering more satisfying services, compared to the public services, as users of the private services were more satisfied than users of the public services. But the use of prenatal care in the public health care facilities is mostly provided by obstetricians, and careful monitoring of high risk cases is done in hospitals where it is facilitated with modern monitoring and diagnostic equipment. Even utilisers of primary health care centres are referred to hospitals for ultrasound and various laboratory tests.

Among the direct accessibility factors included for prenatal care utilisation, having a *private car as the mean of transportation* was found to be associated with the utilisation of private care. This is possibly due to the increased willingness and ability to pay for private care and due to the role of a private car in reaching the private health care facilities. *Shorter traveling time* was found to be associated with the utilisation of the public services, compared to the private services. This indicates better geographical accessibility of the public services, compared to the private services. But *increased waiting time* was associated with the utilisation of the public services. This is due to the higher proportion of the population who depend on the public services and, possibly, to shortages in medical staff numbers.

For infants' full immunisation, none of the *economic indicators* was found to be significant, indicating the high levels of accessibility and acceptability of the immunisation services for parents from different socioeconomic strata. In other research settings lower economic status was found to be related to lower immunisation rates.

Among the *media communication* variables, which can be considered as economic indicators as well as indicators of the levels of health information –since the Saudi and Arabic channels in general broadcast a wide variety of health programmes - *having a television at home* was related to the increase in use of public doctors' services or private

doctors' services in response to adults' and children's acute sickness and both the public and private services for the care of children's acute sickness. This indicates the essential role that television plays in health education and in familiarizing the audience with the possible sources of health care. Having a *radio* at home was found to be related to the use of both public and private services for adults and the use of private doctors' services for children's acute illness, indicating the positive role of the health information conveyed through the radio's health programmes. Having a *satellite TV or cable* at home was found to be related to a decrease in the use of public doctors' services for adults and for children's acute sickness and an increase in children's utilisation of the private services. Satellite TV and cable's opposite effects on the two available sources of care for children probably reflects these families' better economic standing, thus being more able to afford private specialists care, which is also more likely to be more convenient, and reflects the higher levels of health concern of these families, which led them to prefer specialists' care over GP care in public primary health care clinics. Media communication effects have not been explored widely in the literature and, to my knowledge, this is the first utilisation study that included the effect of satellite TV or cable on utilisation.

Regarding prenatal care utilisation, *mothers' television watching* was found to be related to receiving some prenatal care and the early initiation of prenatal care. This reflects the positive influence of health programmes in educating mothers about prenatal care and its value, and it may also reflect, in part, an economic advantage. *Mothers' reading newspapers or magazines on a weekly basis* was found to be associated with making more prenatal care visits. This is probably due to the increased knowledge about health related issues, placing a greater value on prenatal care visits, hence the mothers' keeping their prenatal care session appointments. Media communication effects have not been explored widely in the literature, but in the few studies conducted they were found to have a positive impact on prenatal care utilisation.

8.2.3. The need factors

Regarding the utilisation of services in response to acute sickness, it was found that for adults the *extent of need* as represented by *disability due to sickness* was found to be

associated with the increased likelihood of using public services, private services and both types of services, indicating the effect of illness severity and the willingness of individuals to minimise the economic loss due to activity restrictions. But for children this variable was not found to be significant, which possibly indicates the lower value given to children's activities. *Sickness days* were not found to significantly affect the utilisation of health services, neither for adults nor for children, possibly indicating that this variable does not accurately reflect the extent of need for care for acute sickness in Saudi Arabia. But for diarrhoea and acute respiratory infections, *sickness days* were found to be significant in relation to the utilisation of public and private services, with a stronger effect on the utilisation of the private services. The utilisation of private care indicates the use of higher quality specialist care, which is possibly perceived to be needed when illness duration extends for several days. In addition, with regard to acute respiratory infections *difficulties in breathing* were found to be associated with the increase in the utilisation of public and private services, with a stronger effect on the utilisation of private services. Need has been documented widely in the literature as the principal factor for utilising health services. Since the sample participants included in the analysis suffered from acute sickness they can be considered to be in need; the need indicators reflect its extent.

In relation to the utilisation of prenatal care, it was found that, among the *medical problems* included in the analysis, having *vaginal bleeding* or *severe breathlessness* were associated with an increased likelihood of attending at least one prenatal care session, and complaining of *severe breathlessness* was found to be associated with an increase in the number of prenatal care sessions attended. This positive effect may be due to the perception of the seriousness of these problems. This positive effect of health problems on prenatal care utilisation has been reported in previous research settings. Other factors were not found to be significant, since only 7% did not receive prenatal care and the prevalence of these problems in general is not very high. In addition, the recommended number of prenatal care visits is approximately twelve visits, which makes the need for scheduling more appointments to deal with some health problems unnecessary. Also mothers who suffer from severe complications and multiple health problems have an

increased chance of the early termination of pregnancy; thus they are not included in the survey analysed if they did not give live births and if they did, their gestation period was probably shorter; thus they may have not displayed the increased number of visits they had in their shorter gestation period.

8.3. THE ROLE OF NEED

When reviewing the results of the research, it can be observed that public services are highly accessible and acceptable to the Saudi population, providing the majority of health care services, with no differences in utilisation reported for individuals of lower educational levels and lower economic status, excluding the effect of media communication variables, which are expected to have an additional information effect. No disadvantaged position was reported for rural residents in the utilisation of services due to acute sickness, in receiving some prenatal care and in infants' full immunisation status. Thus, need for the services, as indicated by the presence of a medical condition and its extent, represented by disability due to sickness for adults, played a major role in determining the utilisation of public services for the care of acute sickness. For receiving some prenatal care and infants' immunisation, being pregnant and being an infant were the major determinants of using these preventive services, although some predisposing and enabling factors were found to be significant. For the early initiation of prenatal care and the number of prenatal care visits some predisposing and enabling factors were found to be significant.

However, differences do emerge in the utilisation of private services, with the better educated and the economically advantaged showing a higher dependence on private care. This is more likely to be specialist care, as compared to GP care in public primary health care centres, especially for the care of acute sickness. But since private care is not free of charge, as public care, and the utilisers of private care have to pay service fees as well as for the medications, it can be argued that the advantage of having specialist care is partially undermined by having to pay for their services, thus minimising the disadvantage of public service users. However, the disadvantaged position of the utilisers

of GP services can be reduced with improvements implemented in the primary health care system, as indicated in the following section.

8.4. POLICY IMPLICATIONS AND RECOMMENDATIONS

After reviewing the main research findings, and in accordance to them, the following policy implications and recommendations are suggested.

1) Since the highly educated -who are more likely to be better health informed and have higher incomes- and, for some types of service utilisation, the economically advantaged also favoured the utilisation of the private sectors' services, this raises a question regarding the quality of the GPs primary health care services. It can be argued that if GPs' consultations and the conditions in the primary health care centre environment were more satisfying, out-of-pocket expenditure on health care for common acute health problems could be minimised and primary health centres would attract the better off persons in the society. In order to improve primary health care services and thereby increasing the equity of the Saudi health care system the following recommendations are suggested:

a) Since there has not been any systematic evaluation of primary health care centres conducted in recent years, conducting this type of evaluation across the country is necessary in order to achieve higher quality care and increase the efficiency and effectiveness of the health services. This evaluation should focus on the process of care, including the technical and the human aspects of the care process, process outcomes and the structure of primary health care facilities themselves, with the inclusion of both the health professionals and members of the community in the evaluation process. A step wise procedure to be carried out in the evaluation process would be as follows:
-In order to carry out this evaluation process a description of the structure of primary health care centres and the processes of care that should take place in primary health care centres should be done by an assigned team of health care professionals by the Ministry of Health. This is to provide a preliminary prescription of the constituents of high quality,

efficient primary care needed to maintain the health of the primary health care centre catchement areas.

-A review of the structure and processes of care carried out in primary health care centres should be done by assigned research teams appointed by the Ministry of Health in order to asses how far the ideal prescription of high quality care applies to the primary health care centres in a selected sample of primary health care centres that represent different areas in the country. This includes the evaluation of the facilities, medical and laboratory equipments, the staffing of primary health care centres and health programme implementation, including the quality of medical consultations.

-In addition, community and patients' assessment of the quality of the structure, the process and outcome of health care provided in primary health care centres should be employed, applying a standardized questionnaire in a household survey in different areas of the country and a semi-structured questionnaire, interviewing patients in primary health care centres to explore their views and opinions with regards to the quality of primary health care facilities and the quality and effectiveness of services provided.

-An assessment of primary health care centre managers' and health care professionals' evaluation of the structure, medical facilities, work loads and the process and outcome of health care programmes should be done applying a standardized questionnaire, in addition to carrying out a qualitative research in order to gather their views and recommendations for improvement.

-Extensive analysis should be then applied to the multiple data sources gathered, employing quantitative and qualitative research techniques.

-The data can be used to address the areas that need improvement in a practical manner, including structural facility improvements, dealing with technical equipment shortages and meeting staff requirements with the updating of their skills. A quality assurance programme can be formulated, making use of the data gathered, with the formulation of practical standards for the quality of the structure and process of care.

b) In addition to the evaluation process and in order to achieve a more responsive, higher quality and effective health care system there is a need to establish some collaboration between the health professionals and the general community in service planning and

provision. This facilitates the best use of the collective ideas, opinions and expertise, rendering health planning a two way communication process, especially in assessing the needs of the population and addressing the problems faced in utilising the health services; thus improving the quality, efficiency and responsiveness of the health care system.

c) To improve the quality of primary health care and to achieve more equity in the services provided throughout the Kingdom the introduction of standardised diagnosis and treatment guidelines is suggested for GPs in primary health care centres, especially since the GPs come from various countries around the world with different medical experiences and practices. This is to ensure the best and most effective diagnostic and treatment procedures for all primary care users, while improving the quality and the efficiency of the services. This would minimise the gap and the advantages of the utilisation of specialists' services for the care of common acute sickness conditions by the more advantaged members of the society, compared to the less advantaged.

d) There is a considerable proportion of individuals who refer themselves to private care where self referral is sufficient to see specialists, and appointments are made on short notice upon request, instead of being seen be a GP at first, who may request a referral to a specialist. In order to achieve higher levels of equity between the utilisers of public and private services, a review of the referral process in the primary health care centres should be conducted to assess whether the system is adequate and health problems are dealt with effectively.

2) In order to reduce the longer waiting times in the public health services, as indicated in the utilisation of public prenatal care services, compared to private services, possibly reflecting the pressure put on the health services providers, there is a need for an assessment of the staff requirements. This has to be accompanied by the addition of new staff where needed. They should preferably be Arabic speakers, especially those who are directly involved in service provision, such as doctors. This should be done where work loads are found to exceed the limits of health care staff, leading to longer waiting times and, possibly, the provision of lower quality health care. It is also possible to consider

contracting private health care providers in areas that have a large concentration of private doctors and shortages of specialist doctors in the public sector.

3) Younger generations seem to be less dependent on formal health services for the provision of care for acute sickness, which indicates the possible decline of service use for future generations, and since the population growth rate is high in Saudi Arabia it is important to take an advantage of this finding. Therefore, it is suggested that health education efforts should encourage home management strategies and over the counter drug use for the care of common acute sickness when appropriate, and informing individuals when medical attention is needed. Information regarding common diseases encountered at primary health care centres, treatment applied and their outcomes can be obtained from patients' records. This information can be used to identify common illnesses that can be dealt with applying home management strategies and over the counter drugs so that health education efforts may direct the public to apply these self-treatment strategies, instead of visiting GPs for the care of common, mild illnesses. In return, a decrease in GP work load can be achieved and extra time will be available for patients who need extra medical care; thus improving the quality and the efficiency of the health services.

4) As television seems to be the most influential channel of all communication media on health service utilization, and since 88% of the individuals in Saudi Arabia have colour television sets in their homes, television is the most appropriate channel for health education activities and for creating positive behaviour change. This can be used to address issues such as home management of common illnesses, explaining the crucial role of regular prenatal care checkups, since 30% reported that they used prenatal care because of a complaint and 19% of non users of prenatal care did not attend prenatal care sessions because they had no complaint. This in addition to addressing the importance of timely immunisation of young infants, as 19% of mothers who were not compliant with their infants' immunisation schedules mentioned that their infants were too young.

5) An important issue which emerges, but is not directly associated with the health care system, is the attitude toward women's mobility and their role in the society, since it seems that there are some segments of the population where women do not utilise the public health services as men do, in response to acute sickness. This is especially expected to be prevalent in more traditional and rural societies, as displayed in the results, favouring male children, while this effect was reversed in urban settings. This change in attitude can be achieved through community leaders, including religious figures, and through public media's stressing the equal value of males and females in religion.

6) Another important issue which appears to be of crucial importance is the increase in the levels of female education in Saudi Arabia, as it was shown that mothers' education has a positive effect on the utilisation of prenatal care services. This is to enhance the women's value placed on good health and their level of health information. This leads to increase in the demand for health services, such as prenatal care. In addition, education gives women greater power over their circumstances to overcome the surrounding obstacles which may hamper their ability to receive health care, and it provides them with a greater role in decision making. Targeting areas where female school enrollment is low should be done. These areas are more likely to be more traditional, such as rural areas with a high proportion of families with low socioeconomic status. Community and religious leaders of these areas should be involved in encouraging these families to enroll their females in public schools, stressing their high level of importance.

7) Since the acutely sick, economically disadvantaged children were significantly less likely to have been taken to a private doctor when suffering from acute sickness -while this difference was not found to be significant for the economically disadvantaged adults- a question is raised whether the parents of these children have the knowledge and ability to care for the health of their children properly, compared to parents who are economically better off. This indicates the need to investigate the health care practices for children from the economically disadvantaged backgrounds, who were also reported to have higher mortality rates (Al-Mazrou et al., 1997), and to address these inadequacies in care by corrective policy measures and health education efforts directed towards

disadvantaged families. This is expected to increase the equity in health service utilisation as well and in improving children's health status, decreasing infant and childhood mortality.

8) Regarding the utilisation of prenatal services, since most maternal deaths occur in unbooked mothers (Al-Meshari et al., 1996), targeting the 7% of the mothers who do not receive prenatal care is of crucial importance in order to reduce maternal mortality. This should be done by assessing prenatal care coverage in areas of high illiteracy levels and low economic standards and in remote areas and by initiating activities to target these disadvantaged groups. To target remote and disadvantaged areas, mobile units can be used, equipped with the necessary diagnostic equipment and run by a team of health care professionals, including an obstetrician in order to ensure high quality prenatal checkups for disadvantaged mothers and increasing prenatal care coverage.

9) Rural mothers showed a disadvantaged position with regards to the early initiation of prenatal care and the number of prenatal care visits, compared to urban mothers, while receiving some prenatal care was not affected by urban/rural residence. Therefore, the content of prenatal care should be evaluated, especially when it comes to the health information provided, in order to ensure that mothers understand when they should initiate prenatal care and the importance of timely and regular pregnancy monitoring. Additional educational material for multipara women should be considered in order to keep their interest in attending prenatal care sessions and to inform them of the risk of multiple pregnancies and the value of early and continuous pregnancy monitoring. In addition, difficulties facing rural mothers in attending prenatal care sessions should be assessed in order to deal with them and to minimise their effects.

10) Parents who are non compliant with their infants' immunisation schedules should be identified through close monitoring of the medical files of the children who have received at least one of the recommended immunisations after birth, in addition to tracking and targeting infants who were previously late in their immunisations and providing them with telephone reminders. Educating parents about immunisation, its essential role in

protecting the children's health and the importance of keeping infants immunised as scheduled should also be done. This information can be provided at birth or at the infants' first compulsory immunisation, through primary health care centres and through health programmes in the media.

8.5. STUDY LIMITATIONS

Despite the important information the study reveals regarding the utilisation of health services in Saudi Arabia there are several limitations.

- The study addresses user-related factors affecting the utilisation of health services, but other service related factors such as health care facilities, staffing and the detailed geographical distribution of health care facilities and sociocultural factors, such as health beliefs and the effect of social obligations and social networks, are not included. This indicates the need for further research to cover their relation to health service utilisation. Yet, user-related factors are of considerable value and, as indicated above, the research findings can be used to formulate important policy recommendations which can improve health services and the health status of the population.

- Due to the cross-sectional nature of the study, and as a general characteristic of the analysis of cross-sectional data in general, cause and effect relationships can not be distinguished, although it gives insight into the associations between factors. Since utilisation behaviour has been reviewed extensively, causal relationships have been established, with the nature of the effect of most of the variables included in the analysis in other research settings well known.

- Only Saudi nationals were included in the Saudi Arabia Family Health Survey while non Saudi nationals were not. This was an explicit decision by the survey organizers in the Arabian Gulf Council that this survey was not to cover non-Saudi nationals, since this is a family survey and a large proportion of foreign workers come to Saudi Arabia without their families. Besides, these non Saudi nationals are most likely contracted for only a few years time; thus they are not permanent residents in Saudi Arabia. Therefore,

another study employing a new data source that includes foreign residents is required in order to fully explore the health situation of foreign residents.

- Reliance on self reported illness can lead to some report bias. For example, minor illnesses were more likely to have been underreported, especially for common conditions that go untreated or are routinely dealt by the means of self-care. Under reporting of acute sickness is expected to have been the case for some of the disadvantaged members of the society who suffered from poor health. This may have led them to view some general symptoms of disease as a part of every day life; thus perceive them as normal health conditions rather than illness conditions. But this does not represent a problem in the Saudi context, since infectious endemic diseases do not form a major health care problem in Saudi Arabia. Since the sample size is quite large this would have minimised the effects of the under-reporting of acute sickness for some of the disadvantaged and unhealthy participants.

- The use of proxy respondents for the data gathered, with regards to acute sickness in the survey, can lead to the under-reporting of certain events. But since the head of the household plays a central role in family level decision making, with the inclusion of a large representative sample size, the problem of underreporting due to proxy reporting is likely to have been minimised.

- Another problem related to data reporting is the retrospective nature of the data. This problem is likely to have occurred in reporting the number of prenatal care visits for a retrospective three year period. This could have been resolved by the pooling of a large data set in which the shortage of the memory of some mothers –who are not expected to present a high percentage- would not have been likely to have affected the validity of the overall results of the analysis. Besides, it is expected that the number of visits that have been misreported to be very close to the actual number of visits, and this method for analysing the frequency of prenatal visits for a large country-wide data set has been widely used before.

- Standardised questions, which are typically incorporated in the type of survey data used in the analysis, do not allow for an adequate representation of the complexity of illness in terms of the nature of symptoms, perceptions about causes and seriousness of illness and the complexity of treatment behaviour, and in the survey data set utilised in this study no specific acute sickness conditions were specified for adults. This implies the need for carrying out further research employing qualitative semi-structured interviews to complement the findings of quantitative survey research.

8.6. CONCLUSION

When assessing the utilisation of health services in response to acute sickness, it was found that the sources of health services utilised by Saudis resemble what was reported in developed countries. Saudis were also found to have prenatal care coverage and infants' immunisation coverage at a level comparable to developed countries, which can be considered a great achievement of the Saudi health care system. Regarding the research question of the thesis, according to the multivariate analysis findings, need can be considered, to some extent, the principal determinant of health service utilisation, such as for the utilisation of services due to children's diarrhoea, utilisation versus non-utilisation of prenatal care services and for infant's immunisations. But since some of the predisposing and enabling factors were found to have a significant effect on health services utilization, need is not the only determinant of health service utilization. In fact, some of these variables have a considerable effect, reducing the role of need. This implies some deficiencies in the health care system that need to be addressed in order to help achieve equal medical attention for everybody in need.

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Appendix

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Figure A1. Saudi Arabia location map

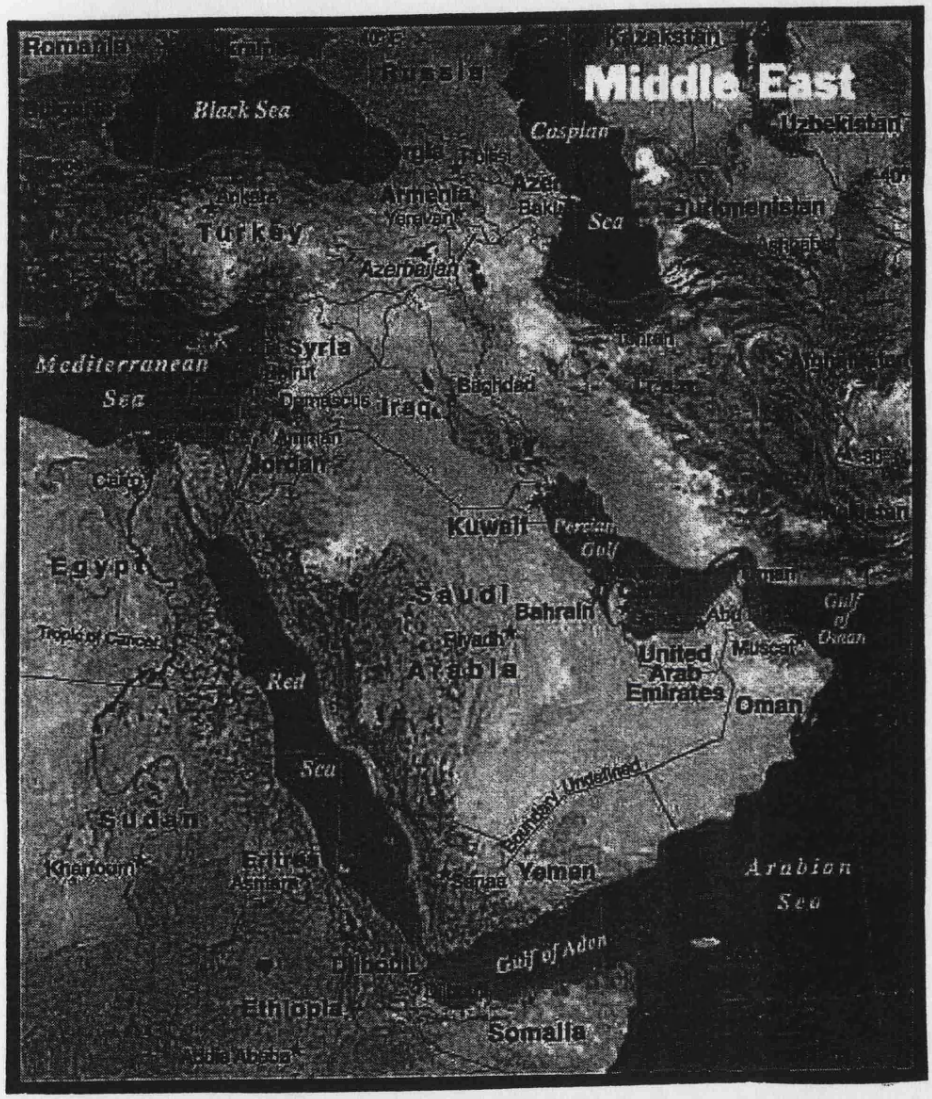
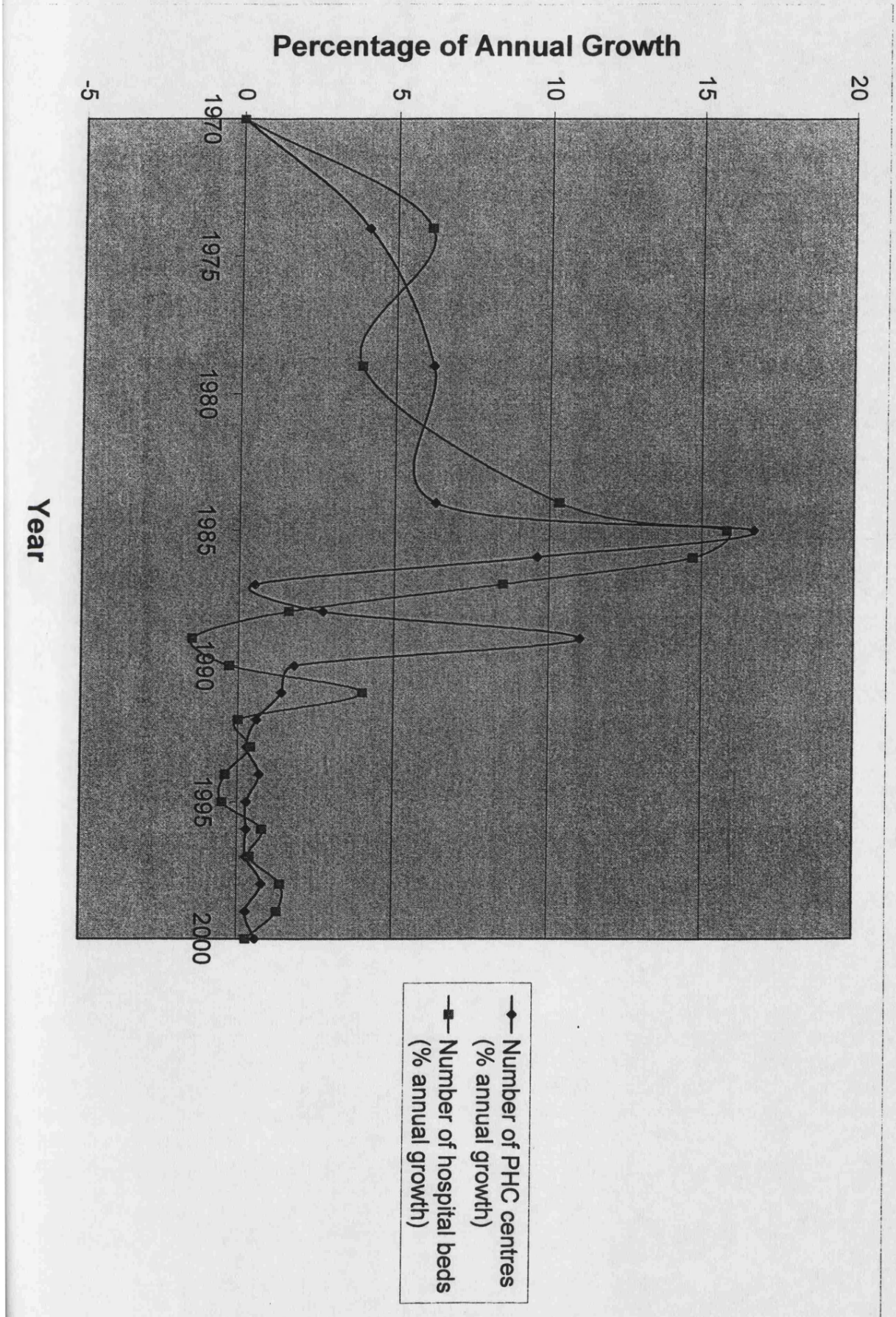


Figure A2. The percentage of annual growth in the number of primary health care centres and the number of hospital beds



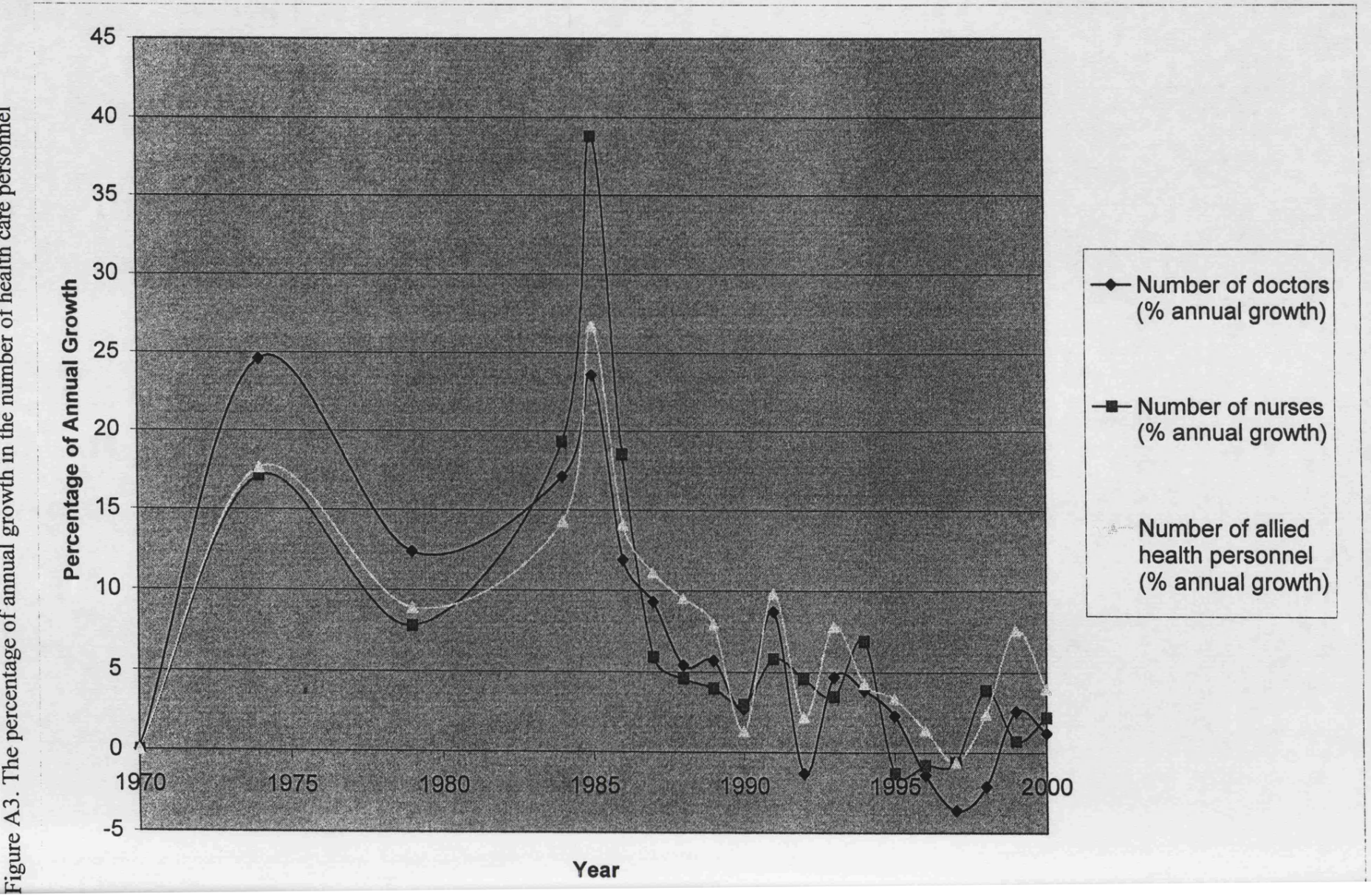


Figure A3. The percentage of annual growth in the number of health care personnel

Table A1. The incidence of notifiable diseases in Saudi Arabia according to nationality and gender in 1999 as presented in the 2001 Ministry of Health Statistical Year Book

Disease	Saudi				Non-Saudi				Total
	Male	Female	Total	Average	Male	Female	Total	Average	
Diphtheria	-	-	-	0.00	-	-	-	-	-
Whooping cough	7	1	8	5.05	-	1	1	0.02	9
Tetanus neonatorum	2	-	2	0.01	4	6	10	5.14	12
Tetanus, other forms	2	-	2	0.01	5	-	5	0.10	7
Poliomyelitis	-	-	-	0.00	-	-	-	0.00	-
Measles	1418	1110	2528	16.40	160	127	287	6.19	2815
Mumps	1169	816	1985	12.90	175	130	305	6.58	2290
Rubella	135	11	256	11.66	22	21	43	0.93	299
Chickenpox	10850	9262	20112	130.40	1815	1160	2975	64.14	23087
Brucellosis	2815	2696	5511	35.70	619	120	739	15.93	6250
Meningococcal meningitis	5	2	7	0.05	9	4	13	0.28	20
Meningitis pnemococcal	21	9	30	0.19	88	7	15	0.32	45
Meningitis, haemophilus	51	43	94	0.61	17	8	25	0.54	119
Other meningitis	219	139	358	2.32	57	34	91	1.96	449
Hepatitis A	1036	912	1948	12.63	186	232	417	8.99	2365
Hepatitis B	1333	852	2185	14.16	696	195	891	19.21	3076
Hepatitis C	669	415	1084	7.03	480	173	653	14.08	1737
Unspecified hepatitis	411	374	785	5.09	120	55	175	3.77	960
Typhoid & Paratypoid	115	106	221	1.43	118	51	169	3.64	390
Amoebic dysentery	1560	1045	2605	16.88	665	252	917	19.77	3522
Shigellosis	266	227	493	3.20	39	19	58	1.25	551
Salmonellosis	948	740	1688	10.94	308	149	457	9.85	2145
Echinococcus hyadatid disease	4	8	12	0.08	1	2	3	0.06	15
Purperal fever	-	1	1	0.01	-	1	1	0.02	2
Rabies	-	-	-	-	-	-	-	-	-
Syphilis	77	45	122	0.79	74	24	98	2.11	220
Other venereal diseases	375	37	412	2.67	35	13	48	1.03	460
Guillian-Barre syndrome	43	11	54	0.35	4	12	13	0.28	67
Transverse myelitis	-	-	-	-	-	-	-	-	-
Poliomyelitis, other suspected cases	4	-	4	0.03	-	-	-	-	4
Hemolytic uraemic syndrome	-	-	-	-	-	-	-	-	-

Table A2. Ministry of Health hospital visits by selected diseases and regions in the year 2000 as presented in the 2001 Ministry of Health Statistical Year Book

Region	Injuries, fractures and burns	Oral and dental diseases	Eye diseases	ENT diseases	OBS/GYN	Diseases of genitourinary system	Diseases of digestive system	Chest diseases	Heart and blood vessels diseases	Mental disorders
Riyadh	52151	255052	133202	164335	221043	93358	129189	17105	13859	61014
Makkah	31835	81917	72401	59213	123456	36134	436952	27997	3340	32409
Jeddah	36550	111208	129294	59151	94486	4990	70357	35792	10750	39900
Ta'if	22249	39549	37703	37342	80614	27716	46332	88183	5480	32547
Medinah	47211	80164	86280	95615	66241	35897	86460	126976	8126	31811
Qaseem	27777	86954	61259	81017	102791	39109	54102	55008	4986	27560
Al-Sharkiah	21068	72412	55471	49845	59144	31444	48151	41259	10162	20451
Al-Ahsa	6325	17522	18383	22861	40068	12770	16329	15952	4272	28205
Hafr Al-Baten	1082	3085	11423	8193	28213	7915	6044	2645	564	1650
Aseer	43895	35253	73277	8830	107333	28342	37381	42544	11100	30580
Bisha	4899	4257	13053	2223	17255	9702	9698	11368	2571	11378
Tabouk	32360	48502	43617	58642	52992	21177	46540	76408	4400	22856
Ha'il	3954	17058	22971	26156	37749	172452	22164	38679	2289	12935
Northern Boundaries	18433	8784	27061	35771	18501	12710	21498	32187	2853	18938
Gizan	41907	53167	58835	57733	63271	27072	37658	63083	26337	37570
Najran	12085	13105	25225	17394	30960	16430	12802	23947	3569	23844
Al-Baha	20968	12379	29242	25953	47790	19388	18833	22856	6537	20809
Al-Jouf	7573	6440	15969	13094	16540	11349	7755	7797	453	7781
Qurayyat	10728	250	11537	8381	9559	9553	7425	17927	1421	7197
Qunfudah	4414	7514	5876	5503	8698	3564	7005	7272	3211	7760
Total	447464	954572	932079	837252	1226704	621072	1122675	754975	126280	477195

Table A3. Ministry of Health hospital visits by selected diseases and regions in percentages in the year 2000

Region	Injuries, fractures and burns	Oral and dental diseases	Eye diseases	ENT diseases	OBS/GYN	Diseases of genitourinary system	Diseases of digestive system	Chest diseases	Heart and blood vessels diseases	Mental disorders
Riyadh	4.6	22.4	11.7	14.4	19.4	8.2	11.3	1.5	1.2	5.4
Makkah	3.5	9	8	6.5	13.6	4	48.3	3.1	0.4	3.6
Jeddah	6.2	18.8	21.8	10	15.9	0.8	11.9	6	1.8	6.7
Ta'if	5.3	9.5	9	8.9	19.3	6.6	11.1	21.1	1.3	7.8
Medinah	7.1	12	13	14.4	10	5.4	13	19.1	1.2	4.8
Qaseem	5.1	16	11.3	14.9	19	7.2	10	10.1	0.9	5.1
Al-Sharkiah	5.1	17.7	13.5	12.2	14.5	7.7	11.7	10.1	2.5	5
Al-Ahsa	3.5	9.6	10.1	12.5	21.9	7	8.9	8.7	2.3	15.4
Hafr Al-Baten	1.5	4.3	16.1	11.6	40	11.2	8.5	3.7	0.8	2.3
Aseer	10.5	8.4	17.5	2.1	25.6	6.8	8.9	10.2	2.7	7.3
Bishah	5.7	4.9	15.1	2.6	20	11.2	11.2	13.1	3	13.2
Tabouk	7.9	11.9	10.7	14.4	13	5.2	11.4	18.8	1.1	5.6
Ha'il	1.1	4.8	6.4	7.3	10.6	48.4	6.2	10.9	0.6	3.6
Northern Boundaries	9.4	4.5	13.8	18.2	9.4	6.5	10.9	16.4	1.5	9.6
Gizan	9	11.4	12.6	12.4	13.6	5.8	8.1	13.5	5.6	8.1
Najran	6.7	7.3	14.1	9.7	17.3	9.2	7.1	13.4	2	13.3
Al-Baha	9.3	5.5	13	11.5	21.3	8.6	8.4	10.2	2.9	9.3
Al-Jouf	8	6.8	16.8	13.8	17.5	12	8.2	8.2	0.5	8.2
Qurayyat	12.8	0.3	13.7	10	11.4	11.4	8.8	21.3	1.7	8.6
Qunfudah	7.3	12.4	9.7	9	5.9	5.9	11.5	12	5.3	12.8

The frequency distributions of the original independent variables in the 1996 Saudi Arabia Family Health Survey:

a) The predisposing factors:

Table A4. The distribution of the household population by age

Age group	Number	Percentage
0-4	10856	14.7
5-9	11564	15.7
10-14	11803	16
15-19	9796	13.3
20-24	6249	8.5
25-29	4426	6
30-34	3506	4.8
35-39	3393	4.6
40-44	2361	3.2
45-49	1797	2.4
50-54	2154	2.9
55-59	1518	2.1
60-64	1516	2.1
65-69	863	1.2
70+	1809	2.5
Total	73611	100

Table A5. The distribution of children younger than five years by age

Age in years	Frequency	Percent
Younger than 1 year	2078	19.2
1	2122	19.6
2	2231	20.6
3	2129	19.7
4	2271	21
Total	10831	100

Table A6. The distribution of the household population by age and sex

Age group	Number of males	Percentage of males	Number of females	Percentage of females	Sex ratio
0-4	5,629	15.2	5,227	14.2	107
5-9	5,866	15.9	5,698	15.5	103
10-14	5,910	16.0	5,893	16.1	99
15-19	4855	13.2	4938	13.5	98
20-24	3,145	8.5	3,104	8.5	100
25-29	1900	5.1	2,526	6.9	74
30-34	1,566	4.2	1,940	5.3	79
35-39	1,559	4.2	1,834	5.0	84
40-44	1,255	3.4	1,106	3.0	113
45-49	999	2.7	798	2.2	123
50-54	888	2.4	1266	3.5	68.5
55-59	774	2.1	744	2.0	105
60-64	917	2.5	599	1.6	156
65-69	573	1.6	290	0.8	200
70+	1,081	2.9	728	2.0	145
Total	36,917	100	36,691	100	100.6

Note: Sex ratio is the number of males per 100 females

Table A7. The distribution of the household adult population by marital status

Marital status	Frequency	Percentage
Single (never married)	22855	49.4
Katib kitab (engaged)	373	0.8
Married	21000	45.4
Widowed	1587	3.4
Divorced or separated	486	1
Total	46301	100

Table A8. The distribution of the households by their size

Household size	Percent
1	1.6
2	6.1
3	6.8
4	9.1
5	9.6
6	11.1
7	11.0
8	10.5
9	10.1
10	7.8
11	6.0
12+	10.3
Total	100.0
Number of households	10,510

Table A9. The distribution of the household members by their relationship to the head of household

The relationship to head of household	Frequency	Percentage
Head	10510	13.9
Wife	9773	12.9
Son/daughter	47067	62
Son or daughter in law	530	0.7
Grandchild	1553	2
Parent	1337	1.8
Parent in law	124	0.2
Brother/sister	1704	2.2
Other relative	944	1.2
Servant	2201	2.9
Other	114	0.2
Total	75857	100

Table A10. The distribution of children under five years by their birth order

Birth order	Frequency	Percentage
1	1306	12.1
2	1378	12.8
3	1314	12.2
4	1233	11.4
5	1127	10.4
6	1063	9.8
7	918	8.5
8	762	7.1
9	573	5.3
10+	979	10.4

Total	10653	100

Table A11. The distribution of the household population by education

Educational level	Frequency	Percentage
Illiterate	14608	24.3
Read	16958	28.2
Primary	12606	20.9
Preparatory	7894	13.1
Secondary	4722	7.8
Diploma	1349	2.2
University	2084	3.5
Total	60221	100

Table A12. The distribution of the fathers of live births during the preceding three years period by education

Educational level	Frequency	Percentage
Read only	305	4.5
Primary	2441	36
Preparatory	1383	20.4
Secondary	1100	16.2
Diploma	512	7.6
University	1033	15.2
Total	6774	100

Table A13. The distribution of the household adults by economic activity

Economic activity	Frequency	Percent
Working	11802	30.8
Unemployed	690	1.8
Retired	1228	3.2
Seeking work for the first time	767	2
In school	11180	29.2
Doing housework	12603	32.9
Other	79	0.2
Total	38349	100

Table A14. The distribution of the heads of households for the population by employment status

Employment status	Frequency	Percentage
Salaried employee	43578	72.6
Own-account worker	13460	22.4
Employer	2633	4.4
Unpaid family worker	273	0.5
Unpaid apprentice	75	0.1
Total	60019	100

A15. The distribution of children under five years by a mother's assessment of the child's health

Mother assessment of a child's health	Frequency	Percentage
Excellent	3541	32.8
Good resistance	851	7.9
Normal	5122	47.4
Ill from time to time	1157	10.7
Often ill	126	1.2
Total	10797	100

Table A16. The grouped number of prenatal care visits for the last three years live births

Number of prenatal care visits	Frequency	Percentage
1-5 visits	1063	18.1
6-8 visits	1343	22.8
9-11 visits	1206	20.5
12+ visits	2271	38.6
Total	5883	100

b) The enabling factors:

Table A17. The distribution of the household population by region of residence

Region	Frequency	Percentage
Central region	20589	27.1
Eastern region	10982	14.5
Western region	23549	31
Northern region	6778	8.9
Southern region	13959	18.4
Total	75857	100

Table A18. The distribution of the household population by the type of dwelling

Type of dwelling	Frequency	Percent
Villa	21381	28.2
Traditional house	19243	25.4
Arabian house	8465	11.2
Apartment	22395	29.6
Duplex	3998	5.3
Other	270	0.4
Total	75752	100

Table 4.19. The distribution of the household population by housing tenure

Housing tenure	Frequency	Percentage
Owned	56111	74
Owned jointly	1752	2.3
Rented	14994	19.8
From employer	2645	3.5
Other	279	0.4
Total	75781	100

Table A20. The distribution of the household population by their houses' floor material

Floor material	Frequency	Percentage
Earth	2714	3.6
Tiles/cement	10861	14.4
Stone/brick	619	0.8
Vinyl/plastic	463	0.6
Carpet	60511	80.1
Marble	413	0.5
Other	9	0
Total	75590	100

Table A21. The distribution of the household population by the main drinking water source

Main drinking water source	Frequency	Percentage
Pipe supply	26439	34.9
Public tap water	2601	3.4

Well with pump	949	1.3
Well without pump	5549	7.3
Tanker	23648	31.2
Bottled	11790	15.5
Stream	149	0.2
Rain water catchment	532	0.7
Other	4200	5.5
Total	75857	100

Table A22. The distribution of the household population by the type of lighting

Type of lighting	Frequency	Percent
Electric	71706	94.7
Gas	982	1.3
Kerosene/ oil lamp or candles	1638	2.2
Other	1126	1.5
None	280	0.4
Total	75732	100

Table A23. The distribution of the household population by the type of toilet

Type of toilet	Frequency	Percentage
Flush connected to the sewers	29710	39.2
Flush connected to a septic tank	29745	39.3
Bucket	12472	16.5
Pit	2485	3.3
Open field	1284	1.7
Other	54	0.1
Total	75750	100

Table A24. The distribution of women who had live births in the previous three years period by TV watching

Women's TV watching	Frequency	Percentage
Watches TV every day	4815	53.7
At least once a week	186	2.1
Watches TV sometimes	2771	30.9
Does not watch TV	1196	13.3
Total	8968	100

Table A25. The distribution of women who had live births in the previous three years period by daily radio listening

Daily radio listening	Frequency	Percentage
Listens everyday	4355	48.6
Does not listen	4613	51.4
Total	8968	100

Table A26. The distribution of women who had live births in the previous three years period by weekly newspaper/magazine reading

Weekly newspapers/magazine reading	Frequency	Percentage
Read at least once a week	3661	73.4
Does not read	1330	26.6
Total	4991	100

Table A27. The number of public doctors per 10,000 of the population according to region

Region	Number of public doctors per 10000 of the population
Riyadh	5.7
Makkah	7.8
Eastern Province	6.2
Aseer	9.6
Al-Medinah	9.3
Gizan	8
Al-Qassim	15
Tabuk	7.8
Hail	8.9
Al-Baha	13.2
Najran	12.8
Al-Jouf	15.29
Northern Boundaries	8

Table A28. The number of private doctors per 10,000 of the population according to region

Region	Number of private doctors per 10,000 of the population
Riyadh	3.8
Makkah	6.3
Eastern Province	2.2
Aseer	1.8
Al-Medinah	2.5
Gizan	1
Al-Qassim	1.5
Tabuk	2.3
Hail	2.5
Al-Baha	2
Najran	4.3
Al-Jouf	1.7
Northern Boundaries	2

Table A29. The usual place of the prenatal care checkups for the live births during the previous three years period

The usual place of checkup	Frequency	Percentage
Public hospital	2182	36.2
Public health centre	2922	48.5
Private care	910	15.1
At home	7	0.1
Other	3	0
Total	6024	100

Table A30. The mean of transportation to reach the last source of prenatal care checkup

Mean of transport	Frequency	Percentage
Walking	133	12.3
Bus/taxi	34	3.1
Private car	915	84.4
Other	2	0.2
Total	1084	100

Table A31. The waiting time at the health care facility attended at the last prenatal care checkup

Waiting time	Frequency	Percentage
Less than ½ hour	506	46.6
Between ½ & 1 hour	426	39.3
Between 1 hour & 2 hours	126	11.6
More than 2 hours	27	2.5
Total	1085	100.0

c) The need variables:

Table A32. The number of acute sickness days during the previous two weeks period

Sickness days	Frequency	Percentage
0	91	1.1
1	320	3.9
2	1467	17.9
3	1895	23.1
4	959	11.7
5	543	6.6
6	158	1.9
7+	2772	33.8
Total	8205	100

Table A33. The number of children under five years acute diarrhoea days during the previous two weeks period

Diarrhoea days	Frequency	Percentage
0	6	1.1
1	30	5.3
2	126	22.2
3	157	27.7
4	79	13.9
5	34	6
6	12	2.1
7+	123	21.7
Total	567	100

Table A34. The number of children under five years acute respiratory infection days during the previous two weeks period

Acute respiratory infection days	Frequency	Percentage
0	22	0.8
1	46	1.6
2	355	12.1
3	545	18.6
4	373	12.7
5	261	8.9
6	63	2.2
7+	1263	43
Total	2928	100

Table A35. The medical conditions reported by mothers who had live births during the previous three years period

Medical condition	Frequency	Percentage
Severe breathlessness	2034	31.9
Vaginal bleeding	371	5.7
High blood pressure	381	5.9

Swelling of face or body	603	9.3
Severe headache	1011	15.6
Convulsions	63	1
Pain in the upper abdomen	953	14.7
Diabetes	336	5.2
Painful urination	816	12.6

Source: Analysis of the Saudi Arabia Family Health Survey, 1996.

The recategorised independent variables' frequency distributions for the analysis of the utilisation of doctors' services in response to acute sickenss:

a-) Predisposing factors

Table A36. Age distribution for the general population

Age group	Frequency	Percentage
0-4	10856	14.7
5-9	11564	15.7
10-14	11803	16.0
15-19	9796	13.3
20-29	10675	14.5
30-39	6899	9.4
40-49	4158	5.6
50-59	3672	5.0
60+	4188	5.7
Total	73611	100.0

Table A37. Head of household age distribution for the general population

Age group	Frequency	Percentage
20-29	5010	6.6
30-39	18044	23.9
40-49	19632	25.9
50-59	15429	20.4
60+	17540	23.2
Total	75655	100.0

Table A38. Gender distribution for the general population

Gender	Frequency	Percentage
Male	36917	50.2
Female	36691	49.8
Total	73608	100.0

Table A39. Marital status distribution for the general population

Marital Status	Frequency	Percentage
Single or katib kitab	23228	50.2
Married	21000	45.4
Widowed	1587	3.4
Divorced or separated	486	1.0
Total	46301	100.0

Table A40. Quintile of household size distribution for the general population

Quintile	Frequency	Percentage
1st (1-5)	12527	16.5
2nd (6-7)	15116	19.9
3rd (8-9)	18377	24.2
4th (10-11)	15113	19.9
5th (12+)	14724	19.4
Total	75857	100.0

Table A41. Relationship to head of household distribution for the general population

Relationship to head of household	Frequency	Percentage
Son or daughter	47067	62.0
Not a son or a daughter	28790	38.0
Total	75857	100.0

Table A42. Educational level distribution for the general population

Education Level	Frequency	Percentage
Illiterate	14608	24.3
Read	16958	28.2
Primary	12606	20.9
Preparatory	7894	13.1
Secondary and diploma	6071	10.1
University	2084	3.5
Total	60221	100.0

Table A43. Economic activity distrution for the general population

Economic Activity	Frequency	Percentage
Working	11802	30.8
Unemployed, seeking work, other	1536	4.0
Retired	1228	3.2
In School	11180	29.2
Doing housework	12603	32.9
Total	38349	100.0

Table A44. Head of household education distribution for the general population

Head of household education	Frequency	Percentage
Illiterate	21681	28.6
Read	12420	16.4
Primary	16836	22.3
Preparatory	8277	10.9
Secondary and diploma	9959	13.2
University	6482	8.6
Total	75655	100.0

Table A45. Head of household economic activity distribution for the general population

Head of household economic activity	Frequency	Percentage
Working	60227	79.4
Unemployed, seeking work for the first time, in school, other	3367	4.4
Retired	8840	11.7

Doing housework	3104	4.1
Total	75538	100.0

Table A46. Head of household occupation distribution for the general population

Head of household occupation	Frequency	Percentage
Salaried employee	43578	72.6
Other	16441	27.4
Total	60019	100.0

b) Enabling factors

Table A47. Regional distribution for the general population

Region	Frequency	Percentage
Central	20589	27.1
Eastern	10982	14.5
Western	23549	31.0
Northern	6778	8.9
Southern	13959	18.4
Total	75857	100.0

Table A48. Urban /rural residence distribution for the general population

Urban/rural	Frequency	Percentage
Urban	51052	67.6
Rural	24497	32.4
Total	75549	100.0

Table A49. Quintiles of public doctors distribution for the general population

Quintiles	Frequency	Percentage
1st	17325	22.8
2nd	10982	14.5
3rd	18148	23.9
4th	14651	19.3
5th	14751	19.4
Total	75857	100.0

Table A50.Quintiles of private doctors distribution for the general population

Quintile	Frequency	Percentage
1st	14647	19.3
2nd	16433	21.7
3rd	13575	17.9
4th	17325	22.8
5th	13877	18.3
Total	75857	100.0

Table A51. Type of dwelling distribution for the general population

Type of dwelling	Frequency	Percentage
Villa	21381	28.3
Duplex or apartment	26393	35.0
Traditional or arabian house	27708	36.7
Total	75482	100.0

Table A52. Tenure of the house distribution for the general population

Housing Tenure	Frequency	Percentage
Owned or owned jointly	57863	76.4
Rented	14994	19.8
Provided by employer & other	2924	3.9
Total	75781	100.0

Table A53. Quintiles of crowding distribution for the general population

Quintile	Frequency	Percentage
1st	17543	23.2
2nd	12227	16.1
3rd	15996	21.1
4th	14118	18.6
5th	15871	21.0
Total	75755	100.0

Table A54. Floor material distribution for the general population

Floor material	Frequency	Percentage
Modern Floor	72524	95.6
Earth , stone or brick	3333	4.4
Total	75857	100.0

Table A55. Type of toilet distribution for the general population

Toilet Type	Frequency	Percentage
Have a flush toilet	59455	78.5
Do not have a flush toilet	16295	21.5
Total	75750	100.0

Table A56. Main drinking water source distribution for the general population

Main drinking water source	Frequency	Percentage
Pipe or bottled	38229	50.4
Other	37628	49.6
Total	75750	100.0

Table A57. Type of lighting distribution for the general population

Type of Lighting	Frequency	Percentage
Have electricity	71706	94.7
Do not have electricity	4026	5.3
Total	75732	100.0

Table A58. Car ownership distribution for the general population

Car Ownership	Frequency	Percentage
Own a car	66549	88.1
Do not own a car	8995	11.9
Total	75732	100.0

Table A59. Radio ownership distribution for the general population

Radio	Frequency	Percentage
Have a radio	61491	81.3
Do not have a radio	14189	18.7
Total	75857	100.0

Table A60. Colour TV ownership distribution for the general population

Colour TV	Frequency	Percentage
Have a colour TV	66764	88.2
Do not have a colour TV	8933	11.8
Total	75697	100.0

Table A61. SatelliteTV/cable ownership distribution for the general population

Satellite TV/cable	Frequency	Percentage
Have a satellite TV/cable	15269	20.2
Do not have a satellite TV/cable	60356	79.8
Total	75625	100.0

c) Need factors:

Table A62. Disability due to sickness distribution for the general population

Disability Due to Sickness	Frequency	Percentage
Had a disability	4082	50.8
Did not have a disability	3949	49.2
Total	8031	100.0

Table A63. Number of acute sickness days distribution for the general population

Sickness days	Frequency	Percentage
0 days	91	1.1
1-2 days	1787	21.8
3-4 days	2854	34.8
5-6 days	701	8.5
7+ days	2772	33.8
Total	8205	100.0

The recoded independent variables frequency distributions for the analysis of the utilisation of health services in response to children under five's diarrhoea and acute respiratory infections and infants' full immunisation:

a) Predisposing factors:

Table A64. Age of children in years distribution

Age	Frequency	Percentage
Younger than 1 year	2078	19.2
1 year	2122	19.6
2 years	2231	20.6
3 years	2129	19.7
4 years	2271	21.0
Total	10831	100.0

Table A65. Gender distribution for children

Gender	Frequency	Percentage
Male	5621	51.9
Female	5210	48.1
Total	10831	100.0

Table A66. Birth order distribution for children

Birth Order	Frequency	Percentage
1st	1306	12.1
2-3	2692	25.0
4-5	2360	21.8
6+	4295	41.1
Total	10653	100.0

Table A67. Mothers' age distribution for children

Mother's age group	Frequency	Percentage
15-24	1910	17.7
25-34	5509	51.1
35-44	2894	26.8
45+	467	4.3
Total	10780	100.0

Table A68. Head of household age distribution for children

Head of household age group	Frequency	Percentage
20-29	1209	11.9
30-39	4038	13.2
40-49	2863	26.5
50-59	1424	37.3
60+	1285	11.2
Total	10819	100.0

Table A69. Quintiles of household size distribution for children

Quintile	Frequency	Percentage
1st (1-5)	2177	20.1
2nd (6-7)	2335	21,6
3rd (8-9)	2328	21.5
4th (10-11)	1920	17.7
5th (12+)	2071	19.1
Total	10831	100.0

Table A70. Mothers' education distribution for children

Mother's education	Frequency	Percentage
Illiterate	4679	43.5
Read	1561	14.5
Primary	1862	17.3
Preparatory	1016	9.4
Secondary, diploma or university	1635	15.2
Total	10753	100.0

Table A71. Mothers' economic activity distribution for children

Mother's economic activity	Frequency	Percentage
Doing housework	9246	85.4
Working	816	7.5
Other	769	7.1
Total	10831	100.0

Table A72. Head of household education distribution for children

Head of household education	Frequency	Percentage
Illiterate	2346	21.7
Read	1612	14.9
Primary	2739	25.3
Preparatory	1450	13.4
Secondary and diploma	1625	15.0
University	1039	9.6
Total	10811	100.0

Table A73. Head of household economic activity distribution for children

Head of household economic activity	Frequency	Percentage
Working	9496	87.7
Not Working	1335	12.3
Total	10831	100.0

Table A74. Child health rating distribution for children

Child health rating	Frequency	Percentage
Excellent or good	4392	40.7
Normal	5122	47.4
Ill from time to time or often ill	1283	11.9
Total	10797	100.0

Table A75. Time of prenatal care initiation distirbution

Time of prenatal care initiation	Frequency	Percentage
First three months	4649	80.1
After three months	1214	19.9
Total	5863	100.0

Table A76. Number of prenatal care visits distribution

Number of prenatal care visits	Frequency	Percentage
1-5 visits	1063	18.1
6-8 visits	1343	22.8
9-11 visits	1206	20.5
12+ visits	2271	38.6
Total	5883	100

b) Enabling factors:

Table A77. Regional distribution for children

Region	Frequency	Percentage
Central	2723	25.1
Eastern	1622	15.0
Western	3273	30.2
Northern	1113	10.3
Southern	2100	19.4
Total	10831	100.0

Table A78. Urban /rural residence distribution for children

Urban/rural residence	Frequency	Percentage
Urban	7326	67.6
Rural	3505	32.4
Total	10831	100.0

Table A79. Type of dwelling distribution for children

Dwelling Type	Frequency	Percentage
Villa	2622	24.3
Duplex or apartment	4178	38.8
Traditional or arabian house	3977	36.9
Total	10777	100.0

Table A80. Tenure of the house distribution for children

Housing Tenure	Frequency	Percentage
Owned or owned jointly	7452	68.9
Rented	2818	26.0
Provided by employer & other	549	5.1
Total	10819	100.0

Table A81. Quintiles of crowding distribution for children

Quintile	Frequency	Percentage
1st	2161	20.0
2nd	2090	19.3
3rd	2174	20.1
4th	2230	20.6
5th	2158	20.0
Total	10831	100.0

Table A82. Floor material distribution for children

Floor material	Frequency	Percentage
Modern floor	10326	95.3
Earth, stone or brick	505	4.7
Total	10831	100.0

Table A83. Type of toilet distribution for children

Toilet Type	Frequency	Percentage
Have a flush toilet	8341	77.1
Do not have a flush toilet	2472	22.9
Total	10831	100.0

Table A84. Main drinking water source distribution for children

Type of Water Source	Frequency	Percentage
Pipe or Bottled	5212	48.1
Other	5619	51.9
Total	10831	100.0

Table A85. Type of lighting distribution for children

Type of lighting	Frequency	Percentage
Have electricity	10148	93.9
Do not have electricity	661	6.1
Total	10809	100.0

Table A86. Car ownership distribution for children

Car ownership	Frequency	Percentage
Own a car	9635	89.4
Do not own a car	1141	10.6
Total	10776	100.0

Table A87. Radio ownership distribution for children

Radio	Frequency	Percentage
Have a radio	8424	78.0
Do not have a radio	2370	22.0
Total	10794	100.0

Table A88. Colour TV ownership distribution for children

Colour TV	Frequency	Percentage
Have a colour TV	9353	86.6
Do not have a colour TV	1447	13.4
Total	10800	100.0

Table A89. Satellite TV/cable ownership distribution for children

Satellite TV/cable	Frequency	Percentage
Have a satellite TV/cable	1953	18.1
Do not have a satellite TV/cable	8845	81.9
Total	10798	100.0

c) Need factors:

Table A90. Number of diarrhoea days distribution for children

Number of diarrhoea days	Frequency	Percentage
Less than two days	162	28.6
3-4 days	236	41.6
5-6 days	46	8.1
7+ days	123	21.7
Total	567	100.0

Table A91. Number of acute respiratory infection days distribution for children

Number of acute respiratory infection days	Frequency	Percentage
Less than two days	423	14.5
3-4 days	918	31.3
5-6 days	324	11.1
7+ days	1263	43.0
Total	2928	100.0

Table A92. Difficulty in breathing distribution for children

Difficulty in breathing	Frequency	Percentage
Did not have difficulty in breathing	2017	68.1
Had some difficulties in breathing	946	31.9
Total	2963	100.0

The recoded independent variables frequency distributions for the analysis of the utilisation of prenatal care services:

a) Predisposing factors

Table A93. Mothers' age distribution for the live births

Mother's Age	Frequency	Percentage
15-24	1596	17.8
25-34	3741	47.7
35-44	2857	31.8
45+	779	8.7
Total	8973	100.0

Table A94. Father's age distribution for the live births

Age group	Frequency	Percentage
20-29	1241	14.7
30-39	2769	32.7
40-49	2192	25.9
50-59	1236	14.6
60+	1017	12.0
Total	8455	100.0

Table A95. Birth order (including under five years old children) distribution

Birth order	Frequency	Percentage
1st	1306	12.1
2-3	2692	25.0
4-5	2360	21.8
6-7	1981	18.3
8+	2314	22.8
Total	10653	100.0

Table A96. Quintiles of household size distribution for the live births

Quintile	Frequency	Percentage
1st	1486	16.5
2nd	1740	19.4
3rd	1957	21.8
4th	1791	19.9
5th	2007	22.3
Total	8981	100.0

Table A97. Mothers' education distribution for the live births

Mother's education	Frequency	Percentage
Illiterate	3836	42.8
Read	1321	14.7
Primary	1519	17.0
Preparatory	873	9.7
Secondary, diploma or university	1409	15.7
Total	8958	100.0

Table A98. Mothers' economic activity distribution for the live births

Mother's economic activity	Frequency	Percentage
Doing housework	7559	84.2
Working	689	7.7

Other	733	8.2
Total	8981	100.0

Table A99. Fathers'education distribution for the live births

Father's education	Frequency	Percentage
Read only	305	4.5
Primary	2441	36.0
Preparatory	1383	20.4
Secondary or Diploma	1612	23.8
University	1033	15.2
Total	6774	100.0

Table A100. Time of initiation of prenatal care distribution for the live births

Time of Initiation	Frequency	Percentage
First 3 months	4649	80.1
After 3 months	1214	19.9
Total	5863	100.0

Table A101. Satisfaction with prenatal care distribution

Satisfaction	Frequency	Percentage
Satisfied	1016	11.3
Not satisfied	69	6.4
Total	1085	100.0

b) Enabling factors:

Table A102. Regional distribution for the live births

Region	Frequency	Percentage
Central	2312	25.7
Eastern	1358	15.1
Western	2909	32.4
Northern	812	9.0
Southern	1590	17.7
Total	8981	100.0

Table A103. Urban /rural residence distribution for the live births

Urban/Rural	Frequency	Percentage
Urban	6361	70.8
Rural	2620	29.2
Total	8981	100.0

Table A104. Type of dwelling distribution for the live birhs

Dwelling Type	Frequency	Percentage
Villa	2381	25.9
Duplex or apartment	3550	39.7
Traditional or arabian house	3072	34.4
Total	8940	100.0

Table A105. Tenure of the house distribution for the live births

Housing tenure	Frequency	Percentage
Owned or owned jointly	6323	70.4
Rented	2242	25.0
Provided by employer & other	416	4.6

Total	8981	100.0

Table A106. Quintiles of crowding distribution for the live births

Quintile	Frequency	Percentage
1st	1625	18.1
2nd	1990	22.2
3rd	1748	19.5
4th	1753	19.5
5th	1852	20.7
Total	8968	100.0

Table A107. Floor material distribution for the live births

Floor material	Frequency	Percentage
Modern floor	8613	95.9
Earth , stone or brick	368	4.1
Total	8981	100.0

Table A108. Type of toilet distribution for the live births

Toilet Type	Frequency	Percentage
Have a flush toilet	7131	79.4
Do not have a flush toilet	1850	20.6
Total	8981	100.0

Table A109. Main drinking water source distribution for the live births

Main drinking water source	Frequency	Percentage
Pipe or bottled	4635	51.6
Other	4346	48.4
Total	8981	100.0

Table A110. Type of lighting distribution for the live births

Type of lighting	Frequency	Percentage
Have electricity	8498	94.6
Do not have electricity	483	5.4
Total	8981	100.0

Table A111. Car ownership distribution for the live births

Car ownership	Frequency	Percentage
Own a car	7956	89.0
Do not own a car	981	11.0
Total	8937	100.0

Table A112. Daily radio listening distribution for ever married women

Radio Listening	Frequency	Percentage
Listens daily	4355	48.6
Does not listen daily	4613	51.4
Total	8981	100.0

Table A113. TV watching distribution for ever married women

T.V. Watching	Frequency	Percentage
Watches TV	7772	86.7
Does not watch TV	1196	13.3
Total	8981	100.0

Table A114. Weekly newspapers/ magazine reading distribution for ever married women

Weekly newspapers/magazine reading	Frequency	Percentage
Read at least once a week	3661	73.4
Does not read at least once a week	1330	26.6
Total	4991	100

Table A115. Traveling time distribution for the last source of prenatal care

Traveling time	Frequency	Percentage
1-15 minutes	731	66.2
16-30 minutes	215	19.5
31+ minutes	158	14.3
Total	1104	100.0

Table A116. Mean of transport distribution for the last source of prenatal care

Mean of transport	Frequency	Percentage
Private car	915	84.4
Other	169	15.6
Total	1084	100.0

Table A117. Waiting time distribution at the last source of prenatal care

Waiting time	Frequency	Percentage
Less than 30 minutes	506	46.6
30-60 minutes	426	39.3
More than 60 minutes	153	14.1
Total	1085	100.0

c) Need factors:

Table A118. Medical conditions distribution during pregnancy

Medical condition	Frequency	Percentage
Severe breathlessness	2034	31.9
Vaginal bleeding	371	5.7
High blood pressure	381	5.9
Swelling of face or body	603	9.3
Severe headache	1011	15.6
Convulsions	63	1
Pain in the upper abdomen	953	14.7
Diabetes	336	5.2
Painful urination	816	12.6

The cross tabulations of adults' utilisation of doctors' services by the independent variables:

a) Predisposing factors:

Table A119. Adults' utilisation of doctors' services by age group

Utilisation	Age						Total (%)
	15-19 years (%)	20-29 years (%)	30-39 years (%)	40-49 years (%)	50-59 years (%)	60+ years (%)	
Both public and private	26 (3.5)	31 (4.2)	22 (3.7)	20 (6.3)	20 (5.7)	30 (6.8)	149 (4.7)
Public doctors	494 (67.3)	430 (58.3)	335 (56.6)	191 (59.9)	219 (62.2)	285 (64.9)	1954 (61.6)
Private doctors	82 (11.2)	92 (12.5)	95 (16)	48 (15)	43 (12.2)	46 (10.5)	406 (12.8)
No use of services	132 (18)	184 (25)	140 (23.6)	60 (18.8)	70 (19.9)	78 (17.8)	664 (20.9)
Total	734 (100)	737 (100)	592 (100)	319 (100)	352 (100)	439 (100)	3173 (100)

Table A120. Adults' utilisation of doctors' services by gender

Utilisation	Gender		Total (%)
	Male (%)	Female (%)	
Both public and private doctors	52 (4.3)	97 (4.9)	149 (4.7)
Public doctors	773 (63.9)	1181 (60.2)	1954 (61.6)
Private doctors	156 (12.9)	250 (12.7)	406 (12.8)
No use of services	229 (18.9)	435 (22.2)	664 (20.9)
Total	1210 (100)	1963 (100)	3173 (100)

Table A121. Adults' utilisation of doctors' services by marital status

	Marital status				Total (%)
	Married (%)	Single/ katib kitab (%)	Divorced or separated (%)	Widowed (%)	
Both public and private	89 (4.9)	38 (3.6)	2 (3.4)	19 (9)	148 (4.7)
Public doctors	1085 (59.5)	696 (65)	40 (67.8)	126 (59.4)	1947 (61.6)
Private doctors	252 (13.8)	125 (11.7)	5 (8.5)	23 (10.8)	405 (12.8)
No use of services	396 (21.7)	211 (19.7)	12 (20.3)	44 (20.8)	663 (21)
Total	1822 (100)	1070 (100)	59 (100)	212 (100)	3163 (100)

Table A122. Adults' utilisation of doctors' services by head of household age

Utilisation	Head of household age					Total (%)
	20-29 years (%)	30-39 years (%)	40-49 years (%)	50-59 years (%)	60+ years (%)	
Both public and private	17 (6.1)	31 (5)	28 (4.3)	32 (4.4)	40 (4.5)	148 (4.7)
Public doctors	143 (51.3)	358 (57.6)	392 (60.9)	467 (64.6)	590 (65.8)	1950 (61.6)
Private doctors	36 (12.9)	96 (15.4)	92 (14.3)	101 (14)	80 (8.9)	405 (12.8)
No use of services	83 (29.7)	137 (22)	132 (20.5)	123 (17)	186 (20.8)	661 (20.9)
Total	279 (100)	622 (100)	644 (100)	723 (100)	896 (100)	3164 (100)

Table A123. Adults' utilisation of doctors' services by household size

Utilisation	Household size					Total (%)
	1st quintile (1-5) (%)	2nd quintile (6-7) (%)	3rd quintile (8-9) (%)	4th quintile (10-11) (%)	5th quintile (12+) (%)	
Both public and private doctors	50 (5.6)	31 (4.7)	28 (4.4)	19 (4.2)	21 (3.9)	149 (4.7)
Public doctors	474 (53.4)	373 (56.9)	399 (62.4)	323 (70.7)	385 (72.1)	1954 (61.6)
Private doctors	129 (14.5)	92 (14)	95 (14.9)	43 (9.4)	47 (8.8)	406 (12.8)
No use of services	234 (26.4)	160 (24.4)	117 (18.3)	72 (15.8)	81 (15.2)	664 (20.9)
Total	887 (100)	656 (100)	639 (100)	457 (100)	534 (100)	3173 (100)

Table A124. Adults' utilisation of doctors' services by educational level

Utilisation	Educational level						Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary/ diploma (%)	University (%)	
Both pubic and private	48 (4.9)	27 (7.5)	28 (4.2)	19 (3.3)	24 (5.4)	3 (2)	149 (4.7)
Public doctors	668 (68.4)	214 (59.3)	419 (62.9)	353 (61.4)	222 (50.3)	73 (49.7)	1949 (61.6)
Private doctors	72 (7.4)	41 (11.4)	84 (12.6)	79 (13.7)	94 (21.3)	34 (23.1)	404 (12.8)
No use of services	188 (19.3)	79 (21.9)	135 (20.3)	124 (21.6)	101 (22.9)	37 (25.2)	664 (21)
Total	976 (100)	361 (100)	666 (100)	575 (100)	441 (100)	147 (100)	3166 (100)

Table A125. Adults' utilisation of doctors' services by head of household education

Utilisation	Head of household education						Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary/ diploma (%)	University (%)	
Both pubic and private	36 (3.9)	26 (4.9)	33 (4.8)	22 (6.5)	23 (5.6)	9 (3.4)	149 (4.7)
Public doctors	642 (69.1)	328 (61.9)	423 (61.3)	206 (60.9)	217 (53.1)	130 (48.7)	1946 (61.5)
Private doctors	63 (6.8)	62 (11.7)	100 (14.5)	44 (13)	71 (17.4)	65 (24.3)	405 (12.8)
No use of services	188 (20.2)	114 (21.5)	134 (19.4)	66 (19.5)	98 (24)	63 (23.6)	663 (21)
Total	929 (100)	530 (100)	690 (100)	338 (100)	409 (100)	267 (100)	3163 (100)

Table A126. Adults' utilisation of doctors' services by economic activity

Utilisation	Economic activity					Total (%)
	Working (%)	Unemployed (%)	Retired (%)	In school (%)	Doing housework (%)	
Both public and private	42 (4.9)	4 (4.5)	5 (6)	26 (3.3)	67 (5.1)	144 (4.6)
Public doctors	508 (59.8)	62 (71.3)	47 (56.6)	509 (65.3)	789 (60.3)	1915 (61.6)
Private doctors	123 (14.5)	5 (5.7)	10 (12)	99 (12.7)	158 (12.1)	395 (12.7)
No use of services	177 (20.8)	16 (18.4)	21 (25.3)	146 (18.7)	294 (22.5)	654 (21)
Total	850 (100)	87 (100)	83 (100)	780 (100)	1308 (100)	3108 (100)

Table A127. Adults' utilisation of doctors' services by head of household economic activity

Utilisation	Head of household economic activity				Total (%)
	Working (%)	Unemployed (%)	Retired (%)	Doing housework (%)	
Both public and private	109 (4.6)	9 (5.1)	19 (4.5)	12 (5.6)	149 (4.7)
Public doctors	1429 (60.5)	114 (65.1)	272 (65.1)	136 (63.6)	1951 (61.5)
Private doctors	331 (14)	11 (6.3)	46 (11)	18 (8.4)	406 (12.8)
No use of services	494 (20.9)	41 (23.4)	81 (19.4)	48 (22.4)	664 (20.9)
Total	2363 (100)	175 (100)	418 (100)	214 (100)	3170 (100)

b) Enabling factors:

Table A128. Adults' utilisation of doctors' services by region of residence

Utilisation	Region					Total (%)
	Central (%)	Eastern (%)	Western (%)	Northern (%)	Southern (%)	
Both public and private doctors	41 (6)	33 (5.5)	44 (4.4)	9 (4.4)	22 (3.2)	149 (4.7)
Public doctors	398 (58.6)	359 (59.6)	541 (53.7)	154 (75.1)	502 (73.9)	1954 (61.6)
Private doctors	96 (14.1)	113 (18.8)	177 (17.6)	6 (2.9)	14 (2.1)	406 (12.8)
No use of services	144 (21.2)	97 (16.1)	246 (24.4)	36 (17.6)	141 (20.8)	664 (20.9)
Total	679 (100)	602 (100)	1008 (100)	205 (100)	679 (100)	3173 (100)

Table A129. Adults' utilisation of doctors' services by urban/rural residence

Utilisation	Urban/rural residence		Total (%)
	Urban (%)	Rural (%)	
Both public and private doctors	112 (5.1)	36 (3.7)	148 (4.7)
Public doctors	1218 (55.7)	732 (74.7)	1950 (61.6)
Private doctors	371 (17)	34 (3.5)	405 (12.8)
No use of services	486 (22.2)	178 (18.2)	664 (21)
Total	2187 (100)	980 (100)	3167 (100)

Table A130. Adults' utilisation of doctors' services by the proportion of public doctors/ 10,000

	Proportion of public doctors/ 10,000					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Both public and private doctors	29 (5)	33 (5.5)	34 (5.2)	17 (2.8)	36 (4.9)	149 (4.7)
Public doctors	325 (55.9)	359 (59.6)	372 (56.6)	370 (61.8)	528 (72.2)	1954 (61.6)
Private doctors	92 (15.8)	113 (18.8)	102 (15.5)	80 (13.4)	19 (2.6)	406 (12.8)
No use of services	135 (23.2)	97 (16.1)	152 (23)	132 (22)	148 (20.2)	664 (20.9)
Total	581 (100)	602 (100)	660 (100)	599 (100)	731 (100)	3173 (100)

Table A131. Adults' utilisation of doctors' services by the proportion of private doctors/ 10,000

Utilisation	Proportion of private doctors/ 10,000					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Both public and private doctors	27 (4.1)	46 (5.9)	15 (2.7)	29 (5)	32 (5.4)	149 (4.7)
Public doctors	490 (74)	488 (62.7)	333 (60.1)	325 (55.9)	318 (53.2)	1954 (61.6)
Private doctors	17 (2.6)	119 (15.3)	78 (14.1)	92 (15.8)	100 (16.7)	406 (12.8)
No use of services	128 (19.3)	125 (16.1)	128 (23.1)	135 (23.2)	148 (24.7)	664 (20.9)
Total	662 (100)	778 (100)	554 (100)	581 (100)	598 (100)	3173 (100)

Table A132. Adults' utilisation of doctors' services by dwelling type

Utilisation	Type of dwelling			Total (%)
	Villa (%)	Duplex or apartment (%)	Traditional or Arabian house (%)	
Both public and private doctors	44 (5.1)	74 (5.9)	31 (2.9)	149 (4.7)
Public doctors	505 (59.1)	684 (54.9)	753 (71.2)	1942 (61.5)
Private doctors	136 (15.9)	194 (15.6)	76 (7.2)	406 (12.9)
No use of services	170 (19.9)	294 (23.6)	198 (18.7)	662 (21)
Total	855 (100)	1246 (100)	1058 (100)	3159 (100)

Table A133. Adults' utilisation of doctors' services by housing tenure

Utilisation	Housing tenure			Total (%)
	Owned or owned jointly (%)	Rented (%)	From the employer/other (%)	
Both public and private doctors	113 (4.7)	27 (4.1)	9 (8.8)	149 (4.7)
Public doctors	1524 (63.3)	373 (56.2)	57 (55.9)	1954 (61.6)
Private doctors	289 (12)	107 (16.1)	10 (9.8)	406 (12.8)
No use of services	481 (20)	157 (23.6)	26 (25.5)	664 (20.9)
Total	2407 (100)	664 (100)	102 (100)	3173 (100)

Table A134. Adults' utilisation of doctors' services by crowding

Utilisation	Crowding					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Both public and private doctors	69 (6.1)	30 (5.9)	23 (3.5)	12 (2.8)	15 (3.4)	149 (4.7)

Public doctors	598 (53)	297 (58.2)	411 (63.1)	296 (68.2)	349 (78.1)	1951 (61.5)
Private doctors	182 (16.1)	72 (14.1)	81 (12.4)	47 (10.8)	24 (5.4)	406 (12.8)
No use of services	279 (24.7)	111 (21.8)	136 (20.9)	79 (18.2)	59 (13.2)	664 (20.9)
Total	1128 (100)	510 (100)	651 (100)	434 (100)	447 (100)	3170 (100)

Table A135. Adults' utilisation of doctors' services by the houses' floor material

Utilisation	Floor material		Total (%)
	Modern floor (%)	Earth/stone/brick (%)	
Both public and private doctors	149 (4.8)		149 (4.7)
Public doctors	1886 (61.2)	68 (73.9)	1954 (61.6)
Private doctors	405 (13.1)	1 (1.1)	406 (12.8)
No use of services	641 (20.8)	23 (25)	664 (20.9)
Total	3081 (100)	92 (100)	3173 (100)

Table A136. Adults' utilisation of doctors' services by toilet type

Utilisation	Toilet type		Total (%)
	Flush toilet (%)	No flush toilet (%)	
Both public and private doctors	130 (5)	19 (3.3)	149 (4.7)
Public doctors	1505 (58.1)	448 (77.1)	1953 (61.6)
Private doctors	396 (15.3)	9 (1.5)	405 (12.8)
No use of services	559 (21.6)	105 (18.1)	664 (20.9)
Total	2590 (100)	581 (100)	3171 (100)

Table A137. Adults' utilisation of doctors' services by main drinking water source

Utilisation	Main drinking water souce		Total (%)
	Pipe or bottled (%)	Other (%)	
Both public and private doctors	88 (5.6)	61 (3.8)	149 (4.7)
Public doctors	852 (53.8)	1102 (69.4)	1954 (61.6)
Private doctors	281 (17.7)	125 (7.9)	406 (12.8)
No use of services	363 (22.9)	301 (18.9)	664 (20.9)
Total	1584 (100)	1589 (100)	3173 (100)

Table A138. Adults' utilisation of doctors' services by having electricity

Utilisation	Electricity		Total (%)
	Have electricity (%)	Do not have electricity (%)	
Both public and private doctors	148 (4.9)	1 (0.6)	149 (4.7)
Public doctors	1842 (61.1)	112 (71.3)	1954 (61.6)
Private doctors	402 (13.3)	3 (1.9)	405 (12.8)
No use of services	623 (20.7)	41 (26.1)	664 (20.9)
Total	3015 (100)	157 (100)	3172 (100)

Table A139. Adults' utilisation of doctors' services by car ownership

Utilisation	Car ownership		Total (%)
	Own a car (%)	Do not own a car (%)	
Both public and private doctors	130 (4.8)	19 (4.1)	149 (4.7)
Public doctors	1629 (60.3)	323 (68.9)	1952 (61.6)
Private doctors	366 (13.6)	39 (8.3)	405 (12.8)
No use of services	575 (21.3)	88 (18.8)	663 (20.9)
Total	2700 (100)	469 (100)	3169 (100)

Table A140. Adults' utilisation of doctors' services by having a radio

Utilisation	Radio		Total (%)
	Have a radio (%)	Do not have a radio (%)	
Both public and private doctors	137 (5.1)	10 (2.1)	147 (4.6)
Public doctors	1617 (59.8)	337 (71.9)	1954 (61.6)
Private doctors	372 (13.8)	34 (7.2)	406 (12.8)
No use of services	576 (21.3)	88 (18.8)	664 (20.9)
Total	2702 (100)	469 (100)	3171 (100)

Table A141. Adults' utilisation of doctors' services having a colour TV

Utilisation	Colour TV		Total (%)
	Have a colour TV (%)	Do not have a colour TV (%)	
Both public and private doctors	135 (4.8)	14 (3.7)	149 (4.7)
Public doctors	1693 (60.7)	261 (68.3)	1954 (61.6)
Private doctors	390 (14)	16 (4.2)	406 (12.8)

No use of services	573 (20.5)	91 (23.8)	664 (20.9)
Total	2791 (100)	382 (100)	3173 (100)

Table 142. Adults' utilisation of doctors' services by having a satellite TV/cable

Utilisation	Satellite TV/cable		Total (%)
	Have a satellite TV/cable (%)	Do not have a satellite TV/cable (%)	
Both public and private doctors	46 (6.1)	103 (4.3)	149 (4.7)
Public doctors	355 (47.2)	1599 (66.1)	1954 (61.6)
Private doctors	172 (22.9)	234 (9.7)	406 (12.8)
No use of services	179 (23.8)	484 (20)	663 (20.9)
Total	752 (100)	2420 (100)	3172 (100)

c) Need factors:

Table A143. Adults' utilisation of doctors' services by disability due to sickness

Utilisation	Disability due to sickness		Total (%)
	Had a disability (%)	Did not have a disability (%)	
Both public and private doctors	104 (6.3)	44 (3)	148 (4.7)
Public doctors	1082 (65.5)	848 (57)	1930 (61.5)
Private doctors	218 (13.2)	183 (12.3)	401 (12.8)
No use of services	248 (15)	413 (27.8)	661 (21.1)
Total	1652 (100)	1488 (100)	3140 (100)

Table A144. Adults' utilisation of doctors' services by number of sick days

Utilisation	Sick days					Total (%)
	0 days (%)	1-2 days (%)	3-4 days (%)	5-6 days (%)	7+ days (%)	
Both public and private	3 (8.8)	11 (1.7)	30 (2.9)	16 (5.9)	89 (7.6)	149 (4.7)
Public doctors	18 (52.9)	405 (62.3)	661 (63.4)	165 (61.1)	705 (59.9)	1954 (61.6)
Private doctors	2 (5.9)	71 (10.9)	125 (12)	45 (16.7)	163 (13.9)	406 (12.8)
No use of services	11 (32.4)	163 (25.1)	227 (21.8)	44 (16.3)	219 (18.6)	664 (20.9)
Total	34 (100)	650 (100)	1043 (100)	270 (100)	1176 (100)	3173 (100)

The cross tabulations of children's utilisation of doctors' services by the independent variables:

a) Predisposing factors:

Table A145. Children's utilisation of doctors' services by age group

Utilisation	Age			Total (%)
	0-4 years	5-9 years	10-14 years	
Both public and private doctors	98 (4.3)	54 (3.8)	31 (3)	183 (3.9)
Public doctors	1436 (63.6)	956 (68.1)	750 (72.3)	3142 (66.9)
Private doctors	319 (14.1)	183 (13)	96 (9.2)	598 (12.7)
No use of services	405 (17.9)	210 (15)	161 (15.5)	776 (16.5)
Total	2258 (100)	1403 (100)	1038 (100)	4699 (100)

Table A146. Children's utilisation of doctors' services by gender

Utilisation	Gender		Total (%)
	Male (%)	Female (%)	
Both public and private doctors	103 (4.2)	80 (3.5)	183 (3.9)
Public doctors	1649 (67.9)	1493 (65.7)	3142 (66.9)
Private doctors	299 (12.3)	299 (13.2)	598 (12.7)
No use of services	376 (15.5)	400 (17.6)	776 (16.5)
Total	2427 (100)	2272 (100)	4699 (100)

Table A147. Children's utilisation of doctors' services by head of household age

Utilisation	Head of household age					Total (%)
	20-29 years (%)	30-39 years (%)	40-49 years (%)	50-59 years (%)	60+ years (%)	
Both public and private	23 (6.1)	62 (3.6)	47 (3.6)	26 (3.8)	24 (4)	182 (3.9)
Public doctors	236 (62.9)	1080 (61.9)	875 (67.9)	501 (72.3)	448 (75.4)	3140 (66.9)
Private doctors	47 (12.5)	303 (17.4)	162 (12.6)	60 (8.7)	26 (4.4)	598 (12.7)
No use of services	69 (18.4)	299 (17.1)	205 (15.9)	106 (15.3)	96 (16.2)	775 (16.5)
Total	375 (100)	1744 (100)	1289 (100)	693 (100)	594 (100)	4695 (100)

Table A148. Children's utilisation of doctors' services by household size

Utilisation	Household size					Total (%)
	1st quintile (1-5) (%)	2nd quintile (6-7) (%)	3rd quintile (8-9) (%)	4th quintile (10-11) (%)	5th quintile (12+) (%)	
Both public and private doctors	60 (7.5)	39 (3.4)	40 (3.4)	12 (1.6)	32 (4)	183 (3.9)
Public doctors	436 (54.6)	744 (63.9)	831 (69.9)	553 (73.4)	578 (72.6)	3142 (66.9)
Private doctors	168 (21.1)	179 (15.4)	135 (11.4)	58 (7.7)	58 (7.3)	598 (12.7)
No use of services	134 (16.8)	202 (17.4)	182 (15.3)	130 (17.3)	128 (16.1)	776 (16.5)
Total	798 (100)	1164 (100)	1188 (100)	753 (100)	796 (100)	4699 (100)

Table A149. Children's utilisation of doctors' services by the relationship to the head of household

Utilisation	Relationship to head of household		Total (%)
	Son or daughter (%)	Not a son or daughter (%)	
Both public and private doctors	163 (3.7)	20 (6.6)	183 (3.9)
Public doctors	2957 (67.3)	185 (61.3)	3142 (66.9)
Private doctors	563 (12.8)	35 (11.6)	598 (12.7)
No use of services	714 (16.2)	62 (20.5)	776 (16.5)
Total	4397 (100)	302 (100)	4699 (100)

Table A150. Children's utilisation of doctors' services by head of household education

Utilisation	Head of household education						Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary/ diploma (%)	University (%)	
Both pubic and private	19 (2.1)	15 (2.3)	57 (5)	33 (5)	33 (4.3)	26 (4.6)	183 (3.9)
Public	702 (76.5)	449 (70.3)	765 (66.8)	430 (65.3)	460 (60.6)	328 (57.5)	3134 (66.8)
Private	34 (3.7)	43 (6.7)	135 (11.8)	82 (12.5)	176 (23.2)	128 (22.5)	598 (12.8)
No use of services	163 (17.8)	132 (20.7)	188 (16.4)	113 (17.2)	90 (11.9)	88 (15.4)	774 (16.5)
Total	918 (100)	639 (100)	1145 (100)	658 (100)	759 (100)	570 (100)	4689 (100)

Table A151. Children's utilisation of doctors' services by head of household economic activity

Utilisation	Head of household economic activity				Total (%)
	Working (%)	Unemployed (%)	Retired (%)	Doing housework (%)	
Both public and private	167 (4.1)	4 (3.1)	12 (3.5)		183 (3.9)
Public doctors	2717 (66.1)	87 (67.4)	258 (75.2)	72 (67.3)	3134 (66.8)
Private doctors	562 (13.7)	5 (3.9)	20 (5.8)	11 (10.3)	598 (12.8)
No use of services	665 (16.2)	33 (25.6)	53 (15.5)	24 (22.4)	775 (16.5)
Total	4111 (100)	129 (100)	343 (100)	107 (100)	4690 (100)

Table A152. Children's utilisation of doctors' services by head of household occupation

Utilisation	Head of household occupation		Total (%)
	Salaried employee (%)	Non salaried employee (%)	
Both public and private doctors	138 (4.4)	29 (3.2)	167 (4.1)
Public doctors	2062 (65.6)	607 (66.3)	2669 (65.8)
Private doctors	449 (14.3)	92 (10.1)	541 (13.3)
No use of services	494 (15.7)	187 (20.4)	681 (16.8)
Total	3143 (100)	915 (100)	4058 (100)

b) Enabling factors:

Table A153. Children's utilisation of doctors' services by region of residence

Utilisation	Region					Total (%)
	Central (%)	Eastern (%)	Western (%)	Northern (%)	Southern (%)	
Both public and private doctors	38 (3.9)	53 (5.5)	63 (4.4)	2 (0.6)	27 (2.6)	183 (3.9)
Public doctors	642 (66.7)	617 (63.7)	825 (58.1)	266 (84.2)	792 (76.8)	3142 (66.9)
Private doctors	110 (11.4)	170 (17.5)	289 (20.4)	13 (4.1)	16 (1.6)	598 (12.7)
No use of services	173 (18)	129 (13.3)	243 (17.1)	35 (11.1)	196 (19)	776 (16.5)
Total	963 (100)	969 (100)	1420 (100)	316 (100)	1031 (100)	4699 (100)

Table A154. Children's utilisation of doctors' services by urban/rural residence

Utilisation	Urban/rural residence		Total (%)
	Urban (%)	Rural (%)	
Both public and private doctors	132 (4.1)	51 (3.5)	183 (3.9)

Public doctors	1999 (61.7)	1131 (78.2)	3130 (66.8)
Private doctors	571 (17.6)	27 (1.9)	598 (12.8)
No use of services	536 (16.6)	238 (16.4)	774 (16.5)
Total	3238 (100)	1447 (100)	4685 (100)

Table A155. Children's utilisation of doctors' services by the proportion of public doctors/ 10,000

Utilisation	Proportion of public doctors/ 10,000					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Both public and private doctors	29 (3.4)	53 (5.5)	47 (4.8)	19 (2.1)	35 (3.4)	183 (3.9)
Public doctors	555 (65.2)	617 (63.7)	589 (60.7)	607 (68.2)	774 (76)	3142 (66.9)
Private doctors	105 (12.3)	170 (17.5)	184 (18.9)	116 (13)	23 (2.3)	598 (12.7)
No use of services	162 (19)	129 (13.3)	151 (15.6)	148 (16.6)	186 (18.3)	776 (16.5)
Total	851 (100)	969 (100)	971 (100)	890 (100)	1080 (100)	4699 (100)

Table A156. Children's utilisation of doctors' services by the proportion of private doctors'/ 10,000

Utilisation	Proportion of private doctors/ 10,000					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Both public and private doctors	26 (2.9)	62 (4.8)	18 (2.3)	29 (3.4)	48 (5.5)	183 (3.9)
Public doctors	694 (77.8)	872 (67.8)	530 (66.6)	555 (65.2)	491 (56.2)	3142 (66.9)
Private doctors	22 (2.5)	179 (13.9)	110 (13.8)	105 (12.3)	182 (20.8)	598 (12.7)
No use of services	150 (16.8)	174 (13.5)	138 (17.3)	162 (19)	152 (17.4)	776 (16.5)
Total	892 (100)	1287 (100)	796 (100)	851 (100)	873 (100)	4699 (100)

Table A157. Children's utilisation of doctors' services by dwelling type

Utilisation	Dwelling type			Total (%)
	Villa (%)	Duplex or apartment (%)	Traditional or Arabian house (%)	
Both public and private doctors	52 (4.3)	92 (4.6)	39 (2.7)	183 (3.9)
Public doctors	773 (63.9)	1257 (62.8)	1096 (74.6)	3126 (66.8)
Private doctors	191 (15.8)	324 (16.2)	82 (5.6)	597 (12.8)
No use of services	194 (16)	328 (16.4)	253 (17.2)	775 (16.6)
Total	1210	2001	1470	4681

	(100)	(100)	(100)	(100)

Table A158. Children's utilisation of doctors' services by housing tenure

Utilisation	Housing tenure			Total (%)
	Owned or owned jointly (%)	Rented (%)	From the employer/other (%)	
Both public and private doctors	112 (3.5)	51 (4.2)	20 (6.3)	183 (3.9)
Public doctors	2181 (68.9)	731 (60.1)	230 (72.8)	3142 (66.9)
Private doctors	350 (11.1)	229 (18.8)	18 (5.7)	597 (12.7)
No use of services	522 (16.5)	206 (16.9)	48 (15.2)	776 (16.5)
Total	3165 (100)	1217 (100)	316 (100)	4698 (100)

Table A159. Children's utilisation of doctors' services by crowding

Utilisation	Crowding					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Both public and private doctors	62 (5.8)	38 (5)	48 (4.2)	24 (2.9)	11 (1.2)	183 (3.9)
Public doctors	603 (56.2)	461 (60.7)	778 (67.7)	606 (73.2)	693 (78.2)	3141 (66.9)
Private doctors	234 (21.8)	134 (17.6)	133 (11.6)	73 (8.8)	22 (2.5)	596 (12.7)
No use of services	174 (16.2)	127 (16.7)	190 (16.5)	125 (15.1)	160 (18.1)	776 (16.5)
Total	1073 (100)	760 (100)	1149 (100)	828 (100)	886 (100)	4696 (100)

Table A160. Children's utilisation of doctors' services by the houses' floor material

Utilisation	Floor material		Total (%)
	Modern floor (%)	Earth/stone/brick (%)	
Both public and private doctors	182 (4)	1 (0.7)	183 (3.9)
Public doctors	3035 (66.6)	107 (74.3)	3142 (66.9)
Private doctors	598 (13.1)		598 (12.7)
No use of services	740 (16.2)	36 (25)	776 (16.5)
Total	4555 (100)	144 (100)	4699 (100)

Table A161. Children's utilisation of doctors' services by toilet type

Utilisation	Toilet type		Total (%)
	Flush toilet (%)	No flush toilet (%)	
Both public and private doctors	170 (4.4)	13 (1.5)	183 (3.9)

Public doctors	2454 (64.2)	687 (78.5)	3141 (66.9)
Private doctors	584 (15.3)	14 (1.6)	598 (12.7)
No use of services	615 (16.1)	161 (18.4)	776 (16.5)
Total	3823 (100)	875 (100)	4698 (100)

Table A162. Children's utilisation of doctors' services by main drinking water source

Utilisation	Main drinking water source		Total (%)
	Pipe or bottled (%)	Other (%)	
Both public and private doctors	113 (4.7)	70 (3)	183 (3.9)
Public doctor	1447 (60.6)	1695 (73.3)	3142 (66.9)
Private doctor	417 (17.5)	181 (7.8)	598 (12.7)
No use of services	409 (17.1)	367 (15.9)	776 (16.5)
Total	2386 (100)	2313 (100)	4699 (100)

Table A163. Children's utilisation of doctors' services by having electricity

Utilisation	Electricity		Total (%)
	Have electricity (%)	Do not have electricity (%)	
Both public and private doctors	181 (4)	2 (1)	183 (3.9)
Public doctors	2986 (66.5)	154 (73.7)	3140 (66.9)
Private doctors	597 (13.3)	1 (0.5)	598 (12.7)
No use of services	724 (16.1)	52 (24.9)	776 (16.5)
Total	4488 (100)	209 (100)	4697 (100)

Table A164. Children's utilisation of doctors' services by car ownership

Utilisation	Car ownership		Total (%)
	Own a car (%)	Do not own a car (%)	
Both public and private doctors	159 (3.8)	24 (4.5)	183 (3.9)
Public doctors	2777 (66.7)	357 (68.3)	3134 (66.9)
Private doctors	553 (13.3)	44 (8.4)	597 (12.7)
No use of services	674 (16.2)	98 (18.7)	772 (16.5)
Total	4163 (100)	523 (100)	4686 (100)

Table A165. Children's utilisation of doctors' services by having a radio

Utilisation	Radio		Total (%)
	Have a radio (%)	Do not have a radio (%)	
Both public and private doctors	161 (4.2)	19 (2.3)	180 (3.8)
Public doctors	2491 (64.8)	645 (76.6)	3136 (66.9)
Private doctors	556 (14.5)	42 (5)	598 (12.8)
No use of services	639 (16.6)	136 (16.2)	775 (16.5)
Total	3847 (100)	842 (100)	4689 (100)

Table A166. Children's utilisation of doctors' services by having a colour TV

Utilisation	Colour TV		Total (%)
	Have a colour TV (%)	Do not have a colour TV (%)	
Both public and private doctors	172 (4.1)	11 (2.2)	183 (3.9)
Public doctors	2773 (66.2)	364 (71.9)	3137 (66.8)
Private doctors	589 (14.10	9 (1.8)	598 (12.7)
No use of services	653 (15.6)	122 (24.1)	775 (16.5)
Total	4187 (100)	506 (100)	4693 (100)

Table A167. Children's utilisation of doctors' services by having a satellite TV/cable

Utilisation	Satellite TV/cable		Total (%)
	Have a satellite TV/cable (%)	Do not have a satellite TV/cable (%)	
Both public and private doctors	62 (5.7)	121 (3.4)	183 (3.9)
Public doctors	581 (53.7)	2556 (70.8)	3137 (66.5)
Private doctors	261 (24.1)	337 (9.3)	598 (12.7)
No use of services	177 (16.4)	597 (16.5)	774 (16.5)
Total	1081 (100)	3611 (100)	4692 (100)

c) Need factors

Table A168. Children's utilisation of doctors' services by disability due to sickness

Utilisation	Disability due to sickness		Total (%)
	Had a disability (%)	Did not have a disability (%)	
Both public and private doctors	104 (4.6)	76 (3.3)	180 (3.9)
Public doctors	1612	1461	3073

	(70.6)	(62.8)	(66.7)
Private doctors	293 (12.8)	297 (12.8)	590 (12.8)
No use of services	275 (12)	491 (21.1)	766 (16.6)
Total	2284 (100)	2325 (100)	4609 (100)

Table A169. Children's utilisation of doctors' services by number of sick days

Utilisation	Sick days					Total (%)
	0 days (%)	1-2 days (%)	3-4 days (%)	5-6 days (%)	7+ days (%)	
Both public and private	7 (14.6)	21 (1.9)	53 (3.1)	11 (2.7)	91 (6.2)	183 (3.9)
Public doctors	34 (70.8)	710 (65.9)	1177 (69.3)	277 (69.1)	944 (64)	3142 (66.9)
Private doctors	4 (8.3)	103 (9.6)	202 (11.9)	51 (12.7)	238 (16.1)	598 (12.7)
No use of services	3 (6.3)	243 (22.6)	267 (15.7)	62 (15.5)	201 (13.6)	776 (16.5)
Total	48 (100)	1077 (100)	1699 (100)	401 (100)	1474 (100)	4699 (100)

The cross tabulations of children's utilisation of health services in response to diarrrhoea by the independent variables:

a) Predisposing factors:

Table A170. Children's utilisation of health services in response to diarrhoea by age

Utilisation	Age					Total (%)
	Less than 1 year (%)	1 year (%)	2 years (%)	3 years (%)	4 years (%)	
Public services	151 (56.8)	153 (48)	79 (50.6)	56 (60.9)	29 (46.8)	468 (52.3)
Private services	24 (9)	35 (11)	15 (9.6)	5 (5.4)	2 (3.2)	81 (9.1)
No use of services	91 (34.2)	131 (41.1)	62 (39.7)	31 (33.7)	31 (50)	346 (38.7)
Total	266 (100)	319 (100)	156 (100)	92 (100)	62 (100)	895 (100)

Table A171. Children's utilisation of health services in response to diarrhoea by gender

Utilisation	Gender		Total (%)
	Male (%)	Female (%)	
Public services	244 (52.1)	224 (52.5)	468 (52.3)
Private services	44 (9.4)	37 (8.7)	81 (9.1)
No use of services	180 (38.5)	166 (38.9)	346 (38.7)
Total	468 (100)	427 (100)	895 (100)

Table A172. Children's utilisation of health services in response to diarrhoea by birth order

Utilisation	Birth order				Total (%)
	1 (%)	2-3 (%)	4-5 (%)	6+ (%)	
Public services	68 (49.3)	112 (45.2)	91 (49.2)	197 (60.8)	468 (52.3)
Private services	17 (12.3)	32 (12.9)	20 (10.8)	12 (3.7)	81 (9.1)
No use of services	53 (38.4)	104 (41.9)	74 (40)	115 (35.5)	346 (38.7)
Total	138 (100)	248 (100)	185 (100)	324 (100)	895 (100)

Table A173. Children's utilisation of health services in response to diarrhoea by mothers' age

Utilisation	Mother's age				Total (%)
	15-24 years	25-34 years	35-44 years	45+ years	
Public services	128 (53.6)	196 (45.4)	126 (66.3)	17 (53.1)	467 (52.3)
Private services	28 (11.7)	44 (10.2)	7 (3.7)	2 (6.3)	81 (9.1)
No use of services	83 (34.7)	192 (44.4)	57 (30)	13 (40.6)	345 (38.6)

Total	239 (100)	432 (100)	190 (100)	32 (100)	893 (100)

Table A174. Children's utilisation of health services in response to diarrhoea by head of household age

Utilisation	Head of household age					Total (%)
	20-29 years (%)	30-39 years (%)	40-49 years (%)	50-59 years (%)	60+ years (%)	
Public services	74 (49)	155 (47.5)	124 (56.6)	62 (56.9)	52 (58.4)	467 (52.2)
Private services	13 (8.6)	43 (13.2)	11 (5)	10 (9.2)	4 (4.5)	81 (9.1)
No use of services	64 (42.4)	128 (39.3)	84 (38.4)	37 (33.9)	33 (37.1)	346 (38.7)
Total	151 (100)	326 (100)	219 (100)	109 (100)	89 (100)	894 (100)

Table A175. Children's utilisation of health services in response to diarrhoea by household size

Utilisation	Household size					Total (%)
	1st quintile (1-5) (%)	2nd quintile (6-7) (%)	3rd quintile (8-9) (%)	4th quintile (10-11) (%)	5th quintile (12+) (%)	
Public services	111 (46.1)	100 (50.3)	93 (52.8)	90 (58.4)	74 (59.2)	468 (52.3)
Private services	33 (13.7)	19 (9.5)	18 (10.2)	5 (3.2)	6 (4.8)	81 (9.1)
No use of services	97 (40.2)	80 (40.2)	65 (36.9)	59 (38.3)	45 (36)	346 (38.7)
Total	241 (100)	199 (100)	176 (100)	154 (100)	125 (100)	895 (100)

Table A176. Children's utilisation of health services in response to diarrhoea by mothers' education

Utilisation	Mother's education					Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary and above (%)	
Public services	203 (60.6)	83 (57.6)	90 (53.3)	42 (42.9)	48 (33.1)	466 (52.3)
Private services	10 (3)	8 (5.6)	15 (8.9)	14 (14.3)	34 (23.4)	81 (9.1)
No use of services	344 (38.6)	53 (36.8)	64 (37.9)	42 (42.9)	63 (43.4)	344 (38.6)
Total	891 (100)	144 (100)	169 (100)	98 (100)	145 (100)	891 (100)

Table A177. Children's utilisation of health services in response to diarrhoea by mothers' economic activity

Utilisation	Mother's economic activity			Total (%)
	Doing housework (%)	Working (%)	Other (%)	
Public services	413 (53.6)	26 (40)	29 (48.3)	468 (52.3)
Private services	66 (8.6)	8 (12.3)	7 (11.7)	81 (9.1)
No use of services	291 (37.8)	31 (47.7)	24 (40)	346 (38.7)

Total	770 (100)	65 (100)	60 (100)	895 (100)

Table A178. Children's utilisation of health services in response to diarrhoea by head of household education

Utilisation	Head of household education						Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary/ diploma (%)	University (%)	
Public services	89 (54.6)	96 (62.7)	118 (53.2)	64 (53.8)	71 (47)	29 (34.9)	467 (52.4)
Private services	8 (4.9)	6 (3.9)	15 (6.8)	12 (10.1)	25 (16.6)	15 (18.1)	81 (9.1)
No use of services	66 (40.5)	51 (33.3)	89 (40.1)	43 (36.1)	55 (36.4)	39 (47)	343 (38.5)
Total	163 (100)	153 (100)	222 (100)	119 (100)	151 (100)	83 (100)	891 (100)

Table A179. Children's utilisation of health services in response to diarrhoea by head of household economic activity

Utilisation	Head of household economic activity		Total (%)
	Working (%)	Not working (%)	
Public services	413 (52.5)	55 (50.5)	468 (52.3)
Private services	69 (8.8)	12 (11)	81 (9.1)
No use of services	304 (38.7)	42 (38.5)	346 (38.7)
Total	786 (100)	109 (100)	895 (100)

Table A180. Children's utilisation of health services in response to diarrhoea by a child's health rating

Utilisation	Child's health rating			Total (%)
	Excellent/good (%)	Normal (%)	Ill from time to time/ often ill (%)	
Public services	165 (55)	205 (53.1)	98 (47.1)	468 (52.3)
Private services	23 (7.7)	32 (8.3)	26 (12.5)	81 (9.1)
No use of services	112 (37.3)	149 (38.6)	84 (40.4)	345 (38.6)
Total	300 (100)	386 (100)	208 (100)	894 (100)

b) Enabling factors

Table A181. Children's utilisation of health services in response to diarrhoea by region of residence

Utilisation	Region					Total (%)
	Central (%)	Eastern (%)	Western (%)	Northern (%)	Southern (%)	
Public services	91 (49.2)	46 (44.2)	163 (50.6)	42 (63.6)	126 (57.8)	468 (52.3)

Private services	15 (8.1)	11 (10.6)	43 (13.4)	3 (4.5)	9 (4.1)	81 (9.1)
No use of services	79 (42.7)	47 (45.2)	116 (36)	21 (31.8)	83 (38.1)	346 (38.7)
Total	185 (100)	104 (100)	322 (100)	66 (100)	218 (100)	895 (100)

Table A182. Children's utilisation of health services in response to diarrhoea by urban/rural residence

Utilisation	Urban/rural residence		Total (%)
	Urban (%)	Rural (%)	
Public services	279 (46.4)	189 (64.3)	468 (52.3)
Private services	73 (12.1)	8 (2.7)	81 (9.1)
No use of services	249 (41.4)	97 (33)	346 (38.7)
Total	601 (100)	294 (100)	895 (100)

Table A183. Children's utilisation of health services in response to diarrhoea by dwelling type

Utilisation	Dwelling type			Total (%)
	Villa (%)	Duplex or apartment (%)	Traditional or Arabian house (%)	
Public services	81 (45)	185 (49.3)	200 (59.2)	466 (52.2)
Private services	10 (5.6)	59 (15.7)	12 (3.6)	81 (9.1)
No use of services	89 (49.4)	131 (34.9)	126 (37.3)	346 (38.7)
Total	180 (100)	375 (100)	338 (100)	893 (100)

Table A184. Children's utilisation of health services in response to diarrhoea by housing tenure

Utilisation	Housing tenure			Total (%)
	Owned or owned jointly (%)	Rented (%)	From the employer/other (%)	
Public services	330 (54.8)	125 (47)	13 (48.1)	468 (52.3)
Private services	43 (7.1)	37 (13.9)	1 (3.7)	81 (9.1)
No use of services	229 (38)	104 (39.1)	13 (48.1)	346 (38.7)
Total	602 (100)	266 (100)	27 (100)	895 (100)

Table A185. Children's utilisation of health services in response to diarrhoea by crowding

Utilisation	Crowding					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Public services	90 (41.5)	83 (51.6)	92 (49.2)	103 (64.4)	98 (58.3)	466 (52.2)
Private	33	16	21	5	6	81

services	(15.2)	(9.9)	(11.2)	(3.1)	(3.6)	(9.1)
No use of services	94 (43.3)	62 (38.5)	74 (39.6)	52 (32.5)	64 (38.1)	346 (38.7)
Total	217 (100)	161 (100)	187 (100)	160 (100)	168 (100)	893 (100)

Table A186. Children's utilisation of health services in response to diarrhoea by the houses' floor material

Utilisation	Floor material		Total (%)
	Modern floor (%)	Earth/stone/brick (%)	
Public services	442 (51.4)	26 (74.3)	468 (52.3)
Private services	81 (9.4)		81 (9.1)
No use of services	337 (39.2)	9 (25.7)	346 (38.7)
Total	860 (100)	35 (100)	895 (100)

Table A187. Children's utilisation of health services in response to diarrhoea by toilet type

Utilisation	Toilet type		Total (%)
	Flush toilet (%)	No flush toilet (%)	
Public services	325 (47.9)	143 (65.9)	468 (52.3)
Private services	78 (11.5)	3 (1.4)	81 (9.1)
No use of services	275 (40.6)	71 (32.7)	346 (38.7)
Total	678 (100)	217 (100)	895 (100)

Table A188. Children's utilisation of health services in response to diarrhoea by main drinking water source

Utilisation	Main drinking water source		Total (%)
	Pipe or bottled (%)	Other (%)	
Public services	200 (45.7)	268 (58.6)	468 (52.3)
Private services	54 (12.3)	27 (5.9)	81 (9.1)
No use of services	184 (42)	162 (35.4)	346 (38.7)
Total	438 (100)	457 (100)	895 (100)

Table A189. Children's utilisation of health services in response to diarrhoea by having electricity

Utilisation	Electricity		Total (%)
	Have electricity (%)	Do not have electricity (%)	
Public services	439 (52.3)	28 (50.9)	467 (52.2)
Private services	80 (9.5)	1 (1.8)	81 (9.1)
No use of services	320	26	346

	(38.1)	(47.3)	(38.7)
Total	839 (100)	55 (100)	895 (100)

Table A190. Children's utilisation of health services in response to diarrhoea by car ownership

Utilisation	Car ownership		Total (%)
	Own a car (%)	Do not own a car (%)	
Public services	408 (52.2)	58 (53.7)	466 (52.4)
Private services	70 (9)	11 (10.2)	81 (9.1)
No use of services	304 (38.9)	39 (36.1)	343 (38.5)
Total	782 (100)	108 (100)	890 (100)

Table A191. Children's utilisation of health services in response to diarrhoea by having a radio

Utilisation	Radio		Total (%)
	Have a radio (%)	Do not have a radio (%)	
Public services	349 (50.7)	117 (57.6)	466 (52.3)
Private services	74 (10.8)	7 (3.4)	81 (9.1)
No use of services	265 (38.5)	79 (38.9)	344 (38.6)
Total	688 (100)	203 (100)	891 (100)

Table A192. Children's utilisation of health services in response to diarrhoea by having a colour TV

Utilisation	Colour TV		Total (%)
	Have a colour TV (%)	Do not have a colour TV (%)	
Public services	399 (52)	67 (53.6)	466 (52.2)
Private services	76 (9.9)	5 (4)	81 (9.1)
No use of services	292 (38.1)	53 (42.4)	345 (38.7)
Total	767 (100)	125 (100)	892 (100)

Table A193. Children's utilisation of health services in response to diarrhoea by having a satellite TV/cable

Utilisation	Satellite TV/cable		Total (%)
	Have a satellite TV/cable (%)	Do not have a satellite TV/cable (%)	
Public services	81 (41.5)	383 (55.1)	464 (52.1)
Private services	38 (19.5)	43 (6.2)	81 (9.1)
No use of services	76 (39)	269 (38.7)	345 (38.8)
Total	195	695	890

	(100)	(100)	(100)

Table A194. Children's utilisation of health services in response to diarrhoea by number of sick days

Utilisation	Sick days				Total (%)
	0-2 days (%)	3-4 days (%)	5-6 days (%)	7+ days (%)	
Public services	56 (39.4)	128 (59)	31 (75.6)	69 (60)	284 (55.1)
Private services	9 (6.3)	21 (9.7)	4 (9.8)	18 (15.7)	52 (10.1)
No use of services	77 (54.2)	68 (31.3)	6 (14.6)	28 (24.3)	179 (34.8)
Total	142 (100)	217 (100)	41 (100)	115 (100)	515 (100)

The cross tabulations of children's utilisation of health services in response to acute respiratory infections by the independent variables:

a) Predisposing factors:

Table A195. Children's utilisation of health services in response to acute respiratory infections by age

Utilisation	Age					Total (%)
	Less than 1 year (%)	1 year (%)	2 years (%)	3 years (%)	4 years (%)	
Public services	329 (64.1)	411 (68.4)	401 (68.2)	350 (71)	364 (69.1)	1855 (68.1)
Private services	84 (16.4)	79 (13.1)	70 (11.9)	50 (10)	60 (11.4)	343 (12.6)
No use of services	100 (19.5)	111 (18.5)	117 (19.9)	93 (18.9)	103 (19.5)	524 (19.3)
Total	513 (100)	601 (100)	588 (100)	493 (100)	527 (100)	2722 (100)

Table A196. Children's utilisation of health services in response to acute respiratory infections by gender

Utilisation	Gender		Total (%)
	Male (%)	Female (%)	
Public services	1006 (68)	849 (68.3)	1855 (68.1)
Private services	187 (12.6)	156 (12.6)	343 (12.6)
No use of services	286 (19.3)	238 (19.1)	524 (19.3)
Total	1479 (100)	1243 (100)	2722 (100)

Table A197. Children's utilisation of health services in response to acute respiratory infections by birth order

Utilisation	Birth order				Total (%)
	1 (%)	2-3 (%)	4-5 (%)	6+ (%)	
Public services	213 (59.2)	438 (62.8)	420 (67.4)	784 (75.3)	1855 (68.1)
Private services	73 (20.3)	106 (15.2)	85 (13.6)	79 (7.6)	343 (12.6)
No use of services	74 (20.6)	154 (22.1)	118 (18.9)	178 (17.1)	524 (19.3)
Total	360 (100)	698 (100)	623 (100)	1041 (100)	2722 (100)

Table A198. Children's utilisation of health services in response to acute respiratory infections by household size

Utilisation	Household size					Total (%)
	1st quintile (1-5) (%)	2nd quintile (6-7) (%)	3rd quintile (8-9) (%)	4th quintile (10-11) (%)	5th quintile (12+) (%)	
Public services	353 (58.7)	414 (66.5)	401 (68.9)	338 (77.5)	349 (72.7)	1855 (68.1)

Private services	119 (19.8)	87 (14)	70 (12)	33 (7.6)	34 (7.1)	343 (12.6)
No use of services	129 (21.5)	122 (19.6)	111 (19.1)	65 (14.9)	97 (20.2)	524 (19.3)
Total	601 (100)	623 (100)	582 (100)	436 (100)	480 (100)	2722 (100)

Table A199. Children's utilisation of health services in response to acute respiratory infections by mothers' age

Utilisation	Mother's age				Total (%)
	15-24 years	25-34 years	35-44 years	45+ years	
Public services	319 (63.2)	962 (66.8)	506 (74.7)	61 (67.8)	1848 (68.1)
Private services	72 (14.3)	175 (12.2)	87 (12.9)	9 (10)	343 (12.6)
No use of services	114 (22.6)	303 (21)	84 (12.4)	20 (22.2)	521 (19.2)
Total	505 (100)	1440 (100)	677 (100)	90 (100)	2712 (100)

Table A200. Children's utilisation of health services in response to acute respiratory infections by head of household age

Utilisation	Head of household age					Total (%)
	20-29 years (%)	30-39 years (%)	40-49 years (%)	50-59 years (%)	60+ years (%)	
Public services	191 (55.7)	690 (65.5)	515 (72.8)	262 (75.7)	196 (72.6)	1854 (68.2)
Private services	59 (17.2)	163 (15.5)	74 (10.5)	31 (9)	16 (5.9)	343 (12.6)
No use of services	93 (27.1)	201 (19.1)	118 (16.7)	53 (15.3)	58 (21.5)	523 (19.2)
Total	343 (100)	1054 (100)	707 (100)	346 (100)	270 (100)	2720 (100)

Table A201. Children's utilisation of health services in response to acute respiratory infections by mothers' education

Utilisation	Mother's education					Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary and above (%)	
Public services	765 (77.6)	310 (72.6)	362 (69.1)	180 (61)	228 (48)	1845 (68.2)
Private services	42 (4.3)	26 (6.1)	66 (12.6)	64 (21.7)	144 (30.3)	342 (12.6)
No use of services	179 (18.2)	91 (21.3)	96 (18.3)	51 (17.3)	103 (21.7)	520 (19.2)
Total	986 (100)	427 (100)	524 (100)	295 (100)	475 (100)	2707 (100)

Table A202. Children's utilisation of health services in response to acute respiratory infections by mothers' economic activity

Utilisation	Mother's economic activity			Total (%)
	Doing housework (%)	Working (%)	Other (%)	
Public services	1613 (68.9)	126 (57.8)	116 (70.7)	1855 (68.1)
Private services	270 (11.5)	50 (22.9)	23 (14)	343 (12.6)
No use of services	457 (19.5)	42 (19.3)	25 (15.2)	524 (19.3)
Total	2340 (100)	218 (100)	164 (100)	2722 (100)

Table A203. Children's utilisation of health services in response to acute respiratory infections by head of household education

Utilisation	Head of household education						Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary/ diploma (%)	University (%)	
Public services	382 (76.2)	258 (70.5)	478 (72.1)	306 (69.5)	249 (56.1)	178 (59.3)	1851 (68.2)
Private services	19 (3.8)	30 (8.2)	77 (11.6)	58 (13.2)	103 (23.2)	56 (18.7)	343 (12.6)
No use of services	100 (20)	78 (21.3)	108 (16.3)	76 (17.3)	92 (20.7)	66 (22)	520 (19.2)
Total	501 (100)	366 (100)	663 (100)	440 (100)	444 (100)	300 (100)	2714 (100)

Table A204. Children's utilisation of health services in response to acute respiratory infections by head of household economic activity

Utilisation	Head of household economic activity		Total (%)
	Working (%)	Not working (%)	
Public services	1629 (67.6)	225 (72.1)	1854 (68.1)
Private services	322 (13.4)	21 (6.7)	343 (12.6)
No use of services	458 (19)	66 (21.2)	524 (19.3)
Total	2409 (100)	312 (100)	2721 (100)

Table A205. Children's utilisation of health services in response to acute respiratory infections by a child's health rating

Utilisation	Child's health rating			Total (%)
	Excellent/good (%)	Normal (%)	Ill from time to time/ often ill (%)	
Public services	575 (70.3)	901 (68.1)	379 (65.3)	1855 (68.1)
Private services	90 (11)	161 (12.2)	92 (15.9)	343 (12.6)
No use of services	153 (18.7)	262 (19.8)	109 (18.8)	524 (19.3)

Total	818 (100)	1324 (100)	580 (100)	2722 (100)

b) enabling factors:

Table A206. Children's utilisation of health services in response to acute respiratory infections by region of residence

Utilisation	Region					Total (%)
	Central (%)	Eastern (%)	Western (%)	Northern (%)	Southern (%)	
Public services	401 (68.3)	300 (62.6)	509 (61.3)	178 (77.1)	467 (78.5)	1855 (68.1)
Private services	61 (10.4)	101 (21.1)	153 (18.4)	11 (4.8)	17 (2.9)	343 (12.6)
No use of services	125 (21.3)	78 (16.3)	168 (20.2)	42 (18.2)	111 (18.7)	524 (19.3)
Total	587 (100)	479 (100)	830 (100)	231 (100)	595 (100)	2722 (100)

Table A207. Children's utilisation of health services in response to acute respiratory infections by urban/rural residence

Utilisation	Urban/rural residence		Total (%)
	Urban (%)	Rural (%)	
Public services	1180 (63.3)	675 (78.6)	1855 (68.1)
Private services	328 (17.6)	15 (1.7)	343 (12.6)
No use of services	355 (19.1)	169 (19.7)	524 (19.3)
Total	1863 (100)	859 (100)	2722 (100)

Table A208. Children's utilisation of health services in response to acute respiratory infections by dwelling type

Utilisation	Dwelling type			Total (%)
	Villa (%)	Duplex or apartment (%)	Traditional or Arabian house (%)	
Public services	443 (68.3)	740 (64.1)	665 (73)	1848 (68.1)
Private services	98 (15.1)	195 (16.9)	50 (5.5)	343 (12.6)
No use of services	108 (16.6)	219 (19)	196 (21.5)	523 (19.3)
Total	649 (100)	1154 (100)	911 (100)	2714 (100)

Table A209. Children's utilisation of health services in response to acute respiratory infections by housing tenure

Utilisation	Housing tenure			Total (%)
	Owned or owned jointly (%)	Rented (%)	From the employer/other (%)	
Public services	1268 (69.4)	481 (64.8)	106 (69.3)	1855 (68.1)
Private services	195 (10.7)	131 (17.7)	17 (11.1)	343 (12.6)
No use of services	364 (19.9)	130 (17.5)	30 (19.6)	524 (19.3)
Total	1827 (100)	742 (100)	153 (100)	2722 (100)

Table A210. Children's utilisation of health services in response to acute respiratory infections by crowding

Utilisation	Crowding					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Public services	350 (57.2)	342 (62)	410 (71.4)	366 (75.9)	386 (77.2)	1854 (68.2)
Private services	128 (20.9)	105 (19)	70 (12.2)	26 (5.4)	14 (2.8)	343 (12.6)
No use of services	134 (21.9)	105 (19)	94 (16.4)	90 (18.7)	100 (20)	523 (19.2)
Total	612 (100)	552 (100)	574 (100)	482 (100)	500 (100)	2720 (100)

Table A211. Children's utilisation of health services in response to acute respiratory infections by the houses' floor material

Utilisation	Floor material		Total (%)
	Modern floor (%)	Earth/stone/brick (%)	
Public services	1767 (67.7)	88 (77.9)	1855 (68.1)
Private services	342 (13.1)	1 (0.9)	343 (12.6)
No use of services	500 (19.2)	24 (21.2)	524 (19.3)
Total	2609 (100)	113 (100)	2722 (100)

Table A212. Children's utilisation of health services in response to acute respiratory infections by toilet type

Utilisation	Toilet type		Total (%)
	Flush toilet (%)	No flush toilet (%)	
Public services	1416 (65.6)	437 (77.8)	1853 (68.1)
Private services	329 (15.2)	14 (2.5)	343 (12.6)
No use of services	413 (19.1)	111 (19.8)	524 (19.3)
Total	2158 (100)	562 (100)	2720 (100)

Table A213. Children's utilisation of health services in response to acute respiratory infections by main drinking water source

Utilisation	Main drinking water source		Total (%)
	Pipe or bottled (%)	Other (%)	
Public services	860 (63.3)	995 (72.9)	1855 (68.1)
Private services	242 (17.8)	101 (7.4)	343 (12.6)
No use of services	256 (18.9)	268 (19.6)	524 (19.3)
Total	1358 (100)	1364 (100)	2722 (100)

Table A214. Children's utilisation of health services in response to acute respiratory infections by having electricity

Utilisation	Electricity		Total (%)
	Have electricity (%)	Do not have electricity (%)	
Public services	1740 (68)	112 (69.1)	1852 (68.1)
Private services	339 (13.3)	4 (2.5)	343 (12.6)
No use of services	478 (18.7)	46 (28.4)	524 (19.3)
Total	2557 (100)	162 (100)	2719 (100)

Table A215. Children's utilisation of health services in response to acute respiratory infections by car ownership

Utilisation	Car ownership		Total (%)
	Own a car (%)	Do not own a car (%)	
Public services	1661 (68.6)	188 (65.5)	1849 (68.3)
Private services	318 (13.1)	21 (7.3)	339 (12.5)
No use of services	442 (18.3)	78 (27.2)	520 (19.2)
Total	2421 (100)	287 (100)	2708 (100)

Table A216. Children's utilisation of health services in response to acute respiratory infections by having a radio

Utilisation	Radio		Total (%)
	Have a radio (%)	Do not have a radio (%)	
Public services	1442 (66.6)	408 (74.9)	1850 (68.2)
Private services	311 (14.4)	28 (5.1)	339 (12.5)
No use of services	413 (19.1)	109 (20)	522 (19.3)
Total	2166 (100)	545 (100)	2711 (100)

Table A217. Children's utilisation of health services in response to acute respiratory infections by having a colour TV

Utilisation	Colour TV		Total (%)
	Have a colour TV (%)	Do not have a colour TV (%)	
Public services	1600 (67.7)	252 (71.4)	1852 (68.2)
Private services	335 (14.2)	7 (2)	342 (12.6)
No use of services	428 (18.1)	94 (26.6)	522 (19.2)
Total	2363 (100)	353 (100)	2716 (100)

Table A218. Children's utilisation of health services in response to acute respiratory infections by having a satellite TV/cable

Utilisation	Satellite TV/cable		Total (%)
	Have a satellite TV/cable (%)	Do not have a satellite TV/cable (%)	
Public services	318 (56)	1534 (71.4)	1852 (68.2)
Private services	146 (25.7)	196 (9.1)	342 (12.6)
No use of services	104 (18.3)	418 (19.5)	522 (19.2)
Total	568 (100)	2148 (100)	2716 (100)

Table A219. Children's utilisation of health services in response to acute respiratory infections by having a difficulty in breathing

Utilisation	Difficulty in breathing		Total (%)
	Suffered from difficulties in breathing (%)	Did not suffer from difficulties in breathing (%)	
Public services	609 (72.2)	1232 (66.2)	1841 (68.1)
Private services	130 (15.4)	212 (11.4)	342 (12.6)
No use of services	105 (12.4)	417 (22.4)	522 (19.3)
Total	844 (100)	1861 (100)	2705 (100)

Table A220. Children's utilisation of health services in response to acute respiratory infections by number of sick days

Utilisation	Sick days				Total (%)
	0-2 days (%)	3-4 days (%)	5-6 days (%)	7+ days (%)	
Public services	238 (60.7)	560 (66.4)	211 (73.5)	846 (70.6)	1855 (68.1)
Private services	31 (7.9)	103 (12.2)	29 (10.1)	180 (15)	343 (12.6)
No use of	123	181	47	173	524

services	(31.4)	(21.4)	(16.4)	(14.4)	(19.3)
Total	392 (100)	844 (100)	287 (100)	1199 (100)	2722 (100)

The cross tabulations of the utilisation of prenatal care services by the independent variables:

a) predisposing factors:

Table A221. Utilisation of prenatal care services by mothers' age

Utilisation	Mother's age				Total (%)
	15-24 years	25-34 years	35-44 years	45+ years	
Did not have prenatal care	92 (6.6)	236 (7.2)	121 (7.3)	22 (12.3)	471 (7.2)
Had prenatal care	1301 (93.4)	3040 (92.8)	1531 (92.7)	157 (87.7)	6029 (92.8)
Total	1393 (100)	3276 (100)	1652 (100)	179 (100)	6500 (100)

Table A222. Utilisation of prenatal care services by fathers' age

Utilisation	Father's age					Total (%)
	20-29 years (%)	30-39 years (%)	40-49 years (%)	50-59 years (%)	60+ years (%)	
Did not have prenatal care	64 (5.9)	164 (6.5)	112 (7)	66 (10.4)	58 (10.1)	464 (7.2)
Had prenatal care	1014 (94.1)	2362 (93.5)	1481 (93)	568 (89.6)	515 (89.9)	5940 (92.8)
Total	1078 (100)	2526 (100)	1593 (100)	573 (100)	573 (100)	6404 (100)

Table A223. Utilisation of prenatal care services by birth order

Utilisation	Birth order					Total (%)
	1 (%)	2-3 (%)	4-5 (%)	6-7 (%)	8+ (%)	
Did not have prenatal care	40 (5)	94 (5.9)	109 (7.7)	97 (8)	131 (8.9)	471 (7.2)
Had prenatal care	761 (95)	1509 (94.1)	1307 (92.3)	1111 (92)	1341 (91.1)	6029 (92.8)
Total	801 (100)	1603 (100)	1416 (100)	1208 (100)	1472 (100)	6500 (100)

Table A224. Utilisation of prenatal care services by by household size

Utilisation	Household size					Total (%)
	1st quintile (1-6) (%)	2nd quintile (7-8) (%)	3rd quintile (9) (%)	4th quintile (10-11) (%)	5th quintile (12+) (%)	
Did not have prenatal care	125 (5.9)	83 (6.4)	56 (8.3)	98 (9)	99 (8.4)	461 (7.2)
Had prenatal care	1988 (94.1)	1224 (93.6)	618 (91.7)	991 (91)	1080 (91.6)	5901 (92.8)
Total	2113 (100)	1307 (100)	674 (100)	1089 (100)	1179 (100)	6362 (100)

Table A225. Utilisation of prenatal care services by mothers' education

Utilisation	Mother's education					Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary and above (%)	
Did not have prenatal care	295 (10.9)	61 (6.6)	55 (4.7)	28 (4.3)	29 (2.8)	468 (7.2)
Had prenatal care	2405 (89.1)	866 (93.4)	1107 (95.3)	629 (95.7)	1009 (97.2)	6016 (92.8)
Total	2700 (100)	927 (100)	1162 (100)	657 (100)	1038 (100)	6484 (100)

Table A226. Utilisation of prenatal care services by by mothers' economic activity

Utilisation	Mother's economic activity			Total (%)
	Doing housework (%)	Working (%)	Other (%)	
Did not have prenatal care	432 (7.8)	19 (3.7)	20 (4.2)	471 (7.2)
Had prenatal care	5087 (92.2)	490 (96.3)	452 (95.8)	6029 (92.8)
Total	5519 (100)	509 (100)	472 (100)	6500 (100)

Table A227. Utilisation of prenatal care services by fathers' education

Utilisation	Father's education					Total (%)
	Read (%)	Primary (%)	Preparatory (%)	Secondary/diploma (%)	University (%)	
Did not have prenatal care	30 (12.8)	137 (7.4)	44 (14.1)	64 (5.3)	27 (3.6)	302 (5.9)
Had prenatal care	205 (87.2)	1715 (92.6)	1021 (95.9)	1146 (94.7)	717 (96.4)	4804 (94.1)
Total	235 (100)	1852 (100)	1065 (100)	1210 (100)	744 (100)	5106 (100)

b) Enabling factors:

Table A228. Utilisation of prenatal care services by region of residence

Utilisation	Region					Total (%)
	Central (%)	Eastern (%)	Western (%)	Northern (%)	Southern (%)	
Did not have prenatal care	115 (6.9)	63 (6.4)	176 (8.9)	53 (8.3)	64 (5.1)	471 (7.2)
Had prenatal care	1541 (93.1)	915 (93.6)	1803 (91.1)	588 (91.7)	1182 (94.9)	6029 (92.8)
Total	1656 (100)	978 (100)	1979 (100)	641 (100)	1246 (100)	6500 (100)

Table A229. Utilisation of prenatal care services by urban/rural residence

Utilisation	Urban/rural residence		Total (%)
	Urban (%)	Rural (%)	
Did not have prenatal care	283 (6.3)	188 (9.3)	471 (7.2)
Had prenatal care	4202 (93.7)	1827 (90.7)	6029 (92.8)
Total	4485 (100)	2015 (100)	6500 (100)

Table A230. Utilisation of prenatal care services by dwelling type

Utilisation	Dwelling type			Total (%)
	Villa (%)	Duplex or apartment (%)	Traditional or Arabian house (%)	
Did not have prenatal care	82 (5.4)	133 (5.3)	240 (10.4)	455 (7.2)
Had prenatal care	1444 (94.6)	2365 (94.7)	2067 (89.6)	5876 (92.8)
Total	1526 (100)	2498 (100)	2307 (100)	6331 (100)

Table A231. Utilisation of prenatal care services by by housing tenure

Utilisation	Housing tenure			Total (%)
	Owned or owned jointly (%)	Rented (%)	From the employer/other (%)	
Did not have prenatal care	344 (8)	92 (5.4)	23 (7.1)	459 (7.2)
Had prenatal care	3972 (92)	1626 (94.6)	300 (92.9)	5898 (92.8)
Total	4316 (100)	1718 (100)	323 (100)	6357 (100)

Table A232. Utilisation of prenatal care services by crowding

Utilisation	Crowding					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Did not have prenatal care	66 (4.4)	89 (6.3)	48 (5.1)	121 (8.5)	135 (12.7)	459 (7.2)
Had prenatal care	1449 (95.6)	1334 (93.7)	890 (94.9)	1295 (91.5)	924 (87.3)	5892 (92.8)
Total	1515 (100)	1423 (100)	938 (100)	1416 (100)	1059 (100)	6351 (100)

Table A233. Utilisation of prenatal care services by the houses' floor material

Utilisation	Floor material		Total (%)
	Modern floor (%)	Earth/stone/brick (%)	
Did not have prenatal care	425 (6.8)	46 (16.1)	471 (7.2)
Had prenatal care	5790 (93.2)	239 (83.9)	6029 (92.8)
Total	6215	285	6500

	(100)	(100)	(100)

Table A234. Utilisation of prenatal care services by toilet type

Utilisation	Toilet type		Total (%)
	Flush toilet (%)	No flush toilet (%)	
Did not have prenatal care	289 (5.9)	182 (11.6)	471 (7.2)
Had prenatal care	4646 (94.1)	1383 (88.4)	6029 (92.8)
Total	4935 (100)	1565 (100)	6500 (100)

Table A235. Utilisation of prenatal care services by main drinking water source

Utilisation	Main drinking water source		Total (%)
	Pipe or bottled (%)	Other (%)	
Did not have prenatal care	187 (6)	274 (8.4)	461 (7.2)
Had prenatal care	2930 (94)	2971 (91.6)	5901 (92.8)
Total	3117 (100)	3245 (100)	6362 (100)

Table A236. Utilisation of prenatal care services by having electricity

Utilisation	Electricity		Total (%)
	Have electricity (%)	Do not have electricity (%)	
Did not have prenatal care	395 (6.6)	76 (14.5)	471 (7.2)
Had prenatal care	5581 (93.4)	448 (85.5)	6029 (92.8)
Total	5976 (100)	524 (100)	6500 (100)

Table A237. Utilisation of prenatal care services by car ownership

Utilisation	Car ownership		Total (%)
	Own a car (%)	Do not own a car (%)	
Did not have prenatal care	391 (6.9)	67 (10.2)	458 (7.2)
Had prenatal care	5288 (93.1)	587 (89.8)	5875 (92.8)
Total	5679 (100)	654 (100)	6333 (100)

Table A238. Utilisation of prenatal care services by mothers' daily radio listening

Utilisation	Mother's daily radio listening		Total (%)
	Listens daily (%)	Does not listen daily (%)	
Did not have prenatal care	168 (5.8)	303 (8.4)	471 (7.3)
Had prenatal care	2713 (94.2)	3307 (91.6)	6020 (92.7)

Total	2881 (100)	3610 (100)	6491 (100)

Table A239. Utilisation of prenatal care services by mothers' television watching

Utilisation	Mother's television watching		Total (%)
	Watches TV (%)	Does not watch TV (%)	
Did not have prenatal care	341 (6.2)	130 (13.4)	471 (7.3)
Had prenatal care	5178 (93.8)	840 (86.6)	6018 (92.7)
Total	5519 (100)	970 (100)	6489 (100)

Table A240. Utilisation of prenatal care services by mothers' weekly newspapers/magazine reading

Utilisation	Mother's weekly newspapers/magazine reading		Total (%)
	Reads weekly (%)	Does not read weekly (%)	
Did not have prenatal care	100 (3.7)	53 (5.1)	153 (4.1)
Had prenatal care	2570 (96.3)	978 (94.9)	3548 (95.9)
Total	2670 (100)	1031 (100)	3701 (100)

c) Medical problems:

Table A241. Utilisation of prenatal care services by having severe breathlessness

Utilisation	Severe breathlessness		Total (%)
	Had a severe breathlessness (%)	Did not have a severe breathlessness (%)	
Did not have prenatal care	94 (4.6)	359 (8.3)	453 (7.1)
Had prenatal care	1938 (95.4)	3983 (91.7)	5921 (92.9)
Total	2032 (100)	4342 (100)	6374 (100)

Table A242. Utilisation of prenatal care services by having a vaginal bleeding

Utilisation	Vaginal bleeding		Total (%)
	Had a vaginal bleeding (%)	Did not have a vaginal bleeding (%)	
Did not have prenatal care	8 (2.2)	462 (7.6)	470 (7.2)
Had prenatal care	363 (97.8)	5655 (92.4)	6018 (92.8)
Total	371 (100)	6117 (100)	6488 (100)

Table A243. Utilisation of prenatal care services by having a high blood pressure

Utilisation	High blood pressure		Total (%)
	Had a high blood pressure (%)	Did not have a high blood pressure (%)	
Did not have prenatal care	12 (3.1)	458 (7.5)	470 (7.2)
Had prenatal care	369 (96.9)	5647 (92.5)	6016 (92.8)
Total	381 (100)	6105 (100)	6486 (100)

Table A244. Utilisation of prenatal care services by having a swelling of the face or body

Utilisation	Swelling of the face or body		Total (%)
	Had a swelling of the face or body (%)	Did not have a swelling of the face or body (%)	
Did not have prenatal care	26 (4.3)	444 (7.5)	470 (7.2)
Had prenatal care	577 (95.7)	5440 (92.5)	6017 (92.8)
Total	603 (100)	5884 (100)	6487 (100)

Table A245. Utilisation of prenatal care services by having a severe headache

Utilisation	Severe headache		Total (%)
	Had a severe headache (%)	Did not have a severe headache (%)	
Did not have prenatal care	40 (4)	430 (7.8)	470 (7.2)
Had prenatal care	971 (96)	5048 (92.2)	6019 (92.8)
Total	1011 (100)	5478 (100)	6489 (100)

Table A246. Utilisation of prenatal care services by having convulsions

Utilisation	Convulsions		Total (%)
	Had convulsions (%)	Did not have convulsions (%)	
Did not have prenatal care	3 (4.8)	467 (7.3)	470 (7.2)
Had prenatal care	60 (95.2)	5957 (92.7)	6017 (92.8)
Total	63 (100)	6424 (100)	6487 (100)

Table A247. Utilisation of prenatal care services by having pain in the upper abdomen

Utilisation	Pain the upper abdomen		Total (%)
	Had pain in the upper abdomen (%)	Did not have pain in the upper abdomen (%)	
Did not have prenatal care	40 (4.2)	430 (7.8)	470 (7.2)

Had prenatal care	911 (95.8)	5106 (92.2)	6017 (92.8)
Total	951 (100)	5536 (100)	6487 (100)

Table A248. Utilisation of prenatal care services by having diabetes

Utilisation	Diabetes		Total (%)
	Had diabetes (%)	Did not have diabetes (%)	
Did not have prenatal care	21 (6.3)	449 (7.3)	470 (7.2)
Had prenatal care	314 (93.7)	5703 (92.7)	6017 (92.8)
Total	335 (100)	6152 (100)	6487 (100)

Table A249. Utilisation of prenatal care services by having painful urination

Utilisation	Painful urination		Total (%)
	Had painful urination (%)	Did not have painful urination (%)	
Did not have prenatal care	32 (3.9)	437 (7.7)	469 (7.2)
Had prenatal care	784 (96.1)	5225 (92.3)	6009 (92.8)
Total	816 (100)	5662 (100)	6478 (100)

The cross tabulations of the time of initiation of prenatal care by the independent variables:

a) Predisposing factors:

Table A250. Time of the initiation of prenatal care by mothers' age

Utilisation	Mother's age				Total (%)
	15-24 years	25-34 years	35-44 years	45+ years	
First three months	1017 (80.4)	2398 (80.7)	1126 (76.4)	108 (71.1)	4649 (79.3)
After three months	248 (19.6)	574 (19.3)	348 (23.6)	44 (28.9)	1214 (20.7)
Total	1265 (100)	2972 (100)	1474 (100)	152 (100)	5863 (100)

Table A251. Time of the initiation of prenatal care by fathers' age

Utilisation	Father's age					Total (%)
	20-29 years (%)	30-39 years (%)	40-49 years (%)	50-59 years (%)	60+ years (%)	
First three months	790 (79.6)	1885 (81.4)	1137 (79.6)	417 (75.1)	357 (73.2)	4586 (79.4)
After three months	203 (20.4)	430 (18.6)	291 (20.4)	138 (24.9)	131 (26.8)	1193 (20.6)
Total	993 (100)	2315 (100)	1428 (100)	555 (100)	488 (100)	5779 (100)

Table A252. Time of the initiation of prenatal care by birth order

Utilisation	Birth order					Total (%)
	1 (%)	2-3 (%)	4-5 (%)	6-7 (%)	8+ (%)	
First three months	640 (86.1)	1179 (80.3)	1033 (80.5)	834 (77.2)	963 (74.8)	4649 (79.3)
After three months	103 (13.9)	290 (19.7)	251 (19.5)	246 (22.8)	324 (25.2)	1214 (20.7)
Total	743 (100)	1469 (100)	1284 (100)	1080 (100)	1287 (100)	5863 (100)

Table A253. Time of the initiation of prenatal care by household size

Utilisation	Household size					Total (%)
	1st quintile (1-6) (%)	2nd quintile (7-8) (%)	3rd quintile (9) (%)	4th quintile (10-11) (%)	5th quintile (12+) (%)	
First three months	1600 (82.5)	958 (80.2)	453 (75.2)	743 (77.9)	801 (76.5)	4555 (79.4)
After three months	339 (17.5)	237 (19.8)	149 (24.8)	211 (22.1)	246 (23.5)	1182 (20.6)
Total	1939 (100)	1195 (100)	602 (100)	954 (100)	1047 (100)	5737 (100)

Table A254. Time of the initiation of prenatal care by mothers' education

Utilisation	Mother's education					Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary and above (%)	
First three months	1760 (75.8)	681 (80.7)	861 (79.6)	513 (82.9)	827 (84)	4642 (79.3)
After three months	561 (24.2)	163 (19.3)	221 (20.4)	106 (17.1)	158 (16)	1209 (20.7)
Total	2321 (100)	844 (100)	1082 (100)	619 (100)	985 (100)	5851 (100)

Table A255. Time of the initiation of prenatal care by mothers' economic activity

Utilisation	Mother's economic activity			Total (%)
	Doing housework (%)	Working (%)	Other (%)	
First three months	3895 (78.8)	405 (84)	349 (79.7)	4649 (79.3)
After three months	1048 (21.2)	77 (16)	89 (20.3)	1214 (20.7)
Total	4943 (100)	482 (100)	438 (100)	5863 (100)

Table A256. Time of the initiation of prenatal care by fathers' education

Utilisation	Father's education					Total (%)
	Read (%)	Primary (%)	Preparatory (%)	Secondary/diploma (%)	University (%)	
First three months	154 (76.6)	1327 (78.7)	795 (80.5)	933 (83.6)	589 (83.5)	3798 (80.9)
After three months	47 (23.4)	359 (21.3)	193 (19.5)	183 (16.4)	116 (16.5)	898 (19.1)
Total	201 (100)	1686 (100)	988 (100)	1116 (100)	705 (100)	4696 (100)

b) Enabling factors:

Table A257. Time of the initiation of prenatal care by region of residence

Utilisation	Region					Total (%)
	Central (%)	Eastern (%)	Western (%)	Northern (%)	Southern (%)	
First three months	1119 (74.6)	765 (84.9)	1382 (80.6)	477 (82.4)	906 (77.5)	4649 (79.3)
After three months	381 (25.4)	136 (15.1)	332 (19.4)	102 (17.6)	263 (22.5)	1214 (20.7)
Total	1500 (100)	901 (100)	1714 (100)	579 (100)	1169 (100)	5863 (100)

Table A258. Time of the initiation of prenatal care by urban/rural residence

Utilisation	Urban/rural residence		Total (%)
	Urban (%)	Rural (%)	
First three months	3299 (80.8)	1350 (75.9)	4649 (79.3)
After three months	786	428	1214

	(19.2)	(24.1)	(20.7)
Total	4085 (100)	1778 (100)	5863 (100)

Table A259. Time of the initiation of prenatal care by the usual place of checkup

Utilisation	Usual place of checkup			Total (%)
	Primary health care centre (%)	Public hospital (%)	Private health care facility (%)	
First three months	2271 (80.2)	1633 (76.5)	734 (83.6)	4638 (79.3)
After three months	562 (19.8)	503 (23.5)	144 (16.4)	1209 (20.7)
Total	2833 (100)	2136 (100)	878 (100)	5847 (100)

Table A260. Time of the initiation of prenatal care by dwelling type

Utilisation	Dwelling type			Total (%)
	Villa (%)	Duplex or apartment (%)	Traditional or Arabian house (%)	
First three months	1136 (79.9)	1838 (80.2)	1565 (78.3)	4539 (79.4)
After three months	285 (20.1)	455 (19.8)	435 (21.8)	1175 (20.6)
Total	1421 (100)	2293 (100)	2000 (100)	5714 (100)

Table A261. Time of the initiation of prenatal care by housing tenure

Utilisation	Housing tenure			Total (%)
	Owned or owned jointly (%)	Rented (%)	From the employer/other (%)	
First three months	3027 (78.3)	1290 (81.5)	236 (81.9)	4553 (79.4)
After three months	837 (21.7)	292 (18.5)	52 (18.1)	1181 (20.6)
Total	3864 (100)	1582 (100)	288 (100)	5734 (100)

Table A262. Time of the initiation of prenatal care by crowding

Utilisation	Crowding					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
First three months	1180 (83.5)	1049 (80.9)	668 (76.9)	990 (78.5)	660 (74.4)	4547 (79.4)
After three months	234 (16.5)	248 (19.1)	201 (23.1)	271 (21.5)	227 (25.6)	1181 (20.6)
Total	1414 (100)	1297 (100)	869 (100)	1261 (100)	887 (100)	5728 (100)

Table A263. Time of the initiation of prenatal care by the houses' floor material

Utilisation	Floor material		Total (%)
	Modern floor (%)	Earth/stone/brick (%)	
First three months	4487 (79.7)	162 (70.1)	4649 (79.3)
After three months	1145 (20.3)	69 (29.9)	1214 (20.7)
Total	5632 (100)	231 (100)	5863 (100)

Table A264. Time of the initiation of prenatal care by toilet type

Utilisation	Toilet type		Total (%)
	Flush toilet (%)	No flush toilet (%)	
First three months	3624 (80.1)	1025 (76.4)	4649 (79.3)
After three months	898 (19.9)	316 (23.6)	1214 (20.7)
Total	4522 (100)	1341 (100)	5863 (100)

Table A265. Time of the initiation of prenatal care by main drinking water source

Utilisation	Main drinking water source		Total (%)
	Pipe or bottled (%)	Other (%)	
First three months	2267 (80)	2288 (78.8)	4555 (79.4)
After three months	568 (20)	614 (21.2)	1182 (20.6)
Total	2835 (100)	2902 (100)	5737 (100)

Table A266. Time of the initiation of prenatal care by having electricity

Utilisation	Electricity		Total (%)
	Have electricity (%)	Do not have electricity (%)	
First three months	4338 (79.9)	311 (71.8)	4649 (20.7)
After three months	1092 (20.1)	122 (28.2)	1214 (20.7)
Total	5430 (100)	433 (100)	5863 (100)

Table A267. Time of the initiation of prenatal care by car ownership

Utilisation	Car ownership		Total (%)
	Own a car (%)	Do not own a car (%)	
First three months	4086 (79.4)	446 (78.7)	4532 (79.3)
After three months	1059 (20.6)	121 (21.3)	1180 (20.7)
Total	5145 (100)	467 (100)	5712 (100)

Table A268. Time of the initiation of prenatal care by mothers' daily radio listening

Utilisation	Mother's daily radio listening		Total (%)
	Listens daily (%)	Does not listen daily (%)	
First three months	2084 (78.8)	2559 (79.7)	4643 (79.3)
After three months	559 (21.2)	653 (20.3)	1212 (20.7)
Total	2643 (100)	3212 (100)	5855 (100)

Table A269. Time of the initiation of prenatal care by mothers' television watching

Utilisation	Mother's television watching		Total (%)
	Watches TV (%)	Does not watch TV (%)	
First three months	4054 (80.4)	588 (72.8)	4642 (79.3)
After three months	990 (19.6)	220 (27.2)	1210 (20.7)
Total	5044 (100)	808 (100)	5852 (100)

Table A270. Time of the initiation of prenatal care by mothers' weekly newspapers/ magazine reading

Utilisation	Mother's weekly newspapers/magazine reading		Total (%)
	Reads weekly (%)	Does not read weekly (%)	
First three months	2042 (81.3)	788 (82.2)	2830 (81.5)
After three months	470 (18.7)	171 (17.8)	641 (18.5)
Total	2512 (100)	959 (100)	3471 (100)

The cross tabulations of the last source of prenatal care by the independent variables:

Table A271. The last source of prenatal care by region of residence

Utilisation	Region					Total (%)
	Central (%)	Eastern (%)	Western (%)	Northern (%)	Southern (%)	
Public services	228 (87.7)	100 (69.9)	218 (65.7)	111 (85.4)	216 (96.9)	873 (80.2)
Private services	32 (12.3)	43 (30.1)	114 (34.3)	19 (14.6)	7 (3.1)	215 (19.8)
Total	260 (100)	143 (100)	332 (100)	130 (100)	223 (100)	1088 (100)

Table A272. The last source of prenatal care by urban/rural residence

Utilisation	Urban/rural residence		Total (%)
	Urban (%)	Rural (%)	
Public services	558 (74.4)	315 (93.2)	873 (80.2)
Private services	192 (25.6)	23 (6.8)	215 (19.8)
Total	750 (100)	338 (100)	1088 (100)

Table A273. The last source of prenatal care by mothers' economic activity

Utilisation	Mother's economic activity			Total (%)
	Doing housework (%)	Working (%)	Other (%)	
Public services	769 (83)	41 (56.2)	63 (70.8)	873 (80.2)
Private services	157 (17)	32 (43.8)	26 (29.2)	215 (19.8)
Total	926 (100)	73 (100)	89 (100)	1088 (100)

Table A274. The last source of prenatal care by dwelling type

Utilisation	Dwelling type			Total (%)
	Villa (%)	Duplex or apartment (%)	Traditional or Arabian house (%)	
Public services	211 (78.4)	320 (71.9)	339 (91.6)	870 (80.3)
Private services	58 (21.6)	125 (28.1)	31 (8.4)	214 (19.7)
Total	269 (100)	445 (100)	370 (100)	1084 (100)

Table A275. The last source of prenatal care by housing tenure

Utilisation	Housing tenure			Total (%)
	Owned or owned jointly (%)	Rented (%)	From the employer/other (%)	
Public services	593 (85)	225 (70.1)	55 (79.7)	873 (80.2)

Private services	105 (15)	96 (29.9)	14 (20.3)	215 (19.8)
Total	698 (100)	321 (100)	69 (100)	1088 (100)

Table A276. The last source of prenatal care by crowding

Utilisation	Crowding					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Public services	165 (64.7)	193 (80.4)	164 (82.4)	163 (84.9)	188 (93.5)	873 (80.3)
Private services	90 (35.3)	47 (19.6)	35 (17.6)	29 (15.1)	13 (6.5)	214 (19.7)
Total	255 (100)	240 (100)	199 (100)	192 (100)	201 (100)	1087 (100)

Table A277. The last source of prenatal care by the houses' floor material

Utilisation	Floor material		Total (%)
	Modern floor (%)	Earth/stone/brick (%)	
Public services	830 (79.4)	43 (100)	873 (80.2)
Private services	215 (20.6)		215 (19.8)
Total	1045 (100)	43 (100)	1088 (100)

Table A278. The last source of prenatal care by toilet type

Utilisation	Toilet type		Total (%)
	Flush toilet (%)	No flush toilet (%)	
Public services	659 (76.5)	214 (94.7)	873 (80.2)
Private services	203 (23.5)	12 (5.3)	215 (19.8)
Total	862 (100)	226 (100)	1088 (100)

Table A279. The last source of prenatal care by main drinking water source

Utilisation	Main drinking water source		Total (%)
	Pipe or bottled (%)	Other (%)	
Public services	406 (73.4)	467 (87.3)	873 (80.2)
Private services	147 (26.6)	68 (12.7)	215 (19.8)
Total	553 (100)	535 (100)	1088 (100)

Table A280. The last source of prenatal care by having electricity

Utilisation	Electricity		Total (%)
	Have electricity (%)	Do not have electricity (%)	
Public services	827 (79.7)	46 (92)	873 (80.2)

Private services	211 (20.3)	4 (8)	215 (19.8)
Total	1038 (100)	50 (100)	1088 (100)

Table A281. The last source of prenatal care by mothers' daily radio listening

Utilisation	Mother's daily radio listening		Total (%)
	Listens daily (%)	Does not listen daily (%)	
Public services	406 (79.5)	467 (80.9)	873 (80.2)
Private services	105 (20.5)	110 (19.1)	215 (19.8)
Total	511 (100)	577 (100)	1088 (100)

Table A282. The last source of prenatal care by mothers' television watching

Utilisation	Mother's television watching		Total (%)
	Watches TV (%)	Does not watch TV (%)	
Public services	751 (78.9)	121 (89.6)	872 (80.2)
Private services	201 (21.1)	14 (10.4)	215 (19.8)
Total	952 (100)	135 (100)	1087 (100)

Table A283. The last source of prenatal care by mode of travel

Utilisation	Mode of travel		Total (%)
	Private car (%)	Other (%)	
Public services	716 (78.3)	157 (90.8)	873 (80.2)
Private services	199 (21.7)	16 (9.2)	215 (19.8)
Total	915 (100)	173 (100)	1088 (100)

Table A284. The last source of prenatal care by traveling time

Utilisation	Traveling time			Total (%)
	1-15 minutes (%)	16-30 minutes (%)	31+ minutes (%)	
Public services	595 (81.4)	166 (77.2)	112 (78.9)	873 (80.2)
Private services	136 (18.6)	49 (22.8)	30 (21.1)	215 (19.8)
Total	731 (100)	215 (100)	142 (100)	1088 (100)

Table A285. The last source of prenatal care by waiting time

Utilisation	Waiting time			Total (%)
	Less than half an hour (%)	Between a half to one hour (%)	More than one hour (%)	
Public services	384 (75.9)	349 (81.9)	137 (89.5)	870 (80.2)
Private services	122 (24.1)	77 (18.1)	16 (10.5)	215 (19.8)
Total	506 (100)	426 (100)	153 (100)	1085 (100)

Table A286. The last source of prenatal care by satisfaction with care

Utilisation	Satisfaction with care		Total (%)
	Satisfied (%)	Not satisfied (%)	
Public services	807 (79.4)	63 (91.3)	870 (80.2)
Private services	209 (20.6)	6 (8.7)	215 (19.8)
Total	1016 (100)	69 (100)	1085 (100)

The cross tabulations of infants' full immunisation by the independent variables:

a) Predisposing factors:

Table A287. Infants' full immunisation by gender

Immunisation	Gender		Total (%)
	Male (%)	Female (%)	
Not fully immunised	236 (21)	215 (20.1)	451 (20.5)
Fully immunised	889 (79)	857 (79.9)	1746 (79.5)
Total	1125 (100)	1072 (100)	2197 (100)

Table A288. Infants' full immunisation by birth order

Immunisation	Birth order				Total (%)
	1 (%)	2-3 (%)	4-5 (%)	6+ (%)	
Not fully immunised	54 (21.5)	127 (22.4)	84 (17.9)	186 (20.5)	451 (20.5)
Fully immunised	197 (78.5)	441 (77.6)	386 (82.1)	722 (79.5)	1746 (79.5)
Total	251 (100)	568 (100)	470 (100)	908 (100)	2197 (100)

Table A289. Infants' full immunisation by mothers' age

Immunisation	Mother's age				Total (%)
	15-24 years	25-34 years	35-44 years	45+ years	
Not fully immunised	111 (23.1)	222 (20.3)	99 (18)	18 (26.1)	450 (20.5)
Fully immunised	369 (76.9)	873 (79.7)	451 (82)	51 (73.9)	1744 (79.5)
Total	480 (100)	1095 (100)	550 (100)	69 (100)	2194 (100)

Table A290. Infants' full immunisation by head of household age

Immunisation	Head of household age					Total (%)
	20-29 years (%)	30-39 years (%)	40-49 years (%)	50-59 years (%)	60+ years (%)	
Not fully immunised	61 (20.4)	169 (20.5)	111 (19.4)	45 (18.6)	62 (24.3)	448 (20.4)
Fully immunised	238 (79.6)	655 (79.5)	460 (80.6)	197 (81.4)	193 (75.7)	1743 (79.6)
Total	299 (100)	824 (100)	571 (100)	242 (100)	255 (100)	2191 (100)

Table A291. Infants' full immunisation by household size

Immunisation	Household size					Total (%)
	1st quintile (1-5) (%)	2nd quintile (6-7) (%)	3rd quintile (8-9) (%)	4th quintile (10-11) (%)	5th quintile (12+) (%)	
Not fully immunised	109 (20.7)	92 (19.9)	89 (20)	72 (20.4)	89 (21.8)	451 (20.5)

Fully immunised	417 (79.3)	371 (80.1)	357 (80)	281 (79.6)	320 (78.2)	1746 (79.5)
Total	526 (100)	463 (100)	446 (100)	353 (100)	409 (100)	2197 (100)

Table A292. Infants' full immunisation by mothers' education

Immunisation	Mother's education					Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary and above (%)	
Not fully immunised	158 (17.3)	61 (19.2)	82 (20.4)	54 (25.8)	95 (27.1)	450 (20.6)
Fully immunised	753 (82.7)	257 (80.8)	319 (79.6)	155 (74.2)	255 (72.9)	1739 (79.4)
Total	911 (100)	318 (100)	401 (100)	209 (100)	350 (100)	2189 (100)

Table A293. Infants' full immunisation by mothers' economic activity

Immunisation	Mother's economic activity			Total (%)
	Doing housework (%)	Working (%)	Other (%)	
Not fully immunised	371 (20)	47 (25.3)	33 (21.7)	451 (20.5)
Fully immunised	1488 (80)	139 (74.7)	119 (78.3)	1746 (79.5)
Total	1859 (100)	186 (100)	152 (100)	2197 (100)

Table A294. Infants' full immunisation by head of household education

Immunisation	Head of household education						Total (%)
	Illiterate (%)	Read (%)	Primary (%)	Preparatory (%)	Secondary/ diploma (%)	University (%)	
Not fully immunised	72 (16.5)	79 (23.5)	108 (19.4)	62 (21.2)	84 (24.2)	46 (20.4)	451 (20.5)
Fully immunised	365 (83.5)	257 (76.5)	450 (80.6)	230 (78.8)	263 (75.8)	179 (79.6)	1744 (79.5)
Total	437 (100)	336 (100)	558 (100)	292 (100)	347 (100)	225 (100)	2195 (100)

Table A295. Infants' full immunisation by by head of household economic activity

Immunisation	Head of household economic activity		Total (%)
	Working (%)	Not working (%)	
Not fully immunised	393 (20.3)	58 (22.7)	451 (20.6)
Fully immunised	1541 (79.7)	197 (77.3)	1738 (79.4)
Total	1934 (100)	255 (100)	2189 (100)

Table A296. Infants' full immunisation by a child's health rating

Immunisation	Child's health rating			Total (%)
	Excellent/good (%)	Normal (%)	Ill from time to time/ often ill (%)	
Not fully immunised	172 (20.3)	204 (19.8)	73 (22.8)	449 (20.5)
Fully immunised	674 (79.7)	825 (80.2)	247 (77.2)	1746 (79.5)
Total	846 (100)	1029 (100)	320 (100)	2195 (100)

Table A297. Infants' full immunisation by the early initiation of prenatal care

Immunisation	Early initiation of prenatal care		Total (%)
	Within the first three months	After the first three months	
Not fully immunised	290 (19.6)	161 (22.4)	451 (20.5)
Fully immunised	1187 (80.4)	559 (77.6)	1746 (79.5)
Total	1477 (100)	720 (100)	2197 (100)

Table A298. Infants' full immunisation by the number of prenatal care checkups

Immunisation	Number of prenatal care checkups				Total (%)
	1-5 visits (%)	6-8 visits (%)	9-11 visits (%)	12+ visits (%)	
Not fully immunised	84 (25.1)	75 (16.7)	75 (18.8)	151 (20.7)	385 (20.1)
Fully immunised	251 (74.9)	374 (83.3)	323 (81.2)	580 (79.3)	1528 (79.9)
Total	335 (100)	449 (100)	398 (100)	731 (100)	1913 (100)

b) Enabling factors:

Table A299. Infants' full immunisation by region of residence

Immunisation	Region					Total (%)
	Central (%)	Eastern (%)	Western (%)	Northern (%)	Southern (%)	
Not fully immunised	133 (21.6)	81 (25.9)	143 (21.8)	26 (12.4)	68 (16.8)	451 (20.5)
Fully immunised	482 (78.4)	232 (74.1)	512 (78.2)	183 (87.6)	337 (83.2)	1746 (79.5)
Total	615 (100)	313 (100)	655 (100)	209 (100)	405 (100)	2197 (100)

Table A300. Infants' full immunisation by urban/rural residence

Immunisation	Urban/rural residence		Total (%)
	Urban (%)	Rural (%)	
Not fully immunised	335 (22.5)	116 (16.4)	451 (20.5)
Fully immunised	1154	592	1746

	(77.5)	(83.6)	(79.5)
Total	1489 (100)	708 (100)	2197 (100)

Table A301. Infants' full immunisation by dwelling type

Immunisation	Dwelling type			Total (%)
	Villa (%)	Duplex or apartment (%)	Traditional or Arabian house (%)	
Not fully immunised	124 (22.5)	176 (21.3)	148 (18.3)	448 (20.5)
Fully immunised	427 (77.5)	649 (78.7)	660 (81.7)	1736 (79.5)
Total	551 (100)	825 (100)	808 (100)	2184 (100)

Table A302. Infants' full immunisation by housing tenure

Immunisation	Housing tenure			Total (%)
	Owned or owned jointly (%)	Rented (%)	From the employer/other (%)	
Not fully immunised	313 (20.7)	107 (18.5)	30 (29.1)	450 (20.5)
Fully immunised	1199 (79.3)	471 (81.5)	73 (70.9)	1743 (79.5)
Total	1512 (100)	578 (100)	103 (100)	2193 (100)

Table A303. Infants' full immunisation by crowding

Immunisation	Crowding					Total (%)
	1st quintile (%)	2nd quintile (%)	3rd quintile (%)	4th quintile (%)	5th quintile (%)	
Not fully immunised	107 (21.2)	100 (23.4)	93 (20.9)	73 (17.3)	76 (19.4)	449 (20.5)
Fully immunised	397 (78.8)	328 (76.6)	351 (79.1)	350 (82.7)	316 (80.6)	1742 (79.5)
Total	504 (100)	428 (100)	444 (100)	423 (100)	392 (100)	2191 (100)

Table A304. Infants' full immunisation by the houses' floor material

Immunisation	Floor material		Total (%)
	Modern floor (%)	Earth/stone/brick (%)	
Not fully immunised	429 (20.5)	22 (21.2)	451 (20.5)
Fully immunised	1664 (79.5)	82 (78.8)	1746 (79.5)
Total	2093 (100)	104 (100)	2197 (100)

Table A305. Infants' full immunisation by toilet type

Immunisation	Toilet type		Total (%)
	Flush toilet (%)	No flush toilet (%)	
Not fully immunised	363	87	450

	(21.4)	(17.6)	(20.5)
Fully immunised	1335 (78.6)	408 (82.4)	1743 (79.5)
Total	1698 (100)	495 (100)	2193 (100)

Table A306. Infants' full immunisation by main drinking water source

Immunisation	Main drinking water source		Total (%)
	Pipe or bottled (%)	Other (%)	
Not fully immunised	246 (22.7)	205 (18.4)	451 (20.5)
Fully immunised	836 (77.3)	910 (81.6)	1746 (79.5)
Total	1082 (100)	1115 (100)	2197 (100)

Table A307. Infants' full immunisation by having electricity

Immunisation	Electricity		Total (%)
	Have electricity (%)	Do not have electricity (%)	
Not fully immunised	430 (20.7)	20 (16.9)	450 (20.5)
Fully immunised	1645 (79.3)	98 (83.1)	1743 (79.5)
Total	2075 (100)	118 (100)	2193 (100)

Table A308. Infants' full immunisation by car ownership

Immunisation	Car ownership		Total (%)
	Own a car (%)	Do not own a car (%)	
Not fully immunised	402 (20.5)	47 (21.1)	449 (20.6)
Fully immunised	1557 (79.5)	176 (78.9)	1733 (79.4)
Total	1959 (100)	223 (100)	2182 (100)

Table A309. Infants' full immunisation by having a radio

Immunisation	Radio		Total (%)
	Have a radio (%)	Do not have a radio (%)	
Not fully immunised	361 (21.1)	87 (18.2)	448 (20.5)
Fully immunised	1347 (78.9)	392 (81.8)	1739 (79.5)
Total	1708 (100)	479 (100)	2187 (100)

Table A310. Infants' full immunisation by having a colour TV

Immunisation	Colour TV		Total (%)
	Have a colour TV (%)	Do not have a colour TV (%)	
Not fully immunised	395 (20.7)	55 (19.2)	450 (20.5)
Fully immunised	1510 (79.3)	231 (80.8)	1741 (79.5)
Total	1905 (100)	286 (100)	2187 (100)

Table A311. Infants' full immunisation by having a satellite TV/cable

Immunisation	Satellite TV/cable		Total (%)
	Have a satellite TV/cable (%)	Do not have a satellite TV/cable (%)	
Not fully immunised	101 (24.9)	349 (19.6)	450 (20.5)
Fully immunised	304 (75.1)	1436 (80.4)	1740 (79.5)
Total	405 (100)	1785 (100)	2190 (100)

The likelihood ratio tests for the multinomial logistic regression models included in the thesis:

Table A312. The likelihood ratio tests for the independent variables of the multinomial logistic regression model for adults' utilisation of doctors' services

Effect	-2 Log likelihood of the reduced model	Chi-square	df	Significance
Gender	5272.802	9.012	3	0.029
Marital status	5285.260	21.469	9	0.011
Head of household age	5289.299	25.509	12	0.013
Educational level	5311.273	47.483	15	0.000
Region	5370.976	107.186	12	0.000
Urban/rural residence	5301.515	37.725	3	0.000
Radio ownership	5277.775	13.985	3	0.003
Colour TV ownership	5274.402	10.611	3	0.014
Satellite TV/cable ownership	5304.431	40.641	3	0.000
Disability due to sickness	5347.487	83.697	3	0.000
Sickness days	5324.014	60.224	12	0.000

Table A313. The likelihood ratio tests for the independent variables of the multinomial logistic regression model for children's utilisation of doctors' services

Effect	-2Log likelihood of the reduced model	Chi-square	df	Significance
Gender	6360.612	0.000	0	.
Household size	6399.139	38.527	12	0.000
Head of household age	6391.348	30.736	12	0.002
Head of household education	6416.089	55.478	15	0.000
Head of household occupation	6370.749	10.137	3	0.017
Region	6497.569	136.957	12	0.000
Urban/rural residence	6360.612	0.000	0	
Crowding	6397.881	37.269	12	0.000
House ownership	6387.484	26.872	6	0.000
Toilet	6368.042	7.430	3	0.05
Car ownership	6371.178	10.566	3	0.014
Radio ownership	6377.495	16.883	3	0.001
Colour TV ownership	6379.032	18.420	3	0.000
Satellite TV/cable ownership	6388.460	27.848	3	0.000
Gender*urban/rural residence	6368.911	8.300	3	0.040

Table A314. The likelihood ratio tests for the independent variables of the multinomial logistic regression model for children under five's utilisation of health services in response to diarrhoea

Effect	-2 Log likelihood of the reduced model	Chi-square	df	Significance
Maternal education	249.801	44.740	8	0.000
Urban/rural residence	218.156	13.096	2	0.001
Sick days	244.089	39.029	6	0.000

Table A315. The likelihood ratio tests for the independent variables of the multinomial logistic regression model for children under five's utilisation of health services in response to acute respiratory infections

Effect	-2 Log likelihood of the reduced model	Chi-square	df	Significance
Mother's age	3624.922	36.755	6	0.000
Head of household age	3605.527	17.361	8	0.027
Mother's education	3683.987	95.821	8	0.000
Mother's economic activity	3599.171	11.005	4	0.027
Region	3633.827	45.660	8	0.000
Urban/rural residence	3627.351	39.184	2	0.000
Crowding	3622.604	34.437	8	0.000
Electricity	3594.437	6.270	2	0.043
Car ownership	3595.580	7.414	2	0.025
Colour TV ownership	3605.288	17.121	2	0.000
Difficulty in breathing	3626.329	38.163	2	0.000
Sick days	3654.097	65.930	6	0.000

In the following section of the appendix the parts of the questionnaires that include the questions used in the data analysis of the thesis are presented.

1 Household Roster

Line number	Name 101 Please give me the names of the persons who usually live in your household starting with the head of the household.	Line number	Sex 102 Is (NAME) male or female?		Relationship 103 What is the relationship of (NAME) to the head of household?		Residence 104 Does (NAME) usually live here?		Age 105 How old is (NAME) now? Less than 6:in years & months		Marital Status Persons aged 12 years & over 106 What is the marital status of (NAME)?					Eligibility 107 Line number of every eligible woman	 108 Line number of every eligible child	 109 Line number of the mother of every eligible child (96= Deceased 97= Other)
			Male	Female		Code	Yes	No	Years	Months	Single	Kath-kitab	Married	Widowed	Divorced/Separated			
01		01	1	2			1	2			1	2	3	4	5	01	01	
02		02	1	2			1	2			1	2	3	4	5	02	02	
03		03	1	2			1	2			1	2	3	4	5	03	03	
04		04	1	2			1	2			1	2	3	4	5	04	04	
05		05	1	2			1	2			1	2	3	4	5	05	05	
06		06	1	2			1	2			1	2	3	4	5	06	06	
07		07	1	2			1	2			1	2	3	4	5	07	07	
08		08	1	2			1	2			1	2	3	4	5	08	08	
09		09	1	2			1	2			1	2	3	4	5	09	09	
10		10	1	2			1	2			1	2	3	4	5	10	10	
11		11	1	2			1	2			1	2	3	4	5	11	11	
12		12	1	2			1	2			1	2	3	4	5	12	12	
13		13	1	2			1	2			1	2	3	4	5	13	13	
14		14	1	2			1	2			1	2	3	4	5	14	14	
15		15	1	2			1	2			1	2	3	4	5	15	15	
16		16	1	2			1	2			1	2	3	4	5	16	16	
17		17	1	2			1	2			1	2	3	4	5	17	17	
18		18	1	2			1	2			1	2	3	4	5	18	18	
19		19	1	2			1	2			1	2	3	4	5	19	19	
20		20	1	2			1	2			1	2	3	4	5	20	20	

* Just to make sure I have a complete listing:
1. Are there any other persons such as small children or infants that we have not listed?
2. In addition, are there any other people who may not be members of your family, such as domestic servants/lodgers/or friend who usually live here?

If YES : enter each in table

Relationship:

1. Head	7. Parent-in-law
2. Wife/Husband	8. Brother/Sister
3. Son/Daughter	9. Other relative
4. Son or daughter-in-law	10. Servant/Driver/Nanny
5. Grandchild	11. Other
6. Parent	98. DK

* If continuation sheet used tick here ☐

* No. of eligible women ⌊_⌋⌊_⌋

* No. of eligible children ⌊_⌋⌊_⌋

Line number	Education											Economic Activity												
	Persons aged 6 years & over											Persons aged 15 years and over												
	110 Has (NAME) ever been to school?			111 IF 110= 1 OR 2: What is the highest certificate he/she obtained?						112 IF 110= 3 OR 111=1 ASK: can (NAME) read?		113 What did (NAME) do most of the time during the past month? Was he/she:							114 IF113 = 1 OR 2: What is (was) his/her status in employment?					115 IF 113= 1,2 OR 3: What is (was) his/her main occupation?	
	Yes: currently	Yes: not currently	No (Go to 112)	None	Primary	Preparatory	Secondary	Diploma	University	Yes	No	Working	Unemployed	Retired	Seeking work for the first time	In school	Doing housework	Other	Salaried employee	Own-account worker	Employer	Unpaid family worker	Unpaid apprentice	Code
				Go to 113																				
01	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
02	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
03	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
04	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
05	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
06	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
07	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
08	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
09	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
10	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
11	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
12	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
13	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
14	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
15	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
16	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
17	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
18	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
19	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	
20	1	2	3	1	2	3	4	5	6	1	2	1	2	3	4	5	6	7	1	2	3	4	5	

2 General Morbidity Module

Line number	Morbidity							Use of Services																		Medication		
	201			202	203			Interviewer : Ask 202-205 for Every Yes at Q201																		205		
	Now I'd like you to think about the past 2 weeks. During the past 2 weeks has (NAME) had an illness or injury?			For how many days was (NAME) sick during the past 2 weeks?	Was (NAME) kept from his/her normal activities at work/about the house / or from going to school because of his illness / injury?			204 Was any of the following persons consulted in the past 2 weeks when (NAME) was sick																		Has (NAME) taken any medication in the past 2 weeks for treatment of this condition?		
								1 Doctor (Public)			2 Doctor (Private)			3 Nurse			4 Pharmacist			5 Traditional healer			6 Other					
	Yes	No	D.K.	Days	Yes	No	D.K.	Yes	No	D.K.	Yes	No	D.K.	Yes	No	D.K.	Yes	No	D.K.	Yes	No	D.K.	Yes	No	D.K.	Yes	No	D.K.
01	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
02	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
03	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
04	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
05	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
06	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
07	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
08	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
09	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
10	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
11	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
12	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
13	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
14	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
15	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
16	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
17	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
18	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
19	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
20	1	2	3		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3

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II. Socio-economic and Environmental Conditions Questionnaire

Identification	2
Region: _____	⌊⌊⌋
Cluster Number : _____	⌊⌊⌊⌋
Household Number : _____	⌊⌊⌊⌋
Household Size : _____	⌊⌊⌋

	Questions	Coding Categories		SKIP TO
10	*Interviewer:* Record the time	Hour: _____ Minutes: _____		

1. Housing

11	What type of dwelling unit does your household occupy?	Villa	1	
		Traditional House	2	
		Arabian House	3	
		Apartment	4	
		Duplex	5	
		Other	6	
12	Is your dwelling owned by your household or is it rented?	Owned	1	
		Owned jointly	2	
		Rented	3	
		Provided by employer	4	
		Other (specify): _____	5	
13	What kind of material is the floor made from? (Record main type)	Earth	1	
		Tiles/Cement	2	
		Stone/Brick	3	
		Vinyl	4	
		Fitted carpet	5	
		Marble	6	
		Other (specify): _____	7	
14	How many rooms are there in this dwelling for the exclusive use of this household?	Number of rooms	⌊⌊⌋	
15	Of this number how many are bedrooms or used for sleeping?	Number of rooms	⌊⌊⌋	
16	Are any animals/birds kept in any part of this (DWELLING)?	Yes : animals	1	
		Yes : Birds	2	
		No	3	

Questions	Coding Categories		SKIP TO
2. Cooking			
21 Is there a special room used for cooking?	Yes	1	
	No	2	
22 Is the place used for cooking shared with other households?	Yes	1	
	No	2	
23 What fuel is used for cooking?	Gas/Electricity	1	
	Oil /Kerosene	2	
	Wood/Coal	3	
	Other	4	
3. Drinking Water			
31 What is the major source of drinking water for members of this household?	Piped supply	1	
	Public tap outside dwelling	2	
	Well with pump	3	
	Well without pump	4	
	Tanker truck (or similar)	5	
	Bottled	6	
	Stream	7	33
	Rain water catchment	8	33
	Other (specify) :	9	
32 Do you buy this water from the government or from a private source or is it free?	Government	1	
	Private source	2	
	Free	3	
33 Do you store your water? IF YES: What kind of container do you use?	Water tank	1	
	Plastic container	2	
	Bottles	3	35
	Cans (tin)	4	35
	Other (specify)	5	35
	No storage	6	35
34 Is this tank/container covered or not covered?	Covered	1	
	Not covered	2	
35 Do you or any member of the household usually boil or treat water before drinking? IF YES: How is water treated?	Boiling	1	
	Filtering	2	
	Other (specify):	3	
	No treatment	4	
. Lighting			
41 What kind of lighting does this unit has?	Electric	1	
	Gas	2	
	Kerosene/Oil lamps/Candles	3	
	Other	4	
	None	5	

Questions	Coding Categories		SKIP TO
5. Sanitation			
51 What type of toilet facilities are available for this household?	Flush toilet connected to sewer network	1	
	Flush toilet connected to septic tank	2	
	Bucket	3	
	Pit	4	
	Open field	7	61
	Other (specify):	8	
52 Where is the toilet that you use located?	Inside dwelling	1	
	Outside dwelling, within same building / courtyard	2	
	Elsewhere		
53 Do you share the toilet facilities with any other household?	Yes	1	
	No	2	
6. Waste Disposal			
61 In what do you put the garbage before it is disposed of?	Container with lid	1	
	Container without lid	2	
	Plastic bag	3	
	Thrown straight in street	4	71
	Other (specify):	5	
62 And where is the garbage (container/bag/etc) kept?	Inside kitchen	1	
	Outside kitchen within dwelling	2	
	Outside dwelling	3	
63 How do you dispose of the garbage?	Garbage collector	1	
	Dumping in special place	2	
	Burning	3	
	Thrown in street	4	71
	Other (specify):	5	
64 How often do you dispose of the garbage?	Every day	1	
	At least twice a week	2	
	Once a week	3	
	Other (specify):	4	

7. Ownership of Objects

Questions	Coding Categories		
	Code	Yes	No
71 Do you have any of the following objects at this dwelling:			
1. Radio	01	1	2
2. Colour TV	02	1	2
3. Cable/Satellite TV	03	1	2
4. Video	04	1	2
5. Video camera	05	1	2
6. Electronic games	06	1	2
7. Refrigerator	07	1	2
8. Gas / Electric cooking stove	08	1	2
9 Microwave	09	1	2
10. Food processor	10	1	2
11. Water cooler	11	1	2
12. Electric iron	12	1	2
13. Washing machine	13	1	2
14. Dishwasher	14	1	2
15. Sewing machine	15	1	2
16. Vacuum cleaner	16	1	2
17. Electric fan	17	1	2
18. Telephone	18	1	2
19. Mobile telephone	19	1	2
20. Pager	20	1	2
21. Fax	21	1	2
22. Air conditioner	22	1	2
23. Desert/Air cooler	23	1	2
24. Private care	24	1	2
25. Personal computer	25	1	2
26. Sports equipment	26	1	2
27. Swimming pool	27	1	2
28. Special container for medicines	28	1	2

8. Drainage

Questions	Coding Categories	SKIP TO
81 *Interviewer*: Observe and circle appropriate box. Is the area around the house dry, or is there stagnant water around the house?	Area dry	1
	Stagnant water	2
	Area flooded	3
82 *Interviewer*: Record the time & enter duration of interview (in minutes).	Hour ———	⌊⌊⌋⌋
	Minutes ———	

Section 1. Respondent's Resources

Questions	Coding Categories		SKIP TO
101 *Interviewer:* Record the time	Hour Minutes	⌊⌊⌋ ⌊⌊⌋	
102 First I would like to ask some questions about you. In what month and year were you born?	Month (DK=98)	⌊⌊⌋	
	Year (DK=98)	⌊⌊⌋	
103 How old were you at your last birthday? • Interviewer : Compare and correct 102 and/or 103 if inconsistent - If respondent is 50 or more years of age: END INTERVIEW	Age in completed years	⌊⌊⌋	
104 Have you always lived in (NAME OF PLACE)?	Yes	1	107
	No	2	
105 How long have you been living continuously in (NAME OF PLACE)?	Years	⌊⌊⌋	
106 For most of the time until you were 12 years old, did you live in a city or a village?	City	1	
	Village	2	
107 Have you ever attended school?	Yes : Currently	1	
	Yes : Not currently	2	
	No	3	111
108 What (is / was) the highest level of education you attended?	Literacy class	1	111
	Primary	2	
	Preparatory	3	
	Secondary	4	
	Diploma	5	
	University	6	
109 What was the highest grade (year) you successfully completed at that level?	Grade	⌊⌊⌋	
110 *Interviewer:* Check 108 & 109	Less than 4 years at primary	1	
	4 years at primary or more	2	113
111 Can you read a letter or newspaper?	Yes	1	
	No	2	114
112 Can you write a letter, for example?	Yes	1	
	No	2	
113 Do you usually read a newspaper or magazine at least once a week?	Yes	1	
	No	2	

Questions	Coding Categories		SKIP TO
114 Do you usually watch television? If Yes : How often?	Yes : every day	1	
	Yes : at least once a week	2	
	Yes : sometimes	3	
	No	4	
115 Do you usually listen to a radio every day?	Yes	1	
	No	2	
116 Before you were (first) married, did you ever do any work regularly for which you were paid in cash?	Yes	1	
	No	2	
117 Since you were first married have you ever done any work for cash?	Yes	1	
	No	2	
118 Are you now doing any work for cash?	Yes	1	
	No	2	120
119 In this work ... are you working on your own, for a family member or for someone else?	On her own	1	122
	For a family member	2	
	For someone else	3	
120 Do you assist any family member in his/her work?	Yes	1	122
	No	2	
121 Do you assist someone not in the family in his/her work?	Yes	1	
	No	2	124
122 What kind of work do you mainly do? *Interviewer:* Write response exactly as given	_____ _____ _____	⌊⌊⌋	
123 *Interviewer:* Check 118	Working for cash	1	201
	Not working for cash	2	
124 If a good opportunity for working for cash was available, would you want to work in the future?	Yes	1	
	No	2	
	Unsure / D.K.	3	

Section 4. Maternal Care: Current Pregnancy

Questions	Coding Categories		SKIP TO
401 Did you see anyone for a check on this pregnancy?	Yes	1	
	No	2	412
402 How many months were you pregnant when you had your first checkup?	Months	⌊_⌋	
403 Was there any complaint, which led you to have a checkup?	Yes	1	
	No	2	
404 How many checkups did you have since you became pregnant?	Number	⌊_⌋⌊_⌋	
405 Have you seen any of the following persons during the checkup(s) on your pregnancy?		Yes No	
	Doctor	1 2	
	Trained muse/Midwife	1 2	
	Daya	1 2	
	Anyone else	1 2	
406 How many weeks ago was the last checkup?	Weeks	⌊_⌋⌊_⌋	
407 Where did you have the last checkup ?	Public hospital	1	
	Public health centre	2	
	Private health facility	3	
	At home	4	413
	Other (specify)	5	413
408 How long did it take to get to (PLACE)?	Minutes	⌊_⌋⌊_⌋	
409 Was that by walking or by using some other means of transport?	Walking	1	
	Bus/Taxi	2	
	Private car	3	
	Other (specify)	4	
410 How long did you have to wait at (PLACE) for the checkup?	Less than ½ hour	1	
	Between ½ and 1 hour	2	
	Between 1 and 2 hours	3	
	More than 2 hours	4	
411 Were you satisfied with the attention you got during your last checkup?	Yes	1	413
	No	2	413

Section 5. Maternal Care: The Last Three Years (Since 1/7/1993)

			Name (youngest) _____		Name (next to youngest) _____		Name (second to youngest) _____	
Interviewer: Check Birth History Tables and Enter Names of All Children in the Last Three Years", starting with Last Live Birth.								
501	Line number of child in "Birth history table".		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋	
502	Survival status : Check 317		Alive ☐ Dead ☐		Alive ☐ Dead ☐		Alive ☐ Dead ☐	
	Questions	Coding Categories	Codes	Skip To	Codes	Skip To	Codes	Skip To
503	When you were pregnant with (NAME), did you see anyone for a check on the pregnancy?	Yes	1		1		1	
		No	2	509	2	509	2	509
504	Was there any complaint, which led you to have the check-up?	Yes	1		1		1	
		No	2		2		2	
505	How long were you pregnant with (NAME) When you had the first check-up?	Months	⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋	
		D.K.	96		96		96	
506	How many check-ups did you have during the pregnancy?	Number	⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋	
		Con not remember	96		96		96	
507	Whom did you usually see? *(Record the most qualified)*	Doctor	1		1		1	
		Trained nurse/midwife	2		2		2	
		Other (specify): ——	3		3		3	
508	Where did you usually have the check-up(s)?	Public hospital	1	510	1	510	1	510
		Public health centre	2		2		2	
		Private health facility	3		3		3	
		At home	4		4		4	
		Other	5		5		5	
509	What was the main reason for not having a check-up on the pregnancy?	Had no complaints	1		1		1	
		Had previous experience	2		2		2	
		Service not available	3		3		3	
		Costs too much	4		4		4	
		Other (specify)	5		5		5	
510	when you were pregnant with (NAME), were you given a tetanus toxiod injection?	Yes	1		1		1	
		No	2		2		2	
		D.K.	3		3		3	

			Name (youngest)		Name (next to youngest)		Name (second to youngest)	
Line number of child in Birth History Table			⌊⌊⌋⌋		⌊⌊⌋⌋		⌊⌊⌋⌋	
Survival status			Alive ☐ Dead ☐		Alive ☐ Dead ☐		Alive ☐ Dead ☐	
	Questions	Coding Categories	Codes	Skip To	Codes	Skip To	Codes	Skip To
511	When you were pregnant with (NAME).. did you suffer from severe breathlessness when you walked such that you were only able to walk a few steps before stopping?	Yes	1		1		1	
		No	2		2		2	
		Can not remember	3		3		3	
512	When you were pregnant with (NAME).did you experience any of the following conditions?		Y N		Y N		Y N	
		Vaginal bleeding	1 2		1 2		1 2	
		High blood pressure	1 2		1 2		1 2	
		Swelling of face or body	1 2		1 2		1 2	
		Severe headache	1 2		1 2		1 2	
		Convulsions / fits	1 2		1 2		1 2	
		Pain in the upper abdomen	1 2		1 2		1 2	
		Diabetes	1 2		1 2		1 2	
		Painful urination	1 2		1 2		1 2	
513	During the delivery of (NAME), did labour last for more than 12 hours?	Yes	1		1		1	
		No	2		2		2	
		D. K.	3		3		3	
514	During labour and /or delivery of (NAME), were you sick with a high fever?	Yes	1		1		1	
		No	2		2		2	
		D. K.	3		3		3	
515	During labour or soon after delivery of (NAME), did you have any convulsions or fits?	Yes	1		1		1	
		No	2		2		2	
		D. K.	3		3		3	
516	Did you experience any excessive vaginal bleeding around the time of labour and delivery of (NAME)?	Yes	1		1		1	
		No	2		2		2	
		D. K.	3		3		3	
517	Where was (Name) delivered?	Public hospital	1		1		1	
		Private health facility	2		2		2	
		At home	3	521	3	521	3	521
		Abroad	4	521	4	521	4	521
		Other	5	521	5	521	5	521

Section 8. Husband's Resources

Questions	Coding Categories		SKIP TO
801 Now I would like to ask some questions about your (last / late) husband. Did he ever attend school?	Yes	1	
	No	2	805
	DK	3	805
802 What was the highest level of education he attended?	Literacy Class	1	805
	Primary	2	
	Preparatory	3	
	Secondary	4	
	Diploma	5	
	University	6	
	D.K.	7	805
803 What was the highest grade (year) he completed at that level?	Grade	⌊⌊⌋	
	D.K.	98	
804 *Interviewer:* Check 802 & 803	Less than 4 years at primary	1	
	Four years at primary or more	2	807
805 Can (could) he read a letter or newspaper, for example?	Yes	1	
	No	2	807
	D.K.	3	807
806 Can (could) he write a letter, for example?	Yes	1	
	No	2	
	D.K.	3	
807 What is (was) his occupation; that is, what kind of work does (did) he mainly do?	----------	⌊⌊⌋	
808 *Interviewer:* Check 201	Currently married	1	
	Not currently married	2	End Interview
809 Does your husband have any additional or secondary job? * IF "YES": What does he do?	Secondary job: ----------	⌊⌊⌋	
	No	96	
	D.K.	98	
810 How old is your husband now?	Age	⌊⌊⌋	
	D.K.	98	

Section 2. Child Health

Now I would like to ask some questions about any illnesses your children night have had recently.

200 Line Number of Child in "Household Roster"		Name ____ ⌊__⌋		Name ____ ⌊__⌋		Name ____ ⌊__⌋		Name ____ ⌊__⌋	
Questions	Coding Categories	Codes	Skip to	Codes	Skip to	Codes	Skip to	Codes	Skip to
201 How is (NAME)'s health in general? Would you say it was excellent, or that he/she has good resistance to disease, or it is normal, or that he/she becomes ill from time to time, or becomes ill often?	Excellent	1		1		1		1	
	Good resistance	2		2		2		2	
	Normal	3		3		3		3	
	Ill from time to time	4		4		4		4	
	Often ill	5		5		5		5	
202 Has (NAME) had diarrhea in the last 24 hours?	Yes	1	205	1	205	1	205	1	205
	No	2		2		2		2	
203 Has (NAME) had diarrhea in the last two weeks?	Yes	1		1		1		1	
	No	2	215	2	215	2	215	2	215
	D.K.	3	215	3	215	3	215	3	215
204 For how many days did the last episode of diarrhea last?	Days (D.K. = 98)	⌊__⌋	206	⌊__⌋	208	⌊__⌋	208	⌊__⌋	208
205 How many days ago did the diarrhea start?	Days (D.K. = 98)	⌊__⌋		⌊__⌋	208	⌊__⌋	208	⌊__⌋	208
206 Interviewer: Check whether last child still breastfed Yes ☐ ↓ No ☐ (Go to 208)									
207 During (NAME)'s diarrhea, was the number of breastfeeds the same as before the diarrhea, or was it increased or reduced, or was breastfeeding stopped completely?	Same	1							
	Increased	2							
	Reduced	3							
	Stopped completely	4							
	Don't know	5							
208 (Aside from breastmilk) Was he/she given the same amount to drink as before the diarrhea, or more or less?	Same	1		1		1		1	
	More	2		2		2		2	
	Less	3		3		3		3	
	Given breast milk only	4		4		4		4	
	Don't know	5		5		5		5	
209 Was (NAME) given more, less, or the same amount of solid food as was given before he/she had diarrhea?	Same	1		1		1		1	
	More	2		2		2		2	
	Less	3		3		3		3	
	Solid food not yet given	4		4		4		4	
	D.K.	5		5		5		5	

Line Number of Child in "Household Roster"		Name ____		Name ____		Name ____		Name ____	
		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋	
Questions	Coding Categories	Codes	Skip to	Codes	Skip to	Codes	Skip to	Codes	Skip to
2100 Was anything given to treat the diarrhea?	Yes	1		1		1		1	
	No	2	212	2	212	2	212	2	212
	Don't know	3	212	3	212	3	212	3	212
2111 What was given to treat the diarrhea? Anything else? *Interviewer:* Record All Mentioned.	ORS (A solution made from powder in a	1		1		1		1	
	Homemade sugar, salt and water solution	2		2		2		2	
	Antibiotic(pill or syrup)	3		3		3		3	
	Other pill or syrup	4		4		4		4	
	Injection (intravenous)	5		5		5		5	
	Home remedies/ Herbal medicines	6		6		6		6	
	Other (specify):	7		7		7		7	
2122 Was (NAME) taken to any of the following persons or places during the last episode of diarrhea?		Y N DK		Y N DK		Y N DK		Y N DK	
	Public hospital	1 2 3		1 2 3		1 2 3		1 2 3	
	Public health centre	1 2 3		1 2 3		1 2 3		1 2 3	
	Private doctor/clinic	1 2 3		1 2 3		1 2 3		1 2 3	
	Pharmacy	1 2 3		1 2 3		1 2 3		1 2 3	
	Traditional herbalist	1 2 3		1 2 3		1 2 3		1 2 3	
	Anyone else	1 2 3		1 2 3		1 2 3		1 2 3	
2133 *Interviewer:* Check 212 Not a single YES to 212 ☐ ▼ At least one YES to 212 ☐ (Go to 215)									
2141 Why was (NAME) not taken somewhere for treatment during the last episode of diarrhea?	No need for treatment	1		1		1		1	
	Illness was mild	2		2		2		2	
	Father/Mother too busy	3		3		3		3	
	No facilities available	4		4		4		4	
	Other (specify):	5		5		5		5	
2151 Did (NAME) have a cough at any time during the last two weeks?	Yes	1		1		1		1	
	No	2	220	2	220	2	220	2	220
	D.K.	3	220	3	220	3	220	3	220
2161 For how many days did he/she have the cough the last time?	Number of days (D.K.= 98)	⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋	
2171 Did (NAME) also experience difficulty in breathing when he/she had the cough?	Yes	1		1		1		1	
	No	2		2		2		2	
	D.K.	3		3		3		3	

Line Number of Child in "Household Roster"		Name ____		Name ____		Name ____		Name ____	
		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋	
Questions	Coding Categories	Codes	Skip to	Codes	Skip to	Codes	Skip to	Codes	Skip to
218 How was (NAME) treated from the cough/shortness of breath? *Interviewer:* Circle all treatments mentioned.	Cough syrup	1		1		1		1	
	Antibiotics (pill/syrup)	2		2		2		2	
	Injection	3		3		3		3	
	Other pill/syrup	4		4		4		4	
	Home remedy/Herbal medicine	5		5		5		5	
	Other (specify): ____	6		6		6		6	
	Nothing	7		7		7		7	
	Don't know	8		8		8		8	
219 Was the advice of any of the following facilities/ persons sought on how to treat the cough? *Interviewer:* Read out list.		Y N DK		Y N DK		Y N DK		Y N DK	
	Public hospital	1 2 3		1 2 3		1 2 3		1 2 3	
	Public health centre	1 2 3		1 2 3		1 2 3		1 2 3	
	Private doctor/clinic	1 2 3		1 2 3		1 2 3		1 2 3	
	Pharmacy	1 2 3		1 2 3		1 2 3		1 2 3	
	Traditional herbalist	1 2 3		1 2 3		1 2 3		1 2 3	
	Relatives/friends	1 2 3		1 2 3		1 2 3		1 2 3	
	Anyone else (specify):	1 2 3		1 2 3		1 2 3		1 2 3	
220 Does (NAME) usually have pus coming from his ears?	Yes	1		1		1		1	
	No	2		2		2		2	
	D.K.	3		3		3		3	
221 Did he/she have pus coming from his/her ears during the last two weeks?	Yes	1		1		1		1	
	No	2		2		2		2	
	D.K.	3		3		3		3	
222 Does (NAME) usually have pus coming from his eyes?	Yes	1		1		1		1	
	No	2		2		2		2	
	D.K.	3		3		3		3	
223 Did he/she have pus coming from his/her eyes during the last two weeks?	Yes	1		1		1		1	
	No	2		2		2		2	
	D.K.	3		3		3		3	
224 Does (NAME) have any kind of food allergy?	Yes	1		1		1		1	
	No	2		2		2		2	
	D.K.	3		3		3		3	
225 Does (NAME) now have or has ever had any of the following conditions?		Y N DK		Y N DK		Y N DK		Y N DK	
	1 Urinary tract infection	1 2 3		1 2 3		1 2 3		1 2 3	
	2 Skin allergy / Urticaria	1 2 3		1 2 3		1 2 3		1 2 3	
	3 Deafness or trouble hearing	1 2 3		1 2 3		1 2 3		1 2 3	
	4 Blindess or trouble seeing	1 2 3		1 2 3		1 2 3		1 2 3	
	5 Crossed eyes	1 2 3		1 2 3		1 2 3		1 2 3	
	6 Stammering or stuttering	1 2 3		1 2 3		1 2 3		1 2 3	
	7 Rickets	1 2 3		1 2 3		1 2 3		1 2 3	

Section 3. Immunization
(For Children Aged 12-13 Months)

300 Line Number of Child in Household Roster				Name ____		Name ____		Name ____		Name ____	
				⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋		⌊_⌋⌊_⌋	
Questions	Coding Categories			Codes	Skip to	Codes	Skip to	Codes	Skip to	Codes	Skip to
301 *Interviewer:* See 102	12-23 months old			1		1		1		1	
	Not 12-23 months old			2	Next child	2	Next child	2	Next child	2	400
302 Is there an immunization card for (NAME)? .. * If Yes: May I see it please?	Yes: Seen			1		1		1		1	
	Yes: Not seen			2	304	2	304	2	304	2	304
	No			3	304	3	304	3	304	3	304
	D.K.			4	304	4	304	4	304	4	304
303 *Interviewer:* See immunization card and mark appropriate code.	BCG		Yes	1	GO TO 306	1	GO TO 306	1	GO TO 306	1	GO TO 306
			No	2		2		2		2	
	DPT	1	Yes	1		1		1		1	
			No	2		2		2		2	
		2	Yes	1		1		1		1	
			No	2		2		2		2	
		3	Yes	1		1		1		1	
			No	2		2		2		2	
	POLIO	1	Yes	1		1		1		1	
			No	2		2		2		2	
		2	Yes	1		1		1		1	
			No	2		2		2		2	
		3	Yes	1		1		1		1	
			No	2		2		2		2	
	Measles		Yes	1		1		1		1	
			No	2		2		2		2	
	MMR		Yes	1		1		1		1	
			No	2		2		2		2	
	HEPATITISB	1	Yes	1		1		1		1	
			No	2		2		2		2	
		2	Yes	1		1		1		1	
			No	2		2		2		2	
		3	Yes	1		1		1		1	
			No	2		2		2		2	
304 Did (NAME) ever receive any vaccinations to prevent him/her from getting diseases?			Yes	1		1		1		1	
			No	2	306	2	306	2	306	2	306
			D.K.	3	306	3	306	3	306	3	306

			Name		Name		Name		Name	
Line number of child in Household Roster			⌊⌊⌋⌋		⌊⌊⌋⌋		⌊⌊⌋⌋		⌊⌊⌋⌋	
Questions		Coding Categories	Codes	Skip to	Codes	Skip to	Codes	Skip to	Codes	Skip to
3305	Please tell me if (NAME) has received any of the following vaccinations:									
1	A BCC vaccination against tuberculosis, that is, an injection in the left shoulder that caused a scar?	Yes	1		1		1		1	
		No	2		2		2		2	
		D.K.	3		3		3		3	
2	A DPT injection?	Yes	1		1		1		1	
		No	2		2		2		2	
		D.K.	3		3		3		3	
	If "Yes" : How many times?	Number of times	⌊⌋		⌊⌋		⌊⌋		⌊⌋	
3	Polio vaccine, that is, drops in the mouth?	Yes	1		1		1		1	
		No	2		2		2		2	
		D.K.	3		3		3		3	
	If "Yes" : How many times?	Number of times	⌊⌋		⌊⌋		⌊⌋		⌊⌋	
4	An injection against measles? (9 months)	Yes	1		1		1		1	
		No	2		2		2		2	
		D.K.	3		3		3		3	
5	An injection against MMR?	Yes	1		1		1		1	
		No	2		2		2		2	
		D.K.	3		3		3		3	
6	An injection against Hepatitis?	Yes	1		1		1		1	
		No	2		2		2		2	
		D.K.	3		3		3		3	
	If "Yes": How many times?	Number of times	⌊⌋		⌊⌋		⌊⌋		⌊⌋	
3306	*Interviewer:* Check 303, 304 & 305	Child not (fully) immunized	1		1		1		1	
		Child fully immunized	2	Next child	2	Next child	2	Next child	2	400
3307	Why was (NAME) not (fully) immunized?	Child too young	1	Next Child	1	Next Child	1	Next Child	1	All go to 400
		Unaware of need for immunization	2		2		2		2	
		Unaware of need to return for other doses	3		3		3		3	
		Place / time of immunization not known	4		4		4		4	
		Fear of side reactions	5		5		5		5	
		Intends to go	6		6		6		6	
		Child ill	7		7		7		7	
		Vaccine not available	8		8		8		8	
		Place far away	9		9		9		9	
		Other (specify)	10		10		10		10	