# Geographical aspects of health and use of primary health care services in Jeddah, Saudi Arabia

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by

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# Abstract

This thesis examines the contribution that geographical analysis can make to the study of the variation in the patterns of human health and subsequently to the discussion on the type and level of use of the public health service in a rapidly developing country.

The current study was conducted in Jeddah Governorate, Kingdom of Saudi Arabia during the period 1994 and 2000. One of the main aims was to examine the pattern of health services provided in Saudi Arabia and this aim was achieved by investigating the provision and use of the Public Healthcare services. An attempt was made to clarify the complex web of relations that existed between, on the one hand, the different socioeconomic and geographic factors and on the other, the distribution of common ailments together with the level of utilization of health services.

Shortcomings in the nature of the official health statistics regarding socio-economic conditions of the patients were remedied through the use of a questionnaire. A total of 1000 patients from the eight PHCCs were surveyed for their use of the public health service. Data was collected from the same patients on their socio-economic, education and habitation details. This sample was used to supplement the data collected from the official government health statistics. These two data sets permitted an evaluation of the occurrence of different ailments and the variations in geographic distribution among the eight selected PHCCs. Difficulties persisted in the availability of official 1992 census data until publication of census data became available in 1999. In contrast to the problems of the census data, the availability of accurate and up-to-date patient records compiled by Ministry of Health staff was of considerable benefit to this research project.

Use was made of Geographic Information Systems software for the analysis of data collected at the level of the PHCC. This allowed visual identification of the spatial variation in the use of the different health services and also allowed the identification of gaps in healthcare provision. The study showed that a density of habitation index used as a prime indicator of socio-economic status could be used as an indicator of the occurrence level for a number of common diseases. A pattern of disease was observed that suggested that the number of visits to PHCCs was substantially higher in low socio-economic districts compared to medium and higher socio-economic districts. It can be shown that the most common ailment was Upper

Respiratory Tract Infections followed by Dental and Gingival diseases. Persons aged between 15 and 44 years made most visits to PHCCs although children under 15 years made proportionately greater use of PHCC facilities. No difference could be found between Saudi and Non Saudi as regards the occurrence of the most common ailments and diseases. The lack of difference was probably due to the close integration of the two population groups and the sharing of the same local environment. This similarity occurred despite considerable differences in income levels and socio-economic status. The level of utilisation of health centers in the selected districts showed differences, being higher in those districts categorized as low socio-economic in the south of Jeddah when compared to higher socio-economic districts in the north of the city. It was evident that the difference in socio-economic factors had an impact on the occurrence of some frequently occurring diseases e.g. URI, Dental, Ophthalmic, musculoskeletal and skin diseases.

Although not primarily concerned with private health care facilities, for completeness sake some information was collected on the use of private health care in conjunction with public health care facilities. The author was surprised to discover that greatest use of private facilities occurred among women and children patients from Al Nuzla al Yamaneyyah and Al Thaalebah, districts that were characterised by low socio-economic conditions.

The use of traditional folk healing was also briefly studied as this form of treatment remains important for some patients. Results showed that there was no difference between the educational standards of patients and their use of traditional folk healers. Again, children and women constituted the majority (86.6%) of users of traditonal healing with Saudi users (18.9%) higher than non Saudi (11.4%). There remains the supposition that alternative medicine may be of far greater importance than the sparse official data suggests. The unquantified illegal immigrant population may be totally reliant on unofficially operating alternative medicine centres.

The thesis concludes by recommending a number of improvements to the existing public health care system. Some changes in the policy and practice of PHCC services will inevitably require more financial resources. These include an extension of the opening times of PHCCs and an increase in the number of specialist facilities such as dental surgeries. Other changes may not require more finances. These include a strengthening of communication and co-operation between PHCCs and hospitals to improve the referral of patients. Expansion of the existing computer network connecting PHCCs with hospitals should be given high priority. A programme of educating new immigrant staff on the special socio-economic conditions that prevail in the districts would be of major benefit both to staff and patients. Attention should be paid to the integration of traditional and modern medicine as this could offer the potential to correct the deficiencies of each and enable the development of a medical service that would provide a better overall level of treatment.

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# Introduction

## 1 Introduction to health care in Saudi Arabia:

The delivery of health care to the whole population as a basic human right is a major challenge to any government, particularly in selecting the best means to achieve the highest possible standard of health care at the lowest possible cost. Governments have tended to create systems to suit their own geographic, environmental, demographic, and socio-economic circumstances and political perceptions. Health policies have been formulated in many developing countries by imitating the health system model of the industrialized world, regardless of whether this health system suits their health problems and conditions, or whether it is practical and cost- effective within their socio-economic conditions and socio-political systems. Health services in the industrial world were developed within particular socio-political and economic systems, which are usually entirely different from those in developing countries. Moreover, the health situations and health problems that are prevalent in the industrial world also differ from those in the developing world. For this reason, it is necessary to think again about existing health care systems and to develop different approaches that can be implemented in the developing world. These approaches must meet the criteria of practicality and cost effectiveness in the context of the huge health problems, soci-cultural structures and resource constraints of developing countries. Many governments have attempted to establish health systems that would work within their political systems, and at the same time are economically cost-effective and provide an acceptable level of health coverage.

The philosophy of development in many developing countries has been to achieve maximum economic growth and consequently, resources have been allocated to the most productive economic sectors. In the past, many governments, development planners and donor organizations have considered health as a costly non-productive sector. Thus, provision of health care was often given very low priority in development planning. However, health is one of the most important aspects of social development, and the position of health in the development process is a very crucial one.

A number of geographers have discussed different types of health care delivery systems, and their effectiveness (Shannon and Dever, 1974, Romer 1977, Joseph and Phillips 1984, Rosenberg 1986, Gesler, 1992), but their studies have largely focused on systems used in more developed countries. Clearly, health care delivery systems differ to varying degrees from one nation to another.

Most geo-economic studies have concentrated on the health delivery systems in the capitalist (North American and Western European) and socialist countries (USSR and China). Much less has been written on the health systems in the Arab countries especially Saudi Arabia.

Basic systems identified normally include the U.S. health delivery system, which is based on free enterprise, fee paying and the freedom of choice. In the U.S., nearly two thirds of health care funds come from direct payments by individuals or from private voluntary insurance. Ownership of two out of three general hospitals is in private hands and planning co-ordination and control of services rests mainly on the voluntary initiative of the providers. This system depends on local decision making by individual doctors and other bodies regarding the location of health services and relies upon very limited assistance from the central government (McGuire *et al.*, 1988).

In contrast to the United States system, the British National Health Service (NHS) is financed mainly from general taxation at the national level. A nationalised care service is controlled by the government but decentralised in its planning and administration. Every resident of the United Kingdom is entitled to these services free of charge by registering with a local general practitioner (GP) of their choice. The GP plays a major part as an entry point to all other medical services. Increasingly, the GP is being encouraged to provide many of the health services within the local medical practice. In recent years, medical practitioners have been encouraged to merge their surgeries and to create Health Care Centres within which some of the services previously only obtainable at a hospital are now available locally. This has enabled hospital waiting lists to be shortened and patients no longer need to travel to hospital nor to spend time as hospital in-patients. Hospital visits are confined to referral to a consultant or for surgery requiring time to be spent in hospital. The NHS is paralleled by a small private sector that has been encouraged by the central authorities over the fast few years. The more affluent members of society can purchase health care insurance that allows patients a choice of treatment centre and at a time that suits them.

Private health care accounts for five percent of the total expenditures on health services in the U.K (McGuire *et al.* 1988).

In the former USSR, the health care system was financed entirely by central government. Ownership of all hospitals was within the public sector and services were planned and operated by districts within substantial regional and national guidelines. Thus, services in the former USSR formed an integral part of the national socio-economic plan for the country. The states administered, planned and financed the health care services and were provided free to users. A monolithic state-operated system such as those operated in the past by the U.K. and the USSR lacked an incentive to raise the cost-efficiency of the system. Worse, such systems consumed ever-greater amounts of centrally funded money. From the patients' point of view, such systems involved long waiting lists for treatment and at hospitals that may not be in easy travel distance from home. Another disadvantage was that the patient could not choose the physician they wanted.

Systems followed in other developed countries such as Canada, Japan, Australia and the Scandinavian countries were often seen as a combination of features selected from the private health care system typified by the U.S. and from the state service typified by Britain. The various combinations of free market health care and state provision have usually been designed to suit the specific needs of a particular country.

Studies of health systems in developing countries are often less informative than those of the developed world due, in part, to a lower level of administrative control. A lack of basic provision of data is also common with data for some regions being available while absent for other areas of the country. Joseph and Phillips (1984) admit that the research of health care systems in the developing countries is usually faced with a number of problems, such as the shortage of basic data on the demographic characteristics, health manpower and the administrative financial support for health care systems. Almost no information exists on how services are used because complete records are seldom available.

Health delivery systems in developing countries are often incoherent, complex and fail to reach much of the population. Other problems also exist. The population may be illiterate and, in turn, fail to understand the need for personal health care. Over population can place extreme pressure on health care facilities. Famine, epidemics, natural disasters and civil war can place abnormal demands on health care services. Immunisation schemes are often incomplete leading to sporadic outbreak of disease. Additional problems include: high mortality rates especially among infants and children; the spread of communal diseases; malnutrition; shortage of clean water; the lack of health and safe environment; shortage of skilled personnel, and lack of funds for purchase of essential drugs and medicines. Consequently, health provision in developing countries often focuses on curative health care provision because the immediate need is to cure illness rather than seek to prevent new ones from occurring. Finally, health care provision in developing countries may be confined to the urban areas because medical staff dislike working in remote rural areas. In these areas, medical provision is often reliant on missionary services or the local population relies on traditional medicine.

In developing countries primary health care, especially in rural areas, has often been neglected. According to estimates for the Middle East:

***Up to 80 percent of the rural communities have no access to health services and over three quarters of doctors work in cities and where three quarters of the health budget is spent, but three quarters of the population and three quarters of ill-health are in rural areas*** **(Simmons, 1980, p.83).**

The advance of medical care in Saudi Arabia was given a stimulus when, in 1977, the General Assembly of the World Health Organisation (WHO) decided that attainment of health for all the people by the year 2000 should be an international goal to be undertaken by all governments of all countries in the world. In 1979, the WHO and its General Assembly adopted the Alma-Ata Declaration, which set out feasible strategies, whereby basic standards of health care would be attainable by all. Each member state was required to prepare its own national strategies that would be integrated with those of other states in the region, and these with the international strategy (M.O.H. 1986).

As the government of the Kingdom of Saudi Arabia is a member state of WHO and since the government has always been working hard to develop and improve the health and well being of all Saudi citizens, the Ministry of Health decided to take effective steps to implement the Alma Ata Declaration. In 1984, the first practical and empirical step was taken by establishing eleven Primary Health Care (PHC) health centres located throughout the kingdom and from which the basic health facilities would be made available. It was decided that each of the centres would deliver a package of comprehensive health services whose purpose was to promote public health to operate preventive and curative medicine and to offer rehabilitative activity (M.O.H. 1986). Since that time there was a progressive implementation of the primary health care elements and strategies throughout the kingdom, and which were coincident with the community needs. The community in Saudi Arabia in general and in Jeddah (the field location for this study) carry unique criteria. The population of Jeddah is cosmopolitan with many representatives of people originating from many different parts of the country and with very different social backgrounds. The phenomenal expansion of Jeddah City as an *entrepôt* and as an industrial and commercial centre, as a place of study and as a place of economic wealth has drawn people not only from within Saudi Arabia but also from throughout the Islamic world. In addition, Jeddah is the point of arrival for religious pilgrims destined for pilgrimage to Mecca. All of these socio-economic factors have given the population of Jeddah a unique structure that, in turn, may create a specific pattern of demand for primary health care. Not least, it will influence such basic factors as the age structure of the population, the educational level and the housing conditions, which may influence the predominant types of disease and the means by which disease is transmitted. The relatively unsophisticated social background of the incomers to Jeddah may also influence the level of demand placed upon the services of the primary health care centre and also influence the level of patient's satisfaction with the level of service provision.

The historical of organized health care service in the Kingdom of Saudi Arabia began in the early 1950s, with a malaria control program initiated jointly by the then recently established Ministry of health, the Arabian-American Oil Company, and the World Health Organization (Al-Tuwaijri, 1989). Since then, health care services have expanded greatly. A great part of health care services is provided by the Saudi government free of charge for Saudi citizen since the government controls all country resources. Health care services in Saudi Arabia are provided in four different systems:

1. Public health care is provided by the Ministry of Health, the agency responsible for delivering health care throughout the country. Saudi law states that the Ministry of Health should provide good health service free of charge to all people who need it.
2. Semi-public health care is provided for by some government institutions, particularly educational institutions, for example, King Abdulaziz University. Services are provided for students, staff and their families free of charge.
3. Military institutions provide health care for military personal and their families free of charge.
4. Private health care is provided as an alternative source of health care for people who are able to pay for it and is also compulsory for certain categories of non-Saudi population. Further details about the health care services in Saudi Arabia will be given in Chapter Three

In broad terms, the provision of health care in organized through a referral system into a country-wide network of primary health care centres, general and specialist hospitals. In addition, a number of government agencies provide health care services directly to their employees. The Ministry of Health is the government agency with overall responsibility for health care in the Kingdom. The National Guard, the Ministry of Defence and Aviation and the Ministry of Interior provide primary, secondary and advanced levels of health care directly for their staff and segments of the general population. The Red Crescent Society provides emergency services and assists pilgrims during the Hajj. High level specialized health care is provided in the kingdom by specialist hospitals, while the Royal Commission for Jubail and Yanbu provides health facilities for employees at the two industrial cities. School health units attend to the immediate primary health care needs of students. The General Organization for Social Insurance and the Presidency of Youth Welfare provide health facilities for certain parts of the population. Through their programs and medical colleges, the universities provide primary and specialized health care services, conduct essential health research and provide medical education programs. Finally, the medical services of the private sector play an increasingly important role in the kingdom and are coordinated with the referral network and the regulatory requirements of health sector as a whole. Chapter Three will give more detail about the health care services in Saudi Arabia.

Studies related to geographical aspects of health and use of primary health care services ranged from the examination of the nature and organisation of systems of health care delivery in various countries under different political, economic, social and cultural conditions through the operation and use of health care facilities at the very local level, (Joseph and Phillips, 1984; Rosenberg, 1986; Gesler, 1992). The researcher is generally interested in that context, so, the study in its spirit reflects an eagerness to explore the nature and organisation of health care delivery system with concern on primary health care services which is considered as the first level of health care in Saudi Arabia, in addition to its widespread distribution in the Kingdom, the other facet was the utilisation of this health services with focusing on the socio-economic characteristics that govern the level of utilisation of these services.

## 2- Aims and objectives of the present study

The thesis addresses two main research questions: first, to consider the level of utilization of health care services as influenced by the socio-economic and demographic composition of the districts. Secondly, to examine environmental and social factors as they affect the pattern of diseases with in Jeddah city.

The main objective was to test the level of satisfaction of patients towards primary health care services, and its impact on the level of utilizing these services, also to know what are the most common diseases prevalent in the community and its relation with the socio-economic and geographic characters.

The study of health care geography represents a new genre of research in which concern with a purely statistical approach towards disease and death has been replaced by an increasing role for the social geographer in which the *provision* of health care has became of interest. Criteria relating to health care facilities and to the availability, accessibility and demand levels of health care service have become paramount. No research of this type has previously been conducted in Jeddah. To put this research into context the development and regional pattern of the health services across the whole country has been examined. This is reported in Chapter 3 before the more detailed study of the situation in Jeddah is considered in Chapters 4, 5 and 6. A simple conceptual framework (Figure 1.1) has been set up to guide the development and analysis of the field-based part of the research in Jeddah city.

Fig 1.1 Model framework

Use of the Primary Health Care Facilities, and Behavior.
1- Type of Ailment.
2- Frequencies of visits.
3- Attitudes towards folk healing.

| (1) | (2) | (3) |
|---|---|---|
| Patient characteristics<br>Demographic and socio-<br>Economic factors.<br>1. Age<br>2. Marital status<br>3. Social level<br>4. Nationality<br>5. Education<br>6. Occupation<br>7. Monthly income<br>8. Family size<br>9. Housing environment | Patients<br>Residence area | Accessibility<br>1- travel time<br>2- type of transportation |

Within this framework the reasons for patients' use of health services can be evaluated against a wide range of other variables. These mainly include various demographic and socio-economic aspects of the patients interviewed at the primary health centers, and include such basic factors as their age, educational level, and housing conditions as well as aspects of their mobility.

Where each patient lives in relation to the health points has been treated as an independent variable and by examining a range of variables it was possible to test the variation in uptake of health care services, and specifically to examine the variation in use pattern according to location, accessibility and type of ailment common within different districts. It was also assumed that different sub-groups of the users could be defined in relation to their patterns of utilization of the modern health care and traditional folk healers.

To examine the differences between the districts, various characteristics of the patients, such as age, marital status, educational level and nationality were considered as independent variables while the types of ailment, utilization pattern of modern primary health care and attitudes to use of folk healers were considered as dependent variables.

The primary research conducted for the thesis investigated the provision and use of primary health care services in Jeddah. It was also concerned to determine the elements that affect the geographical distribution of a sample selection of common diseases that occur in the eight selected Primary Health Care Centres (Al Balad, Al Nuzlah Al Yamaneyyah, Al Ruwais, Al Zahra'a, Bani Malek, Al Thaleba, Madain Al Fahd, Al Safa) in Jeddah City. Although primarily intended as a study in medical geography, it became inevitable that during the period of field research to highlight the use of the health care facilities, the author became involved in a study of the varied socio-cultural characteristics of the population of Jeddah.

## 3 The structure of the thesis:

The study comprises seven chapters. The first chapter is mainly concerned with the historical development of Medical Geography with reference to Saudi Arabia. In Chapter Two an introduction to the study area is provided while the third chapter examines the Health Care Services in Saudi Arabia. Chapter Four is devoted to an examination of the methodology used in the thesis while Chapter Five analyses the official Primary Health Care data collected from the health centre records. The sixth chapter provides a detailed analysis of 1000 questionnaire patient records collected by the author and the seventh chapter draws a series of findings from Chapters Five and Six. The final section, Chapter Seven, provides a conclusion for the thesis.

In order to put the study into context and make clear the approach to the methods of data collection and analysis adopted in this study, it is first necessary to review the historical development of Medical Geography with reference to Saudi Arabia. This is done in Chapter One.

# Chapter One

## Literature Review

### 1.1 Rationale for the study

The subject matter of this research programme describes a unique set of circumstances that is typical only for a small group of oil rich nations, primarily those of the Arabian Peninsula. Until the early 1960's, Saudi Arabia could best be described as a "Third World" country. However, unlike most other Third World countries, its economy was transformed by the development of the largest oil reserves in the world. Despite the relative cheapness of crude oil on the world market throughout most of the 1980's and 1990's, the economy of Saudi Arabia has been such that a major programme of public health and medical services provision has been provided free of charge to Saudi nationals. The Saudi government has been able to invest in the best technology and skills of western medicine and now enjoys a level of free public health care which is among the best in the world.

Despite the advanced nature of the medical service in the kingdom, there remain many legacies of a third world attitude towards health care provision. Foremost among these is the difficulty in obtaining medical statistics. Perhaps as a result of this difficulty, it is not surprising that detailed medical geography research in Saudi Arabia is confined to one textbook and several research theses. The purpose of this thesis has been to build upon the earlier work and to investigate the distribution of the most common ailments prevailing in Jeddah governorate and to highlight the web of interactions between these ailments and various geographical factors in terms of contemporary medical geography.

Due to the lack of previous detailed studies in Saudi Arabia that used medical statistics, it has been necessary for the present study to be both exploratory as well as analytical in its content. The primary research conducted for the thesis investigated the provision and use of primary health care services in Jeddah. It was also concerned to determine the elements that affect the geographical distribution of a sample selection of common diseases that occurred in the different districts of Jeddah City. Although primarily intended as a study in medical geography, it became inevitable that during the period of field research into the use of the health care facilities, the work involved an understanding of the varied socio-cultural characteristics of the population of Jeddah. The population of Jeddah is cosmopolitan with many representatives of peoples originating from many different parts of the country and with very different social backgrounds. The phenomenal expansion of Jeddah City as an *entrepôt* and as industrial and commercial centre, as a place of study and as a place of economic wealth has drawn people not only from within Saudi Arabia but also from throughout the Islamic world. In addition, Jeddah is the point of arrival for religious pilgrims destined for pilgrimage to Mecca. All of these socio-economic factors have given the population of Jeddah a unique structure which, in turn, may create a specific pattern of demand for primary health care. Not least, it will influence such basic factors as the age structure of the population, the educational level and the housing conditions, which may influence the predominant types of disease, and the means by which disease is transmitted. The relatively unsophisticated social background of the incomers to Jeddah may also influence the level of demand placed upon the services of the primary health care centre and also influence the level of patient's satisfaction with the level of service provision.

The position of this study does not fit easily within any clearly identifiable 'formal' category of health geography. Rather it builds upon work that has emerged from several strands of contemporary medical geographical thinking. Part of the objective of the research carried out for this study has been to investigate the general spatial distribution and the environmental factors, which may bring together pathogen and man. These relationships will be explored in later chapters in order to understand the disease-environment relationship within the context of Saudi Arabia

## 1.2 An introduction to medical geography with special relevance to Saudi Arabia

An appreciation of how aspects of the physical and human environment influence the state of bodily and mental health of the human population formed part of the content of medical geography for many years, (Joseph and Phillips, 1984 p.1).

Over time, medical geography has inevitably undergone change in ways that are similar to the changes that have been partly due to increased scientific knowledge but also to a variety of new research methods that have come into common place use by social scientists, (Pyle, 1979, p.9). Medical geography experienced substantial progress during the last two decades of the twentieth century and the discipline has achieved considerably maturity as shown by the diversification of its many areas of research. The traditional interest of the medical geographer such as the study of disease ecology has been broadened to include many aspects of health care provision, (Paul, 1985, p.399). Increasingly sophisticated methods of spatial analysis have been used to study disease patterns and health care delivery. Spatial statistics have been used to describe and explain the patterns of mortality and morbidity. Increasing attention has been paid to the impact of local environment and life style characteristics upon the health of the individual.

As with all definitions, the interpretation of the term "Medical Geography" can mean many different things to different people. In this respect, the term 'Medical Geography' behaves the same as other definitions and has many different interpretations depending on the perspective of the person or organisation using the term. The meaning has also evolved over time as the subject of geography itself has grown and matured.

For example, Hunter (1971) defined medical geography as *the application of geographical concepts and techniques to health related problems.* He believed that geography was a discipline that bridged the social and environmental sciences and its integration and coherence derived from systems-related analysis of people, environmental interactions through time and over space (Hunter, 1974, p.3). Learmonth (1978) defined the term medical geography as one usually found in the English-speaking world to describe *the geography of health and disease, the study of patterns of similarities and of differences between areas.*

Pyle (1979) defined medical geography as *a multi-dimensional body of knowledge and at the same time a multi faceted approach geared toward understanding spatial aspects of human health problems.* One year later, Howe (1980) defined medical geography as *the analysis of spatial variations in human health, and of the environmental conditions, which are, or may be the causes of* *them*. In the same year, Barrett (1986) provided yet another meaning: *the analysis of human environmental relationship of disease, nutrition and medical care systems in order to elucidate its inter-relationships in space.*

Smith in 1977 stated that, *it has become evident that health service availability and utilization have become important aspects in urban, rural and social geography*. Medical and health care services are a major focus of the well-established subject of medical geography. These services established the welfare approach inherent in medical geography and which considers people, their access to and use of essential services and their quality of life. That statement was enforced a few years later by Joseph and Phillips in 1984. Meade *et al*, (1980, p.7) recognised that *'when several medical care systems are available, people will choose among them according to their perceptions of efficacy for particular health problems'*. An individual's response to illness will vary as much as their decision to seek out care. This response will be influenced by outside factors such as accessibility and personal factors such as the individual's resistance to pain. Some authors have divided factors influencing the use of health care services into demographic and socio-economic factors related to the patients, cost factors predisposing factors (such as known availability of the services) and attitudinal factors such as the patients awareness of symptoms, (Stimson, 1980; Phillips, 1981; Eyles and Woods, 1983). The relation between healthcare and the ways in which social, cultural and political and economic influences can alter the experience of health and illness across space and within places are issues which have been of particular interest to medical geographers in recent years.

Initially, medical geography concentrated upon spatial studies of the patterns and incidence of disease. This initial phase placed emphasis upon the geographic study of disease. Typically, specific diseases were studied using a tripartite approach based upon population, environment, and behaviour and the interactions that existed between these factors. Typically, emphasis was placed on the study of the distribution of physiological traits in different communities, and the correlation of such data with features of the natural environment, (Howe, 1972). This has focus in medical geography on the correlation of diseases and disease distribution with possible or actual environmental causative factors. This particular view of medical geography is one that bears a close relationship to epidemiology, in which concern is concentrated on the patterns of disease occurrence in human populations and of the factors that influence the patterns. The epidemiologist is primarily interested in the occurrence of disease by time, place, and persons. Trying to determine whether there has been an increase or decrease of the disease over the years, whether one geographical area has a higher frequency of the disease than another, and whether the characteristics of persons with a particular disease or condition distinguish them from those without it (Lilienffeld & Lilienffeld 1980, p3). This concept places its emphasis on the spatial aspects of environmental relationships. The first tentative attempts to understand the causes of disease in humans were made by Hippocrates (460-377 B.C.) the greatest physician of antiquity. The Hippocratic concept of the cause and treatment of disease persisted until the time of Pasteur and Koch and the introduction of the germ theory towards the end of the nineteenth century. With the advances in the study of bacteriology, the mystery of infectious diseases was gradually swept away, (Howe 1980, p.282).

The study of geographical distribution of disease can trace its origin back to antiquity and over the centuries has received by far the most attention of the three components of medical geography. Hoffman, quoted in Phillips (1981), stated that as early as the beginning of the eighteenth century there were investigations on the patterns of regional diets, and also diseases of the circulatory and respiratory systems and of the digestive system were identified. British and European colonialists with an interest in the potential dangers to health in their newly annexed territories also highlighted the importance of geography to the understanding of health and disease (May, 1952). This type of research established the so-called 'Ecological' approach to medical geography, and was concerned with the cause of disease (for example, the bacteria or the virus) and less with the environmental conditions in which the patient lived. By understanding the life history of the bacterium and by intervening at an appropriate point, the medical practitioner believed that disease could be prevented. Environment only became a consideration if the geographic conditions in which humans lived were suitable for the survival of the cause of disease. Health problems therefore became recognised as having an environmental context and as such were amenable to techniques of spatial analysis. Among the first disease incidents to be studied by means of spatial analysis was the diffusion of plague in Europe in the 1300's. In the early 1960s, one of the most active workers in this field was Sir Dudley Stamp. He observed that medical geography could be treated at four distinct levels of geographical scale.

Initially, the epidemiology of diseases and their distribution were made at a macro level. At this level, researchers could identify world patterns of major diseases distribution. Early work in this area was financed by the American Geographical Society directed by Dr. Jacques May who possessed the ideal qualifications of being a medical man by training and a geographer at heart! At a macro-scale we can find examples that operate on a national (or continental) scale. Many of the studies made by Andrew Learmonth fall into this category, for example, his study of the ecology of malaria in India and Pakistan, and the development of various models depicting the spread of malaria in a hypothetical continent.

Other notable work made at the macro-scale level is that of Hunter (1966, 1976 and 1980) and his studies on Onchocerciasis (river blindness) in specific areas of the world. In addition, considerable work has been conducted on the food and diet patterns of society and the impact this may have on disease patterns, (Sorre, 1962; May, 1974; Learmonth, 1978; Newman, 1980; Vermeer and Ferrell 1985).

The second level at which Medical Geography can be studied was at the meso- or regional scale. Examples include the work of Stamp in which a regional study of 'healthy' and 'unhealthy' areas of Burma was made, and also the work of A. Geddes in India described in Brown (1980, p.84).

The most detailed level of study is that of the local level, or micro-level studies. The first documented evidence of a local level medical geography study was that of Dr. John Snow in his efforts to identify the source of the 1854 cholera outbreak in London. Snow found that all his Soho patients used water from one pump in Broad Street, and when this pump was closed, the outbreak ceased.

Later studies by Steensberg, (1982); Pringle (1983) and Kagami (1984), all reinforce the micro scale at which medical geography research now occurs. This has been made possible by the availability of data at the required detail to support micro-scale research.

During its first decade of existence as a part of post-war Geography, medical geographers were concerned to establish general rules and principles that they considered would apply to their discipline. In an era that would become dominated by rigid systematic divisions in Geography, medical geographers sought to categorise disease occurrence into neat compartments between which inter-linkages were rarely thought to exist. For example, Stamp claimed that there were three categories of human disease linked to environmental factors but which he considered existed at discrete national or regional levels.

Cruickshank (1976) discussed the epidemiology and control of disease in warm climate countries of the tropical and sub-tropical regions. Such areas are often called the 'developing countries' and Cruikshank (*op.cit.*) proposed that the pattern of diseases in such countries was very different from that of the economically advanced and more sophisticated countries in the temperate zones. In the latter, the degenerative diseases of middle and older age groups, such as cardiovascular disease, chronic respiratory infections, rheumatism and malignant diseases are the main causes of invalidity and death. Moreover, he said that in most warm climate countries, disease mainly attacks the younger age groups. Mortality from infection is often combined with malnutrition, and results in extremely high early childhood mortality. Between 40 and 50 percent of children in the poorest developing countries may die before reaching their fifth birthday. The great killers in these early years are pneumonia and dehydration resulting from chronic sickness and diarrhoea. All are related to poverty, malnutrition and dehydration.

Moreover, by analysing the standardised rates for specific diseases it can be demonstrated that spatial patterns of morbidity (illness) and mortality (death) are relative to local environments and life-style characteristics. The World Health Organization (WHO 1965) helped collect the data relating to the place of death or usual place of residence given on death certificates. This information was important for purposes of spatial analysis. In the U.K., Howe and others had made progress in demonstrating and analysing spatial variations in mortality. Emphasis on data has been concentrated on the medical geography of chronic, non-infectious diseases such as the cancers, coronary artery disease, cerebro-vascular disease and bronchitis (Howe, 1959; 1961; 1963; 1968; 1969; 1973; 1974; 1976; 1977; 1980; Murray 1967; Coates and Rawstron 1971).

Cartography has played a major role within ecological approaches to the study of medical geography. National atlases of disease and of mortality patterns have been produced for a number of countries including Great Britain and Japan. Atlases of mortality from cancer have had a strong impact in the United States and in China. Indeed, atlases of disease occurrence and diffusion such as the Welt-Seuchen-Atlas (Rodenwaldt and Jusatz, 1952-1961) have been recognized as providing one of the major contributions by geography to the health professions. British geographers have been especially vigorous in mapping disease distribution and have developed techniques to display data with great accuracy and sophistication. *The National Atlas of Disease Mortality in the United Kingdom* by Howe, supported by the Medical Research Committee of the Royal Geographical Society, is among the best known of the medical atlases, (Stamp, 1964), However, Stamp also drew attention to the need for research into other geographical aspects of health and ill-health, suggesting that suitable subjects for study might be the linkage between health and factors such as housing, occupation and micro-climate-issues which still form the basic of much contemporary research in health geography (see for example Smith,1989; Maclntyer,1994; Smith et al,1997). Cartography, which involves the construction and interpretation of maps, holds a central place in geography. Most geographers have a profound love affair with maps. An old saying in the field is "*if it can't be mapped, it's not geography*", (Mead, 1980).

Geographers in the study of medical geography have used a wide variety of statistical techniques and such, investigation have used classical tools of visitation as well as methods of data exploration and modelling drawn from the statistical and epidemiological sciences. Patrolling such studies in geographical and environmental epidemiology have been others, set less within a natural science paradigm and more within a social science context. Among the most dramatic changes affecting the way geographers go about their work has been the growth of computer-assisted cartography, (Gatrell, 1988; Martin, 1996; Meade and Earickson, 2000). Access to increasingly powerful personal computers has enabled researchers to examine larger sets of data using statistical analysis techniques marketed in readily usable ways. Initially, packages were used for producing simple distribution maps on dot matrix printers. Gradually, these programs allowed the researcher to integrate spatial data analysis. For example, LINMAP and SYMAP originated from the laboratory for computer graphics and spatial analysis at Harvard University in mid-1960s, while SAS-Graph allowed the use of either point or areal data, (Meade, 1980, p279). The 1980s saw a massive rise in the handling of statistical information by computer, leading to the rapid evolution of systems, which have become known as Geographic Information Systems (GIS). These systems allow the production of good quality maps using coloured inkjet printers and have been widely used in health studies, (Martin, 1996, p.44).

Moreover, one major area in which GIS and health research have come together is via the study of environmental epidemiology, which they looked for links between diseases and the physical environment, while controlling for the impact of lifestyle-factors such as smoking, diet and physical exercise and they contrast this with the more narrowly defined geographical or spatial epidemiology. For example, in 1995, Dunn et al, used GIS to explore links between air pollution and health and also Kingham (1993) who has sought to find a link between models of air pollution and respiratory diseases using GIS. In 1995, Hirschfield *et al.* explored a different type of application. They investigated the catchments area of a general medical practice in the UK, and examined factors such as the travel times from home to surgery computed by means of a GIS and based upon a detailed road network map. This work has relevance to the definition of surgery catchment areas and the measurement of accessibility to local health care services, (Martin, 1996, p.44). Also, a similar study was made by U.K. health authorities and surveyed by Gould (1992) who noted a generally high level of awareness of spatial data and GIS capabilities among health service personnel. He concluded that much contemporary activity was of a low-level nature typically involving the production and visual inspection of thematic maps, and that there remains enormous potential for development of geographic analysis in this field (Martin, 1996, p.44).

Hailing, Wise and Blake (1994) used GIS to pinpoint high-risk areas for incidence of cancers. They also applied a similar approach to the delivery of better health care. In November 1993, a pilot project was set up to study the best way to implement an effective desktop mapping system in the Avon Health Department, UK. The system was based on the relatively simple computer mapping system provided by MapInfo V3.0 software and provided a systematic way to allocate patients to practices according to their postcodes. The project also assessed the coverage of the Avon Health Department in terms of medical practice boundaries and identified areas in which coverage was inadequate. In addition the system was used to show how other data such as census data could be utilised and related to practice and, in turn, to find more effective ways of assessing the impact that practice boundary changes would have for patients and upon adjacent practices (Burns, 1995, p.35). In addition, other research used social statistical analysis software such as SPSS to study health care, for example the Eastern Health Authority analysed the population composition and disease profile of its patients and mapped the results to show where health care needs were greatest. Moreover, the London ambulance service invested in GIS to improve the way its' control room handles call and response times (www.spss.com/geo.htm). Many other researchers have used similar modern tools such as Bailey and Gatrell (1995), Jones and Duncan (1995), Sooman and Macintyre (1995), Gatrell, *et al.* (1996), and Gatrell & Löytönen (1998).

Ecological studies of health and disease have tended to use aggregate measures of health and risk factors for populations resident in different geographical areas. Giggs, (1973) used aggregate measures to study the distribution of Schizophrenics in Nottingham. His finding revealed a distinct agglomeration of such individuals within areas that displayed high level of social deprivation. He thus advanced the view that it was possible to identify specific "risk' areas within the city, where increased incidence of mental illness was likely to arise as consequence of adverse environmental conditions, the so-called 'breeder' hypothesis. Recent studies, for example, by Jones and Duncan (1995), focussed on aggregate data as an appropriate level at which to examine spatial differences in chronic illness. They argued that whist ecological explanations are potentially important, much aggregate data does not hold at level of individual. Rather than an ecological fallacy, they maintained that the issue is one of an aggregative fallacy, (p.28). They argued that there was a need to focus on the ecology within an individual's life and work. Whilst acknowledging the importance of individual characteristics (age, gender, class etc) they maintained that to understand health outcomes, it was also necessary to consider whether people of similar characteristics experienced different health outcomes in different places. Also, they recognised the potential problem of an 'atomistic fallacy', in which an exclusive focus on the individual level can miss the context within which individual action occurs. Thus they argued for a multi-level approach which places an emphasis on the modelling of individual and ecological interactions.

The sociological approach of much recent medical geography has led some workers to variously refer to the field as the geography of health care or as the geography of medical care or medical-socio geography. Phillips (1981, p.2) argued that this change was necessary *in recognition of the importance attached to social, economic and political aspects of the provision and use of medical and welfare facilities to counter human health problems.*

In addition, modern medical geography involves a study of health variation and inequalities, not only in terms of health outcomes but also in terms of access to, and the provision of, services. What both areas of research have in common is the recognition that space and place make a difference to the access of health care provision. However, one group of techniques has been favoured above most others - that of spatial analysis - to study disease and health care delivery patterns. By using these techniques geographers have successfully described the spatial patterns of mortality and have unravelled some of the factors associated with the patterns of disease distribution, diffusion and aetiology. In addition, the spatial distribution, location, diffusion and rationalisation of health care resources, access to and the utilisation of resources and factors related to resource distribution use, have all been successfully studied. A further success has occurred in the investigation of spatial aspects of the interactions between disease, and health care delivery (Gesler 1984).

By the late 1970's Medical Geography research was gradually moving away from its traditional earlier pre-occupation with spatial distribution of disease and began to diversify towards the study of spatial aspects of health service provision. Milton Romer, quoted in Pyle (1979, p.205) offered a generalised comparative typology of international health care delivery systems five types of health care systems were proposed:

- Free enterprise;
- Welfare state;
- Transitional state;

- Under developed;
- Socialist state

The work of both Wood (1979) and Smith (1979) had indicated the change in direction of Medical Geography research towards the geography of health care provision.

The work of Wood (1979), Smith (1979), Brown (1980), Pyle(1974) Shannon and Dever (1974) Joseph and Philips (1984) and Phillips (1980,1990) had indicated the change in direction of Medical Geography research towards the geography of health care provision. The study of health care geography represented a new genre of research in which concern with a purely statistical approach towards disease and death has been replaced by an increasing role for the social geographer in which the provision of health care became of interest. Criteria relating to health care facilities and to the availability, accessibility and demand levels of health care service now became paramount.

A number of geographers have discussed different types of health care delivery systems, and their effectiveness (Shannon and Dever, 1974, Romer 1977, Joseph and Phillips 1984, Rosenberg 1986), but their studies focused mainly on systems used in more developed countries. Clearly, health care delivery systems differ to varying degrees from one nation to another depending on the specific and often unique features of individual nations. Their research adopted methods such as location-allocation modelling, correlation and regression analyses, to focus on the spatial and temporal relationships between the distribution and requirement for services and characteristics of the environment. As a consequence of these approaches to medical geographical problems, some studies began to move away from simple and deterministic assumption regarding human behaviour. Phillips (1981), for example, using census enumeration districts (of both high and low economic status) was able to demonstrate how distance, social status, personal mobility and previous residence were all influential in the selection of which GP surgery an individual attended. He argued, that health service usage patterns bore a relationship to distance between patients and service location. Also Phillips (*op.cit.*) was able to demonstrate that many patients preferred to remain with their GP even following a change of residence, revealing an historical inertia to surgery use. Thus, previous residence was seen to play a significant factor in explaining the spatial patterning of GP utilisation behaviour.

Such work was able to highlight the importance of behavioural perspectives on the analysis of health issues, in that they challenged the presumptions of a spatial hierarchy (as proposed by Christaller, 1966). The interaction between the patient and the medical facility was seen to be dependent not only on the medical setting and the patient's attributes, but also on expectations taken to the setting by the patient. More recently, Kanzanjian and Pagliccia (1996) used a similar approach to explore the location influences on physicians in Canada, illustrating how such influences can contribute to the twin problems of physician surplus and geographical inequality in provision.

In general terms, the implications of this contemporary response for medical geography have been that it should be informed by social and cultural theory. This can be broadly subsumed under humanistic and structuralized perspectives. In the process of exploring such social construction of health/ill-health, and with an increased emphasis on the individual, these developments demonstrate a significant growth in the body of research within medical geography that embraces and recognises the value of adopting qualitative approaches to the analysis of a particular research problem.

Curtis and Taket (1996), identify three strands, which can be said to fall within contemporary perspectives on medical geography. These approaches arise from a variety of critiques of both positivism and the biomedical model. Biomedical model means the traditional approaches to medical geography that consider disease as a naturally occurring and culture-free entity (Litva and Eyles, 1995). The first of these contemporary strands concerns itself with the humanistic turn, and has been linked to the Chicago School of Sociologists. Such studies move away from the simplistic normative behavioural assumption which formed the basis of earlier work, to focus on the nature of the motivations behind individual health-related behaviour and a concern with understanding individual decision-making. Thus they take as their focus a concern with socio-cultural constructions of health and illness.

Such perspectives indicate a new way from the more traditional bio-medical models of health toward a special constructionist approach to research. Within medical geography, the works of Waxler (1981), Conwell (1984), Eyles and Donovan (1986), Takahashi (1997) and Parr (1997,1998) have all adopted qualitative approaches as a means of considering not just the causes of ill-health, but also to examine both concepts and perceptions of health and ill-health. The social construction of health and illness can have an impact on community responses to human service facilities, and also the way in which such socially constructed definition can affect both the behaviour of the individual and the practice of health professionals. The second of these more contemporary strands derives from an essentially welfare approach to human geography (Smith, 1977), and focuses on issues of spatial inequality in health and welfare and their importance for the well-being of the individual. In doing so, it moves beyond Smith's concern with "who gets what, where and how", to explore the role of political and socio-economic processes in the production of health and resource distribution.

Other researchers have also illustrated the importance of political factors in considering aspects of health geography Mohan (1995a) for example, in an examination of the macro-political environment in Britain post-1979, maintained that changes in the health sector should not be viewed in terms of technological determinism or convergence.

The third strand of thought that has relevance within this discussion of contemporary perspectives in medical geography is the emergence of work that has been associated with the 'cultural turn' in geography. Philo (1987, 1989) using the development of the 19th century mental asylum, and Gesler (1991, 1992,1993,1996) using example at Lourdes and Epidaurus, explore notions of the 'therapeutic landscape' and its role in the healing process. More recently, Kearns and Barnett (1997) have sought to link culture, place and health by examining the contribution of healthcare facilities and their underlying ideologies of competitive provision, to contemporary urban landscapes in New Zealand. Hence, they explored how the commodification of care has become manifest in medical landscape that is writ with symbols and iconographic images aimed at the health consumer.

In summary, it is possible to recognize how medical geography has inevitably changed over time in ways similar to the changes that have been experienced by the entire discipline of geography. These changes have been particularly due to the continued influences obtained from a variety of approaches now in common place scientific use (Pyle, 1979, p.9).

## 1.3 Medical Geography in the Middle East:

While much progress has been made in recent years in the study of medical geography in Western countries, far less has been written about this field in the developing countries. Western writers have been mainly responsible for the few articles relating to the Middle East, and nearly all were concerned with disease ecology for example Cruickshank (1976). Some books on health care in developing countries have appeared in the last few years, notable that by Gesler (1992). Other authors while concentrating on health care in western countries have included short sections on developing countries, for example Joseph and Phillips (1984). A major reason for the restricted development in medical geography in developing countries has been the limited data bases available for the local populations. Census and demographic data may exist but statistics relating to health characteristics are often unavailable. Hellen (1986) reviewed the recent progress in the study of medical geography in the Third World and showed how little material had appeared in English, German and French. Ramesh (1983), in a review of medical geography in India, also noted the limited literature available on health care delivery systems in spite of the scope for geographers to contribute to this aspect of medical geography.

This is not, however, to deny the importance of work in these fields conducted by health planners, health economists or medical sociologists and some geographers mainly working for government or international organizations like the World Health Organization (WHO). The contribution of WHO in health studies, and especially public health, in the Third World is evident in publications such as public health papers, forum reports, and in its regional publications series. For example, the WHO Regional Office for the Eastern Mediterranean in 1980 published Simon's Middle East Health Report which included general information on the health situation, health services and health manpower in the Middle East, but very little information was included on Saudi Arabia

The magnitude of the problem of tropical diseases remains high in areas with climatic, social and environmental conditions favourable to transmission of this group of communicable diseases. In addition, other factors such as lack of sustainability in application of prevention and control measures against tropical diseases and the high cost of drugs for treatment of some diseases (such as Schistosomiasis, leishmaniasis, lymphatic filariasis, intestinal parasitic infections and Malaria) has significantly restrained progress in reducing the importance of tropical diseases in the region. For examples Schistosomiasis is greatest in rural areas of Egypt, Sudan and Republic of Yemen. Further progress in the reduction of the incidence of this disease has been achieved in Morocco, Saudi Arabia and Syrian Arab Republic. Leishmaniasis is prevelant in Sudan, Tunisia and Libyan Arab Jamahiriya, Palestine and Syrian Arab Republic. Lymphatic filariasis was endemic in Egypt infecting about 15000 people located mainly in rural villages. The World Health Organisation supported a workshop on diagnosis and control of intestinal parasitic infections in Saudi Arabia, which mainly infects children in different provinces. Malaria is one of the epidemiological diseases which is situated in three eco-epidemiological zones with respect to malaria: afro-tropical, oriental and Palaearctic. Consequently, there are striking dissimilarities among the countries of the Region in relation to the malaria problem, although all of them are malaria-receptive. The region can be classified into three groups:

1. Countries where malaria transmission does not occur or sporadically occurs after importation: Bahrain, Cyprus, Jordan, Kuwait, Lebanon , Libyan Arab Jamahiriya, Palestine, Qatar, Tunisia.
2. Countries with strong health systems and effective malaria control programmes, where malaria is quite well contained Egypt, Morocco, Oman, United Arab Emirates where eradication of malaria is in progress. Islamic Republic of Iran, Pakistan, Saudi Arabia, Syrian Arab Republic where malaria morbidity may be brought down.
3. Countries with a very serious malaria problem – these are countries with afro-tropical malaria and/or damaged health systems: Djibouti, Somalia, Sudan, Republic of Yemen, Afghanistan, and Iraq.

The majority of the population of the Middle East (72%) lives in countries in which malaria is effectively controlled (group 2); this figure also includes 21% in countries where malaria eradication is feasible in the near future. This account for the bulk of malaria: more than 95% of the total number of malaria cases, which is estimated at about 14 million per year. The countries of group 1, with no malaria transmission, account for only 7% of the population. See the following Web site for more detail: (www.who.sci.eg/rd/Annualreports/1999/chapter5.htm)

The other major cause of illness and death in the Region is cardiovascular diseases, particularly coronary heart disease and cerebrovascular disease. Available data indicate that the region is going through an epidemiological transition, and that risk factors for this diseases are becoming much more prevalent. It is widely thought that the ageing of population, changing nutritional and behavioural habits and sedentary lifestyle patterns have all contributed to the occurrence of this disease epidemic.

Diabetes mellitus has become the most common metabolic disorder among both adult men and women in the region. Reported data from community based surveys in the countries of the region show exceptionally high rates of diabetes with prevalence rates among adults aged 40 years and older as high as 20% (e.g. Bahrain, Kuwait, Saudi Arabia) in addition, diabetes is becoming a major contribution to death and disability in the region

Upper respiratory infections (URI) were commonest among young children worldwide with four to eight episodes per year. However, the incidence of acute lower respiratory infections, in particular pneumonia, is very high in developing countries. This can be attributed to environmental factors which significantly heighten the risk of infection. These factors include: low birth weight, poor nutrition, low income, and indoor air pollution. It is evident that bout 4 million children die every year due to these infections, mostly from pneumonia. The following web site provides information on URI: www.who.int/aboutwho/preventing/acute.htm.

## 1.4 Medical Geography in Saudi Arabia:

The Kingdom of Saudi Arabia comprises an area of 2.25 million square kilometres, extending over almost 17 degrees of latitude. Seven distinct physiographic regions can be identified and reveal a wide variation in climate, landscape, fauna, flora and socio-economic conditions. A commonly held belief among the medical profession and among the lay population assumes that different parts of the country experience differing proportions of the common diseases and that the explanation for the variation is due to the differing climatic conditions.

Because of the recent development of modern 'western' medicine in Saudi Arabia since 1965 the situation regarding the application of medical geography research studies within the Kingdom differs greatly from the situation that exists in countries such as Britain, Australia, Canada and the United States of America. Despite the considerable progress made by medical geography research, especially in western countries, the situation in developing countries, including Saudi Arabia, is very different. Considerably less basic research has been completed and as such, essential demographic and epidemiological data either does not exist, or has been collected and stored in ways that do not encourage its use. The urgency with which this situation must be changed has reached critical proportions and has been brought about because of the rapid rate of development among the ‘emerging nations’. Unless a substantial effort is put into the collection of detailed data relating to disease occurrence and its spatial pattern then much original information will be swept away as societies throughout the world assume a standardised pattern of health care and management based on the medical practice of the developed world.

Most Medical Geography research has focused on the more developed countries, especially North America and Western Europe where concern with health care provision has reached an all time high due, in part, to an ageing population that is anxious to gain access to an affordable, accessible health care service. The situation in developing world countries is very different. The main problem of researching disease patterns and health care provision is caused by a lack of accurate, consistent, long-term medical data. Financial shortages have resulted in medicare administration and record keeping taking a secondary position to the provision of basic health care services such as immunisation, birth control (Joseph and Phillips, 1984).

The study of medical geography in the Arab world lagged considerably behind the development of the subject in the western world. In Saudi Arabia, interest in western style medicine and the development of health services are of a recent nature, dating from 1926. Even by the late 1990’s, research on medical geography in

Saudi Arabia where medical research and health care provision was rapidly expanding and developing, was still seriously obstructed by the lack of accurate data defining the extent, content and type of health care problems. The first medical geography text written in Arabic was published by Sharaf (1986), entitled *Environment and Human Health: A Medical Geography.* This text was concerned with the geography of diseases and most of its examples and approaches originated from western authors. Most of the limited health research quoted by Sharaf is specifically aimed at Saudi Arabia and is clinically oriented. Apart from Sharaf's work there are only a few unpublished theses written by social scientists on the topic of public health, health and hospital management and health manpower. For example, research based upon Saudi Arabian health service statistics between 1980 and 1989 is confined to two papers by El Bushra on medical geography in Saudi Arabia and examines variation in the levels of provision of health facilities across the kingdom based on hospital workload standards. Spaced out over an interval of eight years, the studies demonstrated the enormous growth that has taken place recently in health facilities in the kingdom. The studies are unfortunately of limited value since they relate only to the five major planning regions and do not provide detail at the current 13 national health regions. A regional approach was taken by Al-Kahtani (1988) in his study of Public Services Provision in Asir region in the Southwest of Saudi Arabia, where he examined the distribution of primary health care centres at the sub-regional level (Sarat Abidah sub-region), and showed the importance of access on levels of health care sought by the local population. Al-Ghamdi (1981) used linear programming techniques to the field of primary health statistics so that a model of optimum allocation of public health centres in the city of Jeddah could be developed. The objective was to design a system in which a health centre was located within 10 minutes travel time of every inhabitant in Jeddah City.

Al Sunai (1983) examined the distribution of health facilities in Makkah City and the characteristics of the users of the hospital out-patient clinics, while in 1982, Al Bauok, under the title *The Geography of Human Diseases in the Kingdom of Saudi Arabia*, described the incidence of malaria, schistosomiasis, trachoma and cholera, viewed mostly from an epidemiological perspective. As a geographer, she discussed the distribution of these diseases in relation to environment, but there is often a gross lack of data to support her observations.

Later, Al Magrabi (1989) under the title *Environmental Contrast and its Impact on Statistical Variation of Malaria Cases in the West and Southwest Saudi Arabia*, attempted to deal in a geographical perspective with one of the most important communicable diseases, malaria, in the west and south western parts of Saudi Arabia. This work used malaria records to delineate the zones with greatest morbidity. Thereafter, Al Magrabi evaluated the statistical relationship between individual physical factors and the prevalence of malaria during the period from 1980 to 1986.

In 1990, Al Ribdi under the title *The Geography of Health Care in Saudi Arabia: Provision and Use of Primary Health Facilities in Al-Qassim Region*, examined the provision of primary health care in Al-Qassim region in the central part of the country and tried to evaluate the understanding of the value of primary health care within the local population. The analysis has indicated that the demographic and socio-economic characteristics of the users varied significantly between the areas of study. The most common causes for health care visits were due to gastro-upsets and chest infection. The analysis indicated that a statistical relationship existed between the types of ailments reported and six of the variables (location, social type, patients, level of education, nationality and marital status). No significant relation-shifts to ailment were found within several other variables including occupation, incomes, family status and housing conditions. This study was limited to the use of primary health care services by adult males only over 15 years. Females were not interviewed. In addition, the health care delivery system was still immature when this research was undertaken and the system was still undergoing expansion, improvement and modification.

Al Wileaee, (1991) under the title *The Geographical Distribution of Diseases and the Effected Distributed Elements in the Al Riyadh Region and Al Riyadh City*, attempted to distribute the diseases in the region by using field data and compared this with data published by the Ministry of Health. Using this approach, Al Wileaee was able to locate the distribution of diseases and related them to a number of demographic and socio-economic characteristics.

In 1995, Bakhashwain under the title *Acceptance and Utilisation of Primary*

*Health Care in Jeddah, Saudi Arabia,* discussed the implementation of PHC in Saudi Arabia and more specifically the utilisation of PHC services in Jeddah. Only recently, with the establishment of a national patient records system, has it become possible to test the assumptions made by Bakhashwain. In general, the most common communicable diseases prevailing in Saudi Arabia are malaria, leishmaniasis, viral hepatitis, acute respiratory diseases (ARD) such as measles and pulmonary tuberculosis, amoebae, dysentery, influenza, conjunctivitis, especially trachoma and helminthic and other parasitic diseases notably schistosomiasis (Arfaa 1974; Davis 1977; Miller 1977; Ministry of Health, 1985).

Precise and accurate data concerning the epidemiology of most, if not all, of the common diseases in the context of Saudi Arabia listed above are not yet available because health services and research activity have only been established within the country since 1951. Despite the growing potential capacity for developing research and health care services, *the shortage of trained health personnel is likely to be a major constraint for some time to come* (Miller, 1977, p.7). For this reason, medical research in Saudi Arabia is of a very recent nature, and epidemiological knowledge and disease ecology are at best general and still lack accuracy.

## 1.5 Overview of the most commonly occurring in Saudi Arabia: -

### 1.5.1 Endemic Diseases: -

Table 1.1 shows the spatial distribution of vectored diseases that are endemic in Saudi Arabia. The table shows schistosomiasis to be predominant in the area of the western coastal area with the highest area affected being the Southwest (Jizan, Assir and Al Baha). Al-Qassem and the eastern provinces appear to be free from the disease. Within the endemic area, the prevalence rate of the disease is not uniform and the distribution of the infection, with the exception of the Southwest, is focal and "can be classed as oasis type transmission sites" (Davis, 1977, p.9).

Table 1.1 The Spatial Distribution of Cases of Schistosomiasis, Malaria and Leishmaniasis Reported in Saudi Arabia (1993).

| **Area** | **Schistosomiasis** | **Malaria** | **Leishmaniasis (Cutaneous)** |
|---|---|---|---|
| Jeddah | - | 1,296 | * |
| Makkah | 81 | 2,489 | 272 |
| Riyadh | 232 | 449 | 2,700 |
| Qassem | - | 109 | 1,740 |
| Assir | 550 | 1,819 | 888 |
| Hail | 77 | - | 708 |
| Eastern | - | 1,204 | 932 |
| Madina | 156 | 736 | 1,195 |
| Baha | 566 | 145 | 772 |
| Tabouk | - | 7 | 239 |
| Jizan | 312 | 9,149 | 166 |
| Western | + 407 | - | 274 |
| Najran | 289 | 158 | 28 |
| Qureyat | - | - | 9 |
| Northern | 52 | 7 | 21 |
| Bisha | 320 | 81 | 231 |
| **TOTAL** | **3,042** | **16,740** | **10,019** |

* - Combined with Makkah. Source:Ministry of Health, 1993, p.22, p.24, p.29.

\+ - Combined with Jeddah and Taif.

From Table 1.1 it can be seen that malaria is universal throughout Saudi Arabia. The regions most affected are those in the western part of the country (Jeddah, Makkah, Assir and Jizan). The occurrence of malaria in the remaining regions is rare compared with the South Western regions, with exception in the Eastern region which can be explained by the pools of water that can form along the flat coastal plain.

Broadly speaking, the amount of rain in the country varies from one year to another, most falling for a few hours during a few days in the rainy season. As a result, periodic floods occur in various part of the kingdom and usually cause damage to houses, roads, crops and livestock. In addition, some parasite ova such as *Ascaris* as well as *Schistosomes*, together with other pathogens could be washed away with the floods and became disseminated, polluting other sources of water along the major flood routes. Floods may also influence the pattern of some diseases, such as schitosomiasis and malaria, in areas such as Hejaz and Assir.

Leishmaniasis is another disease recognised as being a public health problem throughout Saudi Arabia. Two recognised forms of the disease occur in Saudi Arabia: Cutaneous Leishmaniasis and Visceral Leishmaniasis. The general distribution of Cutaneous Leishmaniasis as shown in Table 1.1 illustrates that the disease is endemic throughout the kingdom, especially in Riyadh, Al Madinah, Assir, Eastern Province, Baha and Al-Qassem. In the northern part of the country, in Qureyat and Northern Area, Cutaneous Leishmaniasis appears to be rare (21 and 9 cases respectively).

Malaria and schistosomiasis are widely distributed, though some areas remain free of the disease. There is also a variation in the frequency of occurrence within the endemic areas. As a result, some areas, particularly the southwest, may suffer more from certain diseases than others. Howe (1977, p.8), stated that *disease in any given locality is the result of a combination of geographical circumstances which bring together diseases agent, vector, intermediate host, reservoir and man at the most auspicious time.* May (1977) also highlighted the difference in the variety of the physical and cultural factors associated with the spatial distribution of diseases as a contribution to sound methodological approach to control. The location of a town in an area with specific physical factors may sometimes predetermine the medical fate of its inhabitants. For example, in the Sarawat highland area in the west of the country the occurrence of perennial streams and ponds provide ideal breeding places for *Anopheles arabiensis*, the most efficient malaria vector in the country.

The area between the western edge of the highlands and the Red Sea coastal plain is marked by gullies and valleys, some of which are very deep and rugged constituting especially inaccessible territory (Malaria Control Service, 1983, p.33). Consequently, a permanent source of infection has maintained a high rate of local transmission in this area, giving rise to the potential for epidemics of malaria in adjacent areas (Malaria Control Service, 1983/1984; WHO, 1977).

> *Malaria control in Jeddah and Mecca cities and their outskirts has been carried out since 1952 following the malaria epidemic of 1950/51. Anopheles gambiae, the only vector seen in the two cities at the time, appeared to have succumbed to larvaciding and DDT house spraying in the outskirts. It eventually disappeared but reappeared abruptly in the Jeddah area during the exceptionally wet season of 1957/58.*
> *Circumstantial evidence indicated its infiltration from the valleys draining to the west through the coastal plain. In these valleys too,*

*rainy conditions favoured the multiplication of A. gambiae facilitating its breeding and spread of the insect during the above period and precipitating a severe epidemic...*" (W.H.O., 1977, p.3)

As a result, the malaria situation in the western part of the country may vary from year to year depending on the amount of rainfall in the area and the flood cycle (Malaria Control Service, 1984). In conclusion, relief, temperature, relative humidity, and rainfall, combine to play a role in creating a temporary or permanently suitable environment for diseases. However, it should be borne in mind that these factors, although they are important, are not significant unless considered in combination with the human environment.

## 1.5.2 Epidemics:

Cholera, which occurs in sporadic epidemic form in various areas, has a unique history in Saudi Arabia. Successive waves of cholera epidemics swept through the Arabian Peninsula during the Cholera pandemics that occurred in the 19th and early 20th Centuries, (May, 1958, p.p.38-43). Referring to the first pandemic that occurred between 1816-1823, the Arab historian, Ben Beshr, (1965, p.277) stated that:

*a great epidemic (of Cholera) had broken out, a disease which causes an acute diarrhea, vomiting and death within one, two or three days. The disease occurred first in India, then by 1236 A.H. after Hijrah (1820 A.D.), it swept through Bahrain, Qatif, Al Ahssa, Iraq and Persia. As far as I know, this disease which caused the death of a large proportion of the population had not occurred in the world before the above date*". (Translated from the original Arabic).

Throughout the pandemic of 1826-1875, cholera spread to other parts of the Arabian Peninsula, especially to the coastal area along the Arabian Sea and the Red Sea as well as to certain parts of the interior along the caravan routes connecting the southern part of Arabia to its eastern and northern parts. More recently, a few epidemics have occurred in areas such as Jizan and the pilgrimage area (known locally as Hejaz). The commonly held explanation for these outbreaks is that they are due to pilgrims already infected with the disease when they arrive in Saudi Arabia.

In the epidemic that occurred in 1972, 286 cases were reported in Jizan (Sebai and Shehata, 1974, p.554), and in the epidemics occurring during the years 1974 and 1977 in Jizan area, the number of cases reported were 1,159 and 86 respectively (M.O.H., 1977-78).

### 1.5.3 Infectious Diseases:-

One of the most prevalent medical complaints recorded throughout the Middle East is diarrhoea. Milaat & Elassouli (1995) conducted a study in two referral hospitals in Jeddah and Al-taif into the epidemiological pattern, the causative agents and risk factors of their occurrence the of diarrhoeal diseases. The mean age of all cases was 20.2 months and RVGE (Rota Virus Gastro-Enteritis) cases showed a steady rise from the neonatal period onward, reaching a peak between 6-14 months. Males accounted for a higher percentage of all cases. Mothers of children recorded with diarrhoea were mostly housewives with low educational level. Bottle-fed children showed a higher proportion (53.1 per cent) of diarrhoea than other types of feeding suggesting the faeco-oral route of infection and the effect of poor sanitation. A pattern of higher RVGE cases was seen in warmer months in Al-taif and in cooler months Jeddah. Findings demonstrated the interaction between host, pathogen and environmental factors in the epidemiology of infectious diarrhoeas in developing countries and the areas of possible prevention.

The risk of contamination of the human and agricultural environment with parasites through reuse of treated municipal wastewater(TMWW) in two selected sites in metropolitan area Riyadh at different seasons the winter and summer season was carried out by (Boibol, 1992). The variation between sites and seasonal fluctuations show a significant difference in parasite per litre. High atmospheric temperatures in the Riyadh area seem to be lethal to most intestinal pathogens. Similarly, the absence of protozoal cysts in the TMWW could be attributed to certain treatment processes and other environmental factors.

Other research on skin diseases among adolescent schoolboys in Abha was designed to determine the prevalence of these diseases among boys aged between 11 to 19 years. The results found that 19.8 % of the children were affected by one form or another of transmissible skin diseases (TSD). The prevalence of TSD increased as the age decreased and the crowding index increased. This finding indicates the need to develop regional intervention programs at school level.

Moreover, the prevalence of skin diseases among school children reflects their nutritional status, customs and habitats, as well as social and hygienic standard, and the quality and quantity of medical care. Abolfotouh *et al.*, (1996) showed that prevalence studies among schoolchildren in the Asir Region in south-western Saudi Arabia have previously been conducted where the aim of the study was to estimate the prevalence and type of skin disorders among male pupils in the Asir region and to compare the prevalence in rural and urban areas of the region. The result of this study reveals a relatively low prevalence of transmissible skin infections. The low prevalence in the Asir region may be attributed to the cold weather over the Asir Mountains, as well as to the suppressing effect of high altitude upon the survival of micro-organisms. Also, it revealed a significantly higher prevalence of skin disorders in rural sample, especially those of parasitic origin, a finding that could be due to the difference in socio-economic conditions from the urban sample

### 1.5.4 Chronic illnesses and degenerative diseases:

A separate project on the causes of morbidity among a sample of elderly (ages 60 years and above) hospital patients in Riyadh was carried out by Allballa *et al*, (1993). The causes of morbidity were chronic degenerative disorders of which cardiovascular diseases were the most frequent followed by acute respiratory problems, diabetes, and digestive and neoplastic diseases. The pattern of disease was very similar to that in the industrialized countries. Respiratory diseases and diabetes mellitus were higher in females than males, while cardiovascular diseases, particularly ischaemic heart disease and heart failure, as well as malignant neoplastic diseases mainly of the digestive system, were more prevalent in males.

In 1995 Mohsen et al carried out a study in Riyadh to determine the prevalence of diabetes mellitus and impaired glucose tolerance. That study was the first in a series of investigations at national level, which they initiated during 1991 at different parts of Saudi Arabia to obtain detailed insight into the prevalence of diabetes mellitus and IGT (Impaired Glucose Tolerance) in Saudi population. That study showed that the overall prevalence of diabetes in Riyadh population was around 4.4%, but when subjects were grouped according to age, a significant increase in prevalence was observed in both males and females. In adults over the age of 30 years, 16% of males were found to suffer from diabetes mellitus, compared to 12.34% of the females in same age group. In each age group, the prevalence of NIDDM (Non Insulin Dependent Diabetes Mellitus) was higher in the males compared to females. The prevalence was higher than that reported by Baccus and co-workers for the Riyadh population in 1982, which can be taken as proof that the prevalence of diabetes mellitus is on the rise with the changing lifestyle. The fast socio-economic growth, which has taken place in Saudi Arabia, can be considered as one of the major factors to influencing the prevalence of diabetes. However, environmental factors including changing dietary habits and lifestyle involved in the aetiology of diabetes need to be explored further.

In 1996 Ali *et al* conducted a survey about bone mineral density measurements of distal radius in Saudi Arabian Females with minimum age 44 years and the maximum was 71 years compared to western females. They found that the Postmenopausal Osteoporosis (PMO) was a major public health problem and Osteoportic-related fractures(ORF), particularly of the hip, is expected to rise to 6,000,000 throughout the world in the next 50 years. These patients were screened at the emergency room (ER) of King Fahad Hospital of the university at Al-khobar. The results for that survey showed that BMD (Bone Mineral Density) of PM (Postmenopausal) Saudi females is lower than that amongst western females at same age, making them more osteoporotic with a higher risk of osteoporotic-related fractures. Also, it was discovered that the rural Saudi females had a BMD which was higher than that of the urban females. This could be explained by the pattern of physical exercise exerted by the urban females in Saudi Arabia society. It was also observed that BMD was higher in females who had borne more than 10 children, compared to those who had borne fewer than five.

Rheumatoid arthritis (RA) is a common chronic inflammatory disease in developed countries. The prevalence of RA varies from country to country, from 0.7% to 3%, with an average of 1% in the adult population. In the Gulf region, two studies estimated the prevalence of RA to be 1% in Iraqi population, and 0.36% in Omani population. In 1998 survey was conducted in the Qassim Region. The results showed that the prevalence was 2.2 per thousand. It was also noted that the prevalence of the disease increased with age and that it was more common in females, (Al-Dalaan).

### 1.5.5 Diseases Related to variation in climate and altitude

The epidemiology of stroke at different geographical locations in the Kingdom of Saudi Arabia has been recently investigated by Al Tahan *et al*, 1998). This paper investigated the risk factors of stroke at high (Al Baha >2000 metres) and low altitude locations (Riyadh, 620 metres) and used a case-control study design. The resulted revealed that the frequency of thrombotic stroke at the high altitude location was 93.4% as compared to 79.3% at low altitude. The odds ratios (OR) (which is the likelihood of occurrence of an event) for the different risk factors at high and low altitudes, respectively, were: hypertension 4.4 and 2.1; diabetes mellitus: 2.7 and 1.9; ischemic heart disease (IHD): 2.4 and 1.9; atrial fibrillation: 3.9 and 3.3: and smoking: 2.3 and 2.5. The mean hematocrit values which is an index for polythycemia were 45.3% at high altitude and 41.0% for low altitude patients and its association with stroke at high altitude remain significant even after adjusting for age and occupation. The study finding of an increased frequency of thrombosis stroke at high altitude was explained by increased hematocrit, which might have caused this in conjunction with other factors such as hypertension and IHD.

Also in the western region of Saudi Arabia, a study designed to find the effect of climatic changes on the occurrence of urinary stone colic as well as the effect of Ramadan fasting and pilgrimage festival was completed in an area with a high prevalence of urolithiasis. Three consecutive years of emergency room records at King Abdulaziz University Hospital in Jeddah showed a steady increase in urinary stone colic in the hot season with a maximum rate in the months of June, July and august and the lowest number was in March. Strong correlation was found between urinary stone colic and both temperature and atmospheric pressure. No correlation was observed with relative humidity nor to Ramadan fasting or the pilgrimage festival (Al-Hadramy MS, 1997).

Research into climatic proteoglycan stomal keratopathy; a new corneal degeneration in El Maghraby Hospital, Jeddah, and pathologic analysis demonstrated focal intracellular and extra cellular deposits of excess proteoglycans. One specimen showed amyloid. It was postulated that climatic factors play a pathogenic role because the disorder occurs in individuals who were exposed to the sunny, dry, dusty environment of the Middle East and because other corneal degenerative disorders were present concomitantly (Malaty et al, 1995).

Also there was a research about asthma and respiratory symptoms in urban and rural in Saudi Arabia that showed children living in urban areas suffered more than rural children because the habit for eating at fast food outlets and family history, atopy were significant risk factors for wheezy illness, as were the lowest intakes of milk and vegetables and fibre, vitamin, calcium, magnesium, sodium, and potassium (Hijazi *et al.* 1998)

## 1.6 Health care delivery systems:

Studies of health systems in developing countries are often less informative than those of the developed world due, in part, to a lower level of administrative control. A lack of basic provision of data is also common with data for some regions being available while absent for other areas of the country. Joseph and Phillips (1984) admit that the research of health care systems in the developing countries is usually faced with a number of problems, such as the shortage of basic data on the demographic characteristics, health manpower and the administrative financial support for health care systems. Almost no information exists on how services are used because complete records are seldom available.

Health delivery systems in developing countries are often incoherent, complex and fail to reach much of the population. Other problems also exist. The population maybe illiterate and, in turn, fail to understand the need for personal health care. Over population can place extreme pressure on health care facilities. Famine, epidemics, natural disasters and civil war can place abnormal demands on health care services. Immunisation schemes are often incomplete leading to sporadic outbreak of disease. Additional problems include: high mortality rates especially among infants and children; the spread of communal diseases; malnutrition; shortage of clean water; the lack of health and safe environment; shortage of skilled personnel, and lack of funds for purchase of essential drugs and medicines. Consequently, health provision in developing countries often focuses on curative health care provision because the immediate need is to cure illness rather than seek to prevent new one occurring. Finally, health care provision in developing countries may be confined to the urban areas because medical staff dislike working in remote rural areas. In these areas, medical provision is often reliant on missionary services or the local population relying on traditional medicine.

Under this heading, therefore, studies can range from the examination of the nature and organisation of systems of health care delivery in various countries under different political, economic, social and cultural conditions through the operation and use of health care facilities at the very local level, Joseph and Phillips, (1984); Rosenberg, (1986).

After reviewing epidemiological researches mentioned before, it is clear that most of these research studies were carried out by medical professionals working in large hospitals, for example King Faisal Specialist Hospital and Research Centre, Department of Family and Community Medicine, King Saud University; Department of Community Medicine and Primary Health Care, Faculty of Medicine and Allied Sciences, King Abdulaziz University, Department of Medicine, King Khalid National Guard Hospital, and geographers were not involved with these issues. The current study aims to highlight the epidemiological aspects of health problems and health services from the geographical point of view. Chapter Two provides details of the area study used in this thesis.

# The Regional Setting

## Chapter Two

### 2.1 Location of the Study Area

Saudi Arabia shares extensive boundaries with no fewer than seven adjacent countries. In the north, it borders Jordan, Iraq and Kuwait. The eastern boundary is formed in the north by seacoast from Ra's Al Khafji to Sallwa while further south the border is shared respectively with Qatar, the United Arab Emirates and Oman. The southern boundary is formed with the Democratic Republic of Yemen, while the western coastline between Jordan in the north and Yemen in the south lies along the Red Sea, see Figure 2.1.

Saudi Arabia enjoys a unique location between Asia and Africa and, with the advent of modern air communications, is not far from Europe. Contacts and communications with all countries of the world became easier, following the opening of Suez Canal in 1869, which made the Red Sea one of the major world trade routes. The long coasts in the west along the Red Sea and the east along the Arabian Gulf facilitate communication with both east and the west. In addition, Saudi Arabia assumes its obligations towards the Islamic World by extending assistance to Muslims in Asia and Africa and maintaining services in and to the holy place for visitors and natives alike.

The modern urban area comprising the city of Jeddah occupies the area located between 21°20’ to 21°45’ latitude north and 39°5’ to 39°20’ longitude east, see Figure 2.1.

### 2.2 Historical Background

The city of Jeddah is THE major port on the Red Sea and major service centre for the western region. It is the largest city in the region with a current population of about 2,046,251 persons (Central Department of Statistics, 1992).

The development of Jeddah began early in the Islamic period, both as a port

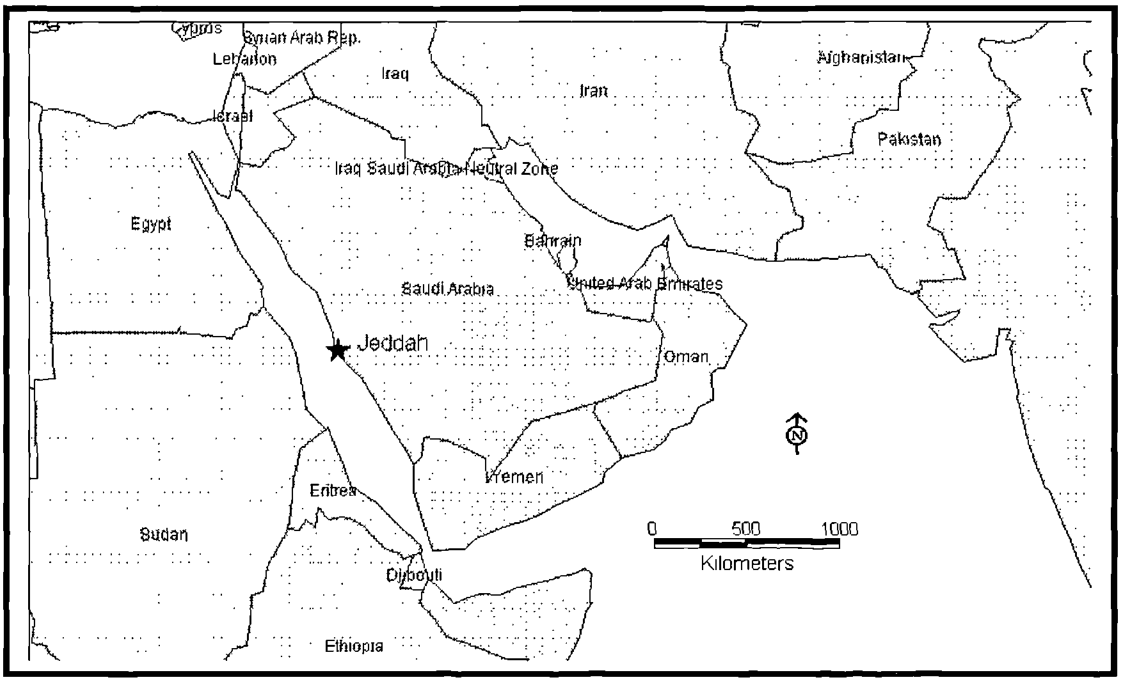



Figure 2.1 Location of Jeddah City

for the Holy City and as a commercial emporium in its own right. The Caliph Uthman laid the foundation in the year 26 A.H. (AD 646). In that year the Caliph decided to move from the old bonding at Al Shuaybah (about 20 km to the south of the location of present day Jeddah) to new Jeddah (Abdullah 1971, p.171). Jeddah can, therefore, be described an Ancient City (Al Ansari, 1972, p.10). Its name has three variations namely, "Juddah", "Jeddah" and "Jaddah" Mohammed Ibn Makram Al Ansari, author of *Issan Al-Arab*, described the location as *Juddah, the coastal areas* [behind] *the sea leading to Makkah*" (Al Ansari, 1964, p.70). One of the earliest geographers, Idrisi (*circa* 1098-1159) who made an intensive study of Jeddah said: *Jeddah is the port of Mecca, the two cities being 40 miles apart. Jeddah is well populated and its commerce is considerable, the pilgrimage is very favourable to the city as it brings in (ships carrying) a great amount of supplies and merchandises of value. It is after Mecca, the most important city in the whole of Hejaz* (Pesce, 1977, p.17).

In 1050 A.D., Nasir Khosrow produced the first written account of life in Jeddah. He gave a general description of the town: *Jeddah is a great city situated on the coast and surrounded by a strong wall. Its population includes 5,000 male* *inhabitants. There are no buildings to be seen outside the city except a mosque, which is called "Masjed Al-Rassoul.* He also wrote: *the city has two gates (in its wall); one to the east, opens onto the Makkah road; and the other to the west, opens onto the sea. There are no trees nor any vegetation in Jeddah; all that is necessary for everyday life is brought in from a nearby villages*" (Didier, 1857, p.121). The first basic map of Jeddah City was made before the wall was broken. This wall surrounded the city and protected the population from the frequent inroad attacks of Bedouins to the city. The city wall ultimately had four gates linking it with the outside world either by land or by sea. The position of these gates occupied the four prime points of the compass and were named North Gate, East Gate, South Gate and Seashore Gate (West Gate), Figure 2.2. The position of the gates came to control the shape and function of the settlement. The gates symbolised the outlook of the city and its trading nature and linked Saudi Arabia with both the world beyond the local area as well as delimiting its internal structure. Jeddah's maritime trade mainly depended for its vigour on forces and linkages external to the Hejaz region.

As Jeddah was the port for Makkah, it handled almost all the core traffic for the important religious and secular functions of this important historic city. It was this early function of an *entrepôt* for Makkah that determined the commercial prosperity of Jeddah and the importance and prosperity of Jeddah was closely related to that of Makkah. The latter had been an important caravan centre since early times. With the advent of Islam, this function was strengthened with the development of the pilgrim traffic and the need to import foods to support the two cities and the pilgrims. The wall surrounding Jeddah did not create a barrier between it and the two religious cities of Makkah and Madina and Jeddah soon developed into an important city in its own right for both of the Holy Places. The four original gates shaped the internal structure of Jeddah and the function of the districts behind the wall evolved a dependency upon the locations outside the wall. The four sectors, known as *harah*, or quarters, linked the internal function of Jeddah to Makkah, to Madina, to the seaport and to the area to the south.

One of the *harah* located in south east of the city behind the south gate was known as *harah* quarter Alyaman. The population in this sector came from the district known as Alyaman (located in the south west of modern day Saudi Arabia).

These people worked mainly as skilled craftsman. The second gate located in the north of the city behind *harah* quarter Al Sham was the largest and most well arranged area of the city. Its inhabitants were almost exclusively traders. Another *harah* was located at the south west of the city in a district known as Bab Sharref. It represented the oldest quarter and formed the old core of the city. Here, the inhabitants were Bedouins (nomadic) who lived behind the coast and earned their livelihood from fishing. The fourth and final gate led to the Al Mazlom *harah*, which extended to the Alyaman quarter and also to the Al Sham quarter. The commercial section was located in this quarter along with housing for the local inhabitants. From this description of the gates and quarters of Jeddah City, it appears that the main function of the city was that of providing trading services from which was generated the main income of the city.

Gradually, the settlement was extended beyond the wall. Five main growth areas were established as follows:

1. The caravan trading centre based at the north of the city, for example, Al Bagdadeyyah and at the southern extremity, Al Nuzlah Al Yammaneyyah
2. Settlement around the water well of Al Wazirreyah, for example at Al Sabeel.
3. The population settlement responsible for rearing and trading in animals, for example, Al Kandarah.
4. Some other settlements such as the Bedouin houses for those who preferred to live outside the city, for example, Al Sahefah and Al Hindaweyyah.
5. A group of settlements involved in fishing activities (the fishing village), for example, Al Ruwais.

By 1947 (1367AH), the wall of the city had been pulled down and the beginnings of the modern built up area covered most of the total area of the former old city. Residential, administrative and commercial uses occurred in specific areas of the city. The city was extended to the north and was linked by a paved road to Makkah and Madinah. New districts were added and extended the city in a northerly direction, a process that accelerated following the relocation of the airport. Another expansion occurred in the east and the south of the city (Al Semeat, 1987).

The modern history of Jeddah is closely linked to exploitation of the east coast oil field in latter half of the twentieth century (14th Century A.H.) The shedding of the city walls in 1947 can be seen as a symbol of the transition of Jeddah from a local trading centre to its present role as the major gateway by sea and air and the major commercial centre of one of the world's richest and most dynamic nations (Sert Jackson, 1978, p.4).

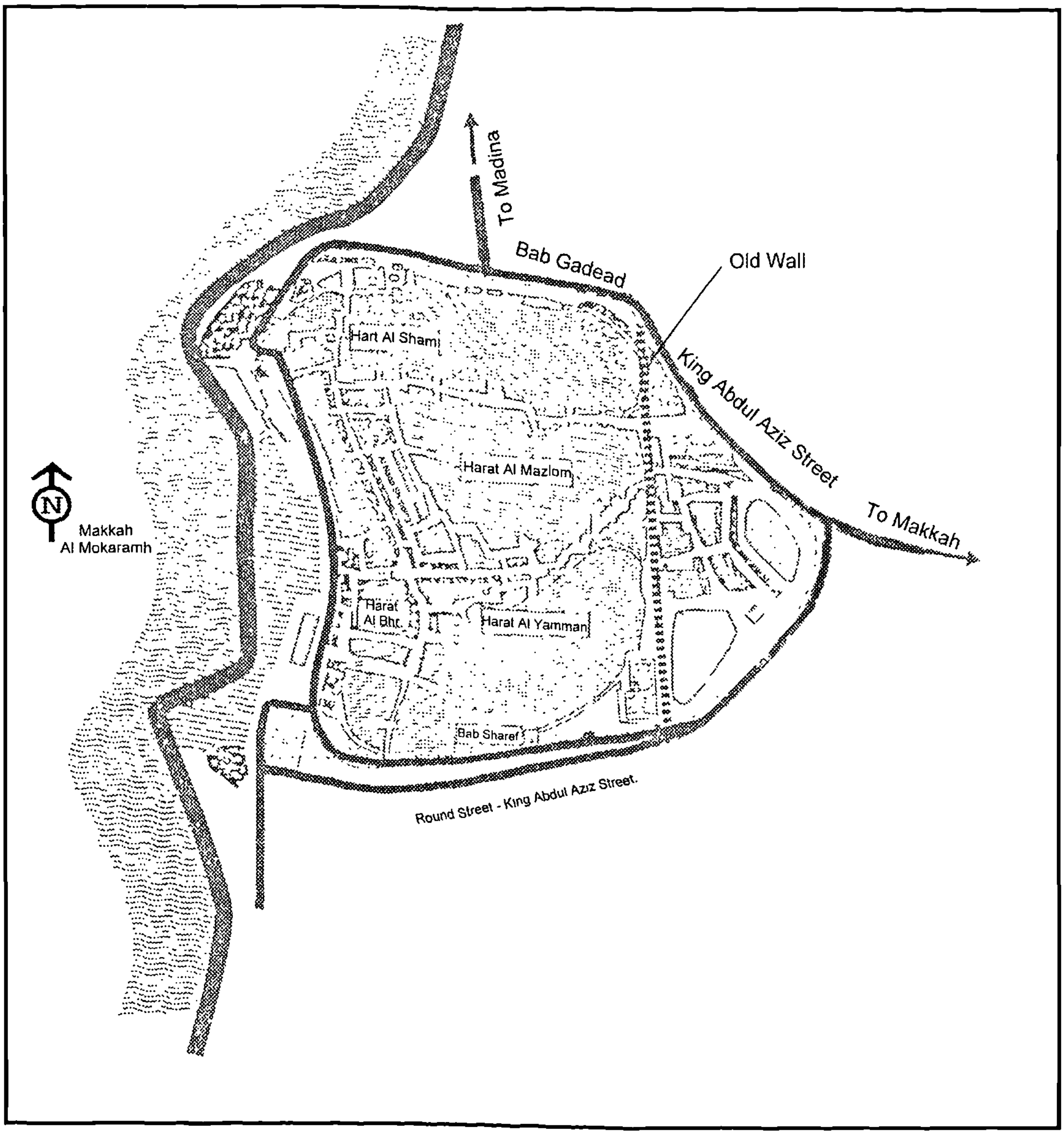



Figure 2.2 Old Jeddah after the old wall had been destroyed.
(After Alsemet, 1987, p5)

Between 1962 and 1974, several new districts were created, for example Al Jamea'a, Madain Al Fahd, and Al Thaalebah (Al Farsi, 1983, p.19). In 1975, the growth of the economy of the country gave birth to further new districts, for example, in the north, Sharm Obhur, and in the south, the Industrial District and the marine base (Al Farsi, 1983, p.21), see Figure 2.3. New districts also started to appear at the north of the city, for example, Mishrefah, Al Hamrah, Al Salamah, Al Rawdah, Al Nuzlhah, Al Khaldeah, Al Safa, Al Naeam and Al Bawadi. These areas were the first to benefit from modern urban planning. In 1980, it was found that the area had extended the urban settlement by 350 sq. kilometres (Al Farsi, 1983, p.21).

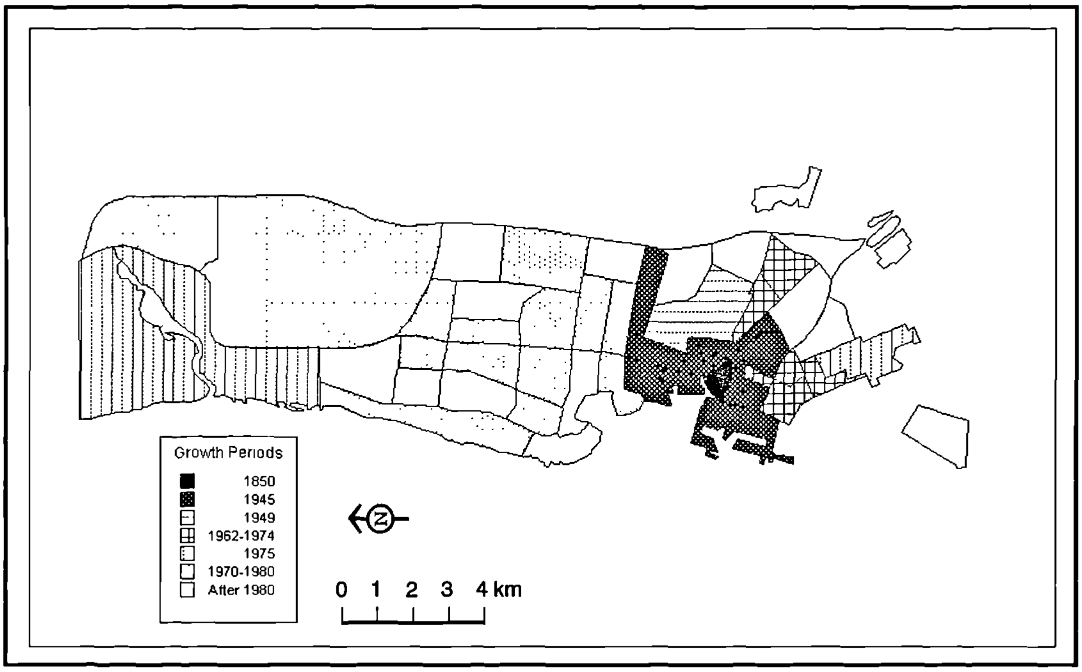
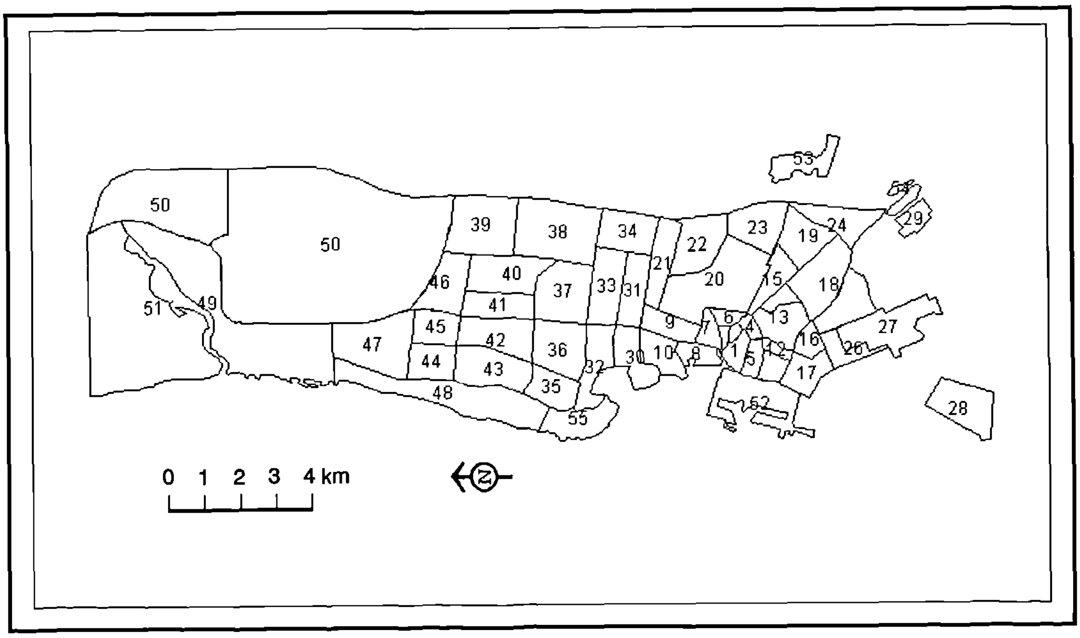



Figure 2.3 Historic Growth of the City of Jeddah 1850 - 2000

In general, the growth of Jeddah extended along a north-south axis, because in the east there occurred the physical barriers presented by the Al Hejaz Mountain, while to the west lay the Red Sea. However, only about 15 percent of Jeddah's growth was located in south because the extensive industrial area prevented housing development. By contrast, the development in 1980 of the King Abdulaziz

Figure 2.4 Reference Map Showing Location of All Administrative Districts in Jeddah City, 2000




District names:

1. Al Balad
2. Al Saheefah
3. Al Ammareyyah
4. Al Sabeel
5. Al Hindaweyyah
6. Al Kandarah
7. Baghdadeyyah Al Sharqeyyah
8. Baghdadeyyah Gharbeyyah
9. Al Sharafeyyah
10. Al Ruwais
11. Al Qeryat
12. Al Thaalebah
13. Al Nuzlah Al Yaamaneyyah
14. Al Nuzlah Al Sharqeyyah
15. Al Saghr
16. Ghulayl
17. Petromin
18. Madain Al Fahad
19. Al Jameah
20. Old Airport
21. Bani Malek
22. Al Naseem
23. Al Sulaymaneyyah
24. AlRawbi
25. Al Wazireyyah
26. Al Mahjiar
27. Industrial City
28. Warehouse
29. General South Housing
30. Al Hammra'a
31. Al Mushrefah
32. Al Andalus
33. Al Azizeyyah
34. Al Rehab
35. Al Kahaledeyyah
36. Al Rawdah
37. Al Faysaleyyah
38. Al Safa
39. Al Marwah
40. Al Rabwah
41. Al Bawadi
42. Al Salama
43. Al Zahra'a
44. Al Nahdah
45. Al Naeem
46. Al Nuzhah
47. Al Mohammdeyyah
48. Al Shate'e
49. O'bhur Al Janoubeyyah
50. King Abdul Aziz International Airport
51. O'bhu Al Shamaleyyah
52. Jeddah Islamic Seaport
53. Quwaizh
54. Al Amir Fawaz Housing
55. Al Kornash.

International Airport to the north provided a stimulus for employment and has been accompanied by extensive housing development (Al Semeat, 1987).

To give a clear picture of the city, the main feature of both the old and new districts need to be described.

**Common features of the old districts are:**

1. Streets are narrow, many are crooked, impenetrable *cul-de-sacs*.
2. There are no public parks and children normally play in the streets putting their lives at risk.
3. There is no harmony in construction style. It is not uncommon to see a high rise building of eight floors next to a small two-storey house or a modern house next to a one built from mud bricks.
4. The area is very crowded so that during the rush hours of the early morning and afternoon, driving is difficult and delays are common.
5. Houses in some areas are so close together that in the event of any emergency such as fires, the emergency services cannot easily gain access. Moreover, the safety of neighbouring houses is jeopardised.
6. Regarding services, girls' schools are generally situated in well-designed buildings, but the majority of boys' schools are in inconvenient rented building. No buildings have been designated for health services. Health centres are operated from rented buildings; standards and facilities are variable.

**The main features of the new districts are:**

1 Streets are wide.

2 There is a good proportion of open areas and green parks to give an attractive view, facilitate ventilation and in some districts, to provide playing facilities for children.

3 The distance between houses is sufficient to allow easy vehicular access, so that in an emergency, for example, the fire brigade or ambulance would face no difficulties in gaining access to the scene of the accident.

4 The new districts contain uniform area of either modern or traditional house styles. These villas are well constructed and concrete has been used in their building.

5 Most, it not all, new districts, have schools for boys and girls of all ages, adequate

shopping facilities, but unfortunately, no land has been allocated for health care facilities. Consequently, most of the primary health care centres are in rented houses or buildings.

Additional evidence was then sought, for example, visual evidence to show the differences between districts. Photographic evidence has been included to show the different visual characteristics of the districts, see Figures 2.5 to 2.12.

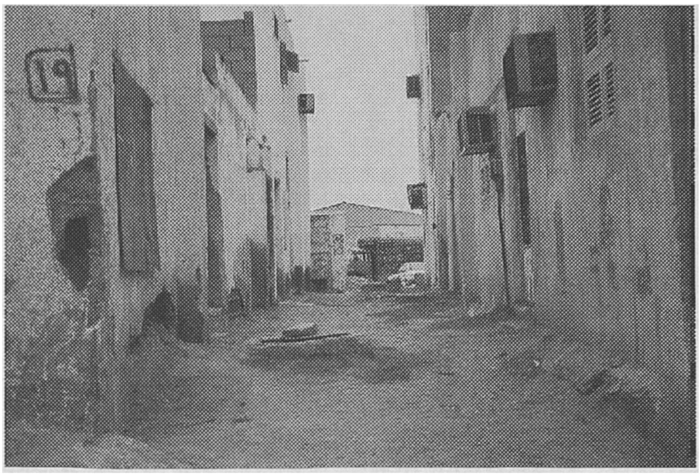


Figure 2.5 Al Nuzlah Al Yammaneyah District. Low socio-economic district located in the old sector of Jeddah City. View along passageway connecting streets. Note the un-paved surface and drain in middle of passageway. No litter and few cars. Buildings mostly two storeys.

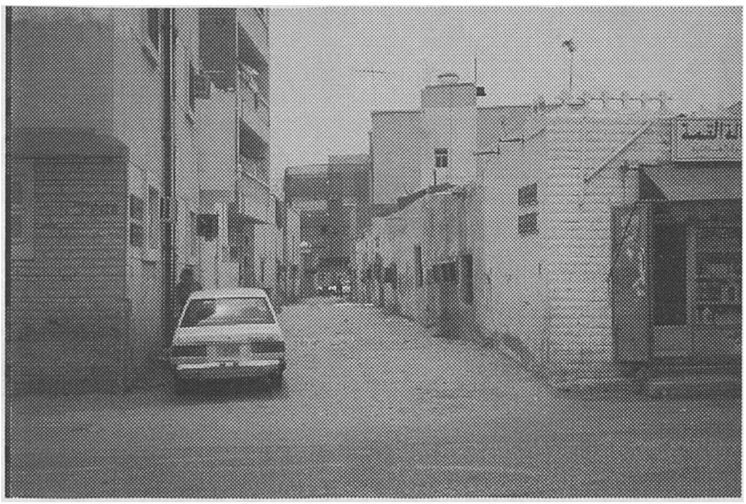


Figure2.6 Madain Al Fahad District. Low socio-economic district located in the old sector of Jeddah City. View along passageway, but wider than in Fig. 4.9. Paved surface. No pavements. Small supermarket on right of picture. Buildings 2 or 3 storeys. Most houses have air conditioning units.

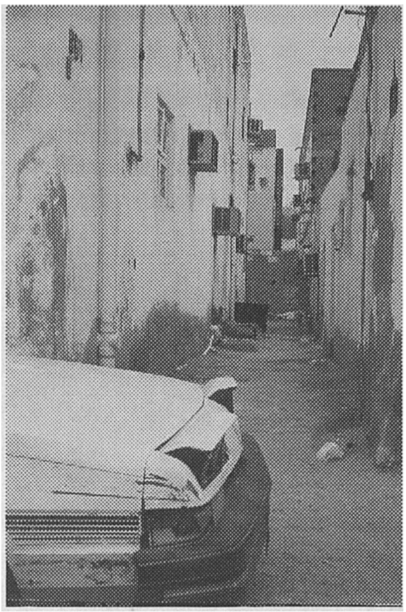


Figure 2.7 Al Thaalebah District. Low socio-economic district located in the old sector of Jeddah City. Narrow inter-connecting passage, buildings mostly houses. Note air conditioning units on walls.

Figure 2.8 Al Balad District. Oldest and most central district of Jeddah City. Main commercial centre, wholesale outlets on many floors of buildings. Most inhabitants originate from beyond Saudi Arabia. Low socio-economic area. Congested roads. Poor quality small hotels. Mosques.

Figure 2.9 Bani Malik District. Low socio-economic district located in the north-eastern sector of Jeddah City. Wider passageways than in oldest parts of Jeddah. Buildings 2 or 3 storeys high. Most houses have air-conditioning. Employment category mostly as engineers in small workshops. Many car repairing workshops.


Figure 2.10 Al Ruwais District. Figure. Low socio-economic district located in the north-western sector of Jeddah City. Parts of this district have been redeveloped. This view shows original street design. Shops on ground floor. Accommodation on $2^{nd}$ and $3^{rd}$ floors.

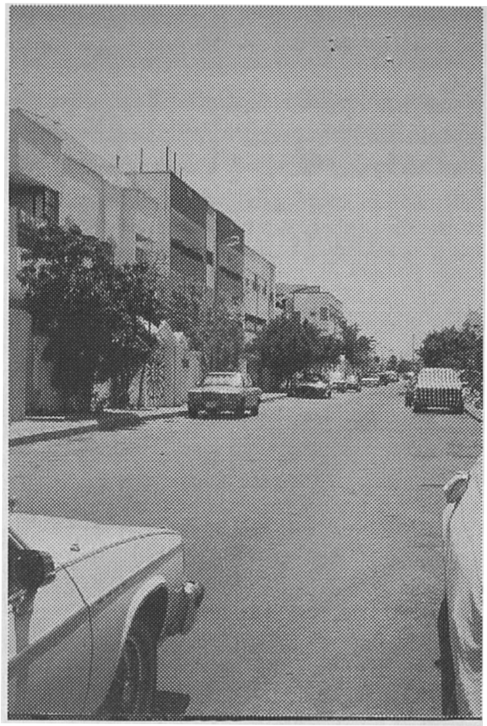


Figure 2.11 Al Zahra'a District. High class district in the northwest of the city. Built during the 1980s with good planning design. Properties mainly single villas not exceeding 3 floors. Large private hospital in vicinity. Note the use of vegetation and also the car protected from dust and sun damage. Wide, well maintained streets. Pavements.

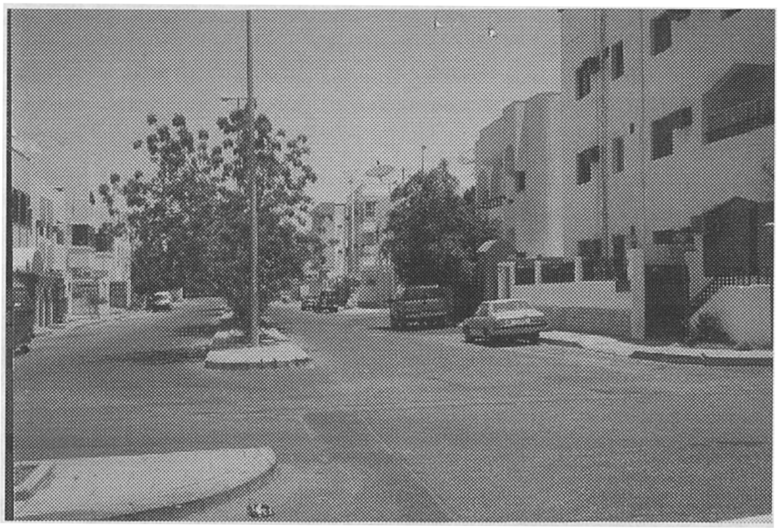


Figure 2.12 Al Safa District. Medium quality district to the north east of the city. Developed in the 1980s with good planning control. Note central reservation with trees. Pavements. Villa development and some apartments.

Due to its location on the Red Sea coast, the city of Jeddah has taken on many responsibilities. For example, it is the main air, sea and land gateway for pilgrims going to the two Holy Mosques (Makkah and Madinah), arriving and leaving either through its King Abdulaziz International Airport, the Jeddah Islamic Port, or the modern asphalted roads linking to the southern part of the kingdom. It has also developed a major commercial, industrial and cultural centre in its own right. Jeddah's factories meet a major part of the country's requirements for various commodities and products. The city is also a very active commercial and financial centre because of its open policy towards both east and west in the three continents of Asia, Africa and Europe

# 2.3 Physical Geography

## 2.3.1 Introduction

The coastal plain on the eastern side of the Red Sea on which is located the City of Jeddah is called Tuhama and forms the western-most region of Saudi Arabia. This region extends over an area of approximately 3810 sq. km and comprises mountains of the Arabian shield formed of different metamorphic and intrusive rocks, moulded in some places by vast field of basaltic lava. The Tuhama plain is, in turn, formed of debris from erosion of reefs and its width is approximately 12 kilometres in the vicinity of Jeddah. The plain is formed of both soft and coarse sands and mud at the mouth of its valleys, and slopes gently downwards from the mountains towards the sea. These recent sediments cover calcareous coral reef, which in some places are also covered with sands and basalt flows.

Broken chains of foothills form Jeddah's eastern border parallel to the high mountains of the Hejaz. In earlier pluvial periods, a pathway of deep valleys trending east west covered the region of Jeddah. The mouths of these valleys at the seashore contain deltaic sediments (silt, sand and gravel) and now from gulfs along the coast, or bays penetrating deeply inland.

The eastern part of the Jeddah region comprises the western sides of the hills known as the Al-Hamra, Marrikh, Tandub and Briman mountains. These hills comprise inter-bedded layers of sandy and silt deposits. The lower parts of the valleys are filled with debris of all these elements, in addition to layers of angular gravel from igneous rocks. These sediments are about one meter thick in the higher parts of the valleys and around 15 meters thick where the valleys reach the sea. Underlying the sedimentary rocks area, igneous or metamorphic rocks outcrop in the easternmost part.

The central section of the Jeddah region comprises different alluvial sediments (gravel and silt) resulting from the erosion of igneous rocks and marine sediments (coral limestone and shell debris). The lower part is formed of old porous coral limestone a few meters thick, with voids sometimes filled with sand. In some parts the limestone layer is limited in thickness and in underlain by soft sand and gravel.

Along the coast can be found sediments formed of sand and mud mixed with shell fragments. The sand is of igneous origin (quartz and feldspar). As for the mud, it is the product of disintegration of basalt and organic dissolution of human waste on the shore, especially in the area of Arba'in Lagoon and Ghalil. The surface sediments in Jeddah area also comprise of:

- Clean loose sand and gravel: very fine sand alternating with layers of different thickness of gravel. All these materials come from the basement and are originally of igneous nature but may contain small amount of calcareous debris or occasional limestone blocks. Thickness varies between two and three meters, reaching at times five meters (e.g.. the small hill behind the conference room of the Ministry of Education).
- Fill material: Formed of construction material: refuse, broken gravel, cement blocks and red bricks mixed with natural soil components (sand, mud and other materials).

Jeddah is located in the so-called Bani Malek basin, which has limited water resources due to the scarcity of rain falling on the hills to the east. On the other side is the basin of Wadi Fatimah valley and Wadi Khulais in the north. They retain more water because of the sloping hills to the north and east and because they are full of great amounts of coarse sediments.

The surface layers in Jeddah do not contain aquifers except in Wadi Bani Malek where it is possible for a limited amount of water to accumulate. This also applies to the few shallow valleys east of the city. The level of the underground water is consistent in Jeddah, at a depth ranging between one to three meters depending on the precise location. The hydrodynamic gradient of the underground water is not homogeneous but varies according to the nature of the underground strata. There is a general gradient from east to west with a little diversion towards the north, which becomes more defined towards Wadi Quwaizah.

As the city developed, the streambeds within the city became obliterated, resulting in local flooding whenever heavy rains fall. Rainwater accumulates because of the inability of the surface sediments to absorb the rains. As a consequence of the expansion in asphalt areas within the city, the availability of underground water became mostly non-potable, brackish with variable degrees of soluble salts, depending on the rates of rainfall. Salinity also generally increases in the direction of the sea, due to penetration of the ground water table by seawater.

Salinity is lower in the aquifers of the old valleys such as Bani Malek and Quwaizah, due to replenishment by rainwater, or due to the greater porosity of the underground layers, as for example, east of the Jeddah-Makkah road.

## 2.3.2 Climate

The climate of the City of Jeddah is directly affected by its geographical location. Jeddah lies in a coastal desert region lying just south of the Tropic of Cancer in which the seasonal effects of air mass movements produce corresponding seasonal variations in climate. Climate is also responsible for influencing the health of the inhabitants.

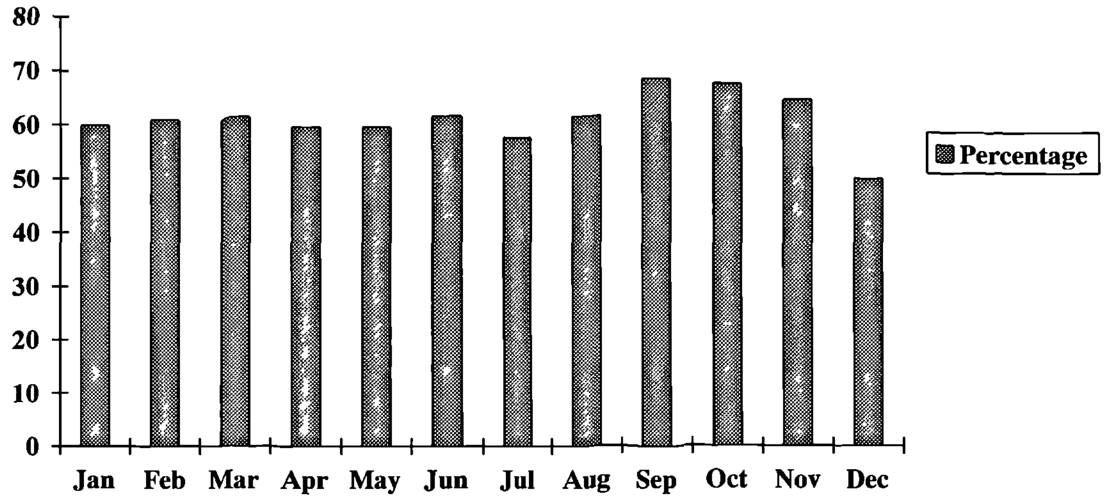
Climate has influenced both the economy and settlement of the narrow coastal plain area on which Jeddah is located. Climate also profoundly influences the health of the inhabitants. Due to its coastal location, Jeddah suffers from high humidity on most days of the year, and especially during the summer when it is affected by the extension of the Indian seasonal depression (warm and humid air flow). The highest levels of humidity are reached at the end of the summer and remain high until the second month of autumn. The average monthly relative humidity are as follows: August, 62 %, September 69 %, October 67 %, November, 64% see Table 2.1 and Figure 2.13

Table 2.1 Average Monthly Humidity Figures - Jeddah City 1961-1990

| Months | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent | 60 | 61 | 61 | 60 | 60 | 62 | 58 | 62 | 69 | 67 | 64 | 50 |

Source: Meteorology Department, Climate Section, 1990.

**Figure 2.13 Average Monthly Relative Humidity, 1961-1990, Jeddah**




The temperature along the coastal zone on which Jeddah is situated is modified by the proximity of the Red Sea, which, in summer, provides a cooling influence, whereas, in the winter, the situation is reversed. The distribution of the main monthly temperature between 1961-1990 is as follows, Table 2.2, Figure 2.14.

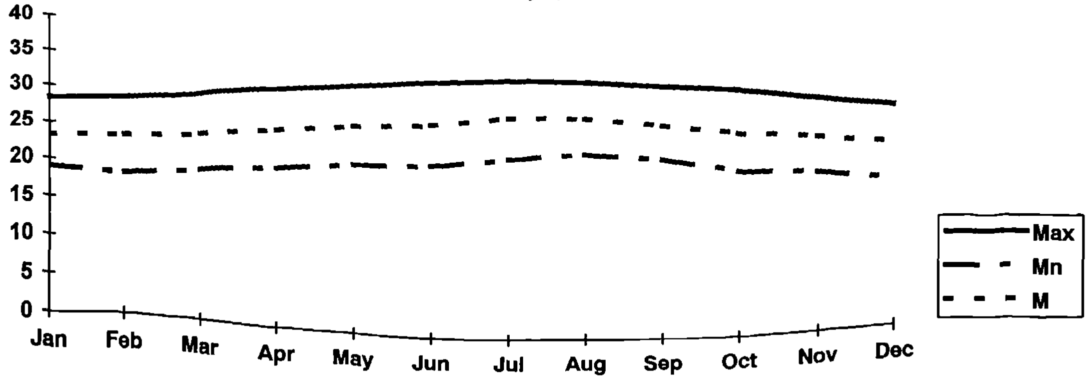
A comparison of the main monthly temperature with the maximum temperature reveals some variation. The lowest average monthly temperatures occur during January (23.2°) and December (24.7°) and are the result of a relatively cold polar airflow. The highest average monthly temperatures prevail during July (32.4°) and August (32.1°). The highest maximum temperature of 49°C was recorded in Jeddah in June 1961 and the lowest minimum temperature of 11°C was recorded in Jeddah in March 1983.

Table 2.2: Average Monthly Temperature (°C) 1961 - 1990, Jeddah

| Months | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Max | 28.3 | 28.9 | 31.1 | 33.5 | 35.4 | 36.9 | 37.6 | 37.2 | 36.1 | 35.1 | 32.3 | 29.8 |
| Mn | 19.0 | 18.5 | 20.3 | 22.2 | 24.1 | 25.0 | 26.4 | 27.1 | 25.9 | 23.8 | 22.2 | 19.9 |
| M | 23.2 | 23.6 | 25.2 | 27.6 | 29.6 | 30.8 | 32.4 | 32.1 | 30.7 | 29.1 | 27.1 | 24.7 |

Source: Meteorology Department, Climate Section, 1990.

Figure 2.14 Average Monthly Temperature Degree Centigrade in Jeddah City 1961-1990




Rain in Jeddah City occurs mainly during the winter and spring time and is brought by the passage of climatic depressions passing from west to east. When they meet with the extended Sudan high-pressure area located over the Western Region very sparse rainfall may occur. The average monthly rainfall in Jeddah between 1961-1990 is shown in Figure 2.15 and Table 2.3.

In an arid area like Jeddah, the mean annual rainfall often has little meaning when compared with the amount of rainfall that falls on individual days or months. For example, peak monthly precipitation occurred in January 1969, (124.7mm) and in January 1989, (102.2mm). The dominant characteristic of heavy rainfall is for it to fall in torrential bursts lasting no more than a few hours. Water run-off becomes very rapid because of the limited amount of vegetation and poor percolation rates to intercept and hold the rainfall.

Rainfall is usually considered as being essential for life, but unfortunately, in Jeddah, it has also resulted in problems. The periodic heavy concentration of rainfall produces locally channelled flooding which has had some influence on the detailed sitting of buildings. Recently, as municipal services have been developed to protect the city from such flooding, storm water ditches and interception systems have been built. However, the lowest areas, especially in the old parts of the city, still have to be pumped to discharge the accumulation of rainfall against sea level (Watson, 1968, p.p.18-19). Such local water flows affect planning in detail but are not of any special significance to the overall functioning of Jeddah.

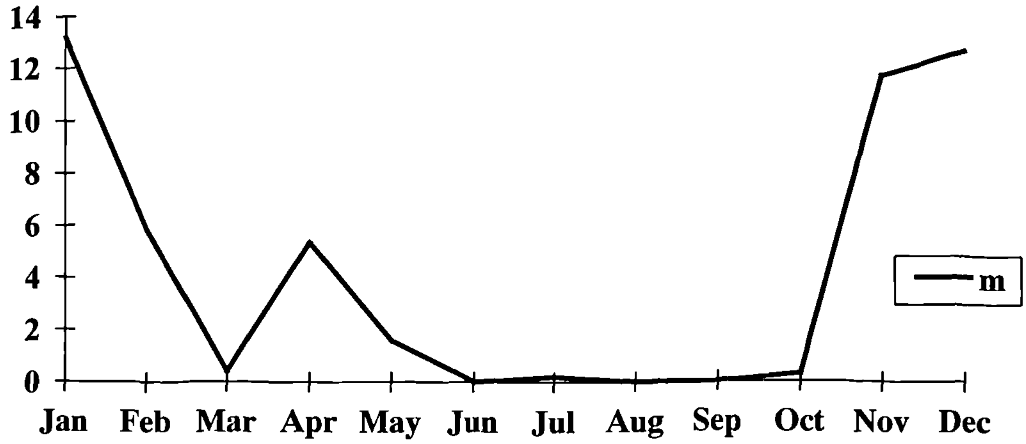
Rainfall, however, may contribute to human ill health. After rain, mosquitoes became more active and this contributes to the occurrence of outbreaks of malaria especially in valleys located to the north of the city. In the past, *Anopheles gambiae* has been observed up to 150 km north of Jeddah and its existence has been linked to cases of malaria (M.O.H., 1983, p.29).

Table 2.3: Average Monthly Rainfall (mm), 1961-1990, Jeddah.

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 13.2 | 5.9 | 0.4 | 5.4 | 1.6 | 0 | 0.2 | 0 | 0 | 0.3 | 11.7 | 12.7 |

Source: Meteorology Department, Climate Section,1990.

**Figure 2.15: Average Monthly Rainfall (mm) 1961-1990, Jeddah.**




From Table 2.4, it can be seen that the most common winds blowing over Jeddah are from the north, this wind being known as *Al-Shami.* One of the advantages of the northerly wind is their ability to reduce the temperature especially during the summer months. The northwest wind is also common in Jeddah City. This wind is usually light to moderate on most days of the year, but becomes more active during certain periods such as wintertime and is associated with cold air. This wind is known locally as *Al Bahar* and its occurrence is thought likely to cause a rise in upper respiratory diseases in Jeddah accrue.

Table 2.4: The Most Common Winds Directions 1961-1990, Jeddah.

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trend | N | N | N | N | NNW | N | N | NNW | N | N | N | N |

Source: Meteorology Department, Climate Section,1990.

## 2.4 - The Population of Jeddah

### 2.4.1 Historical Background

As shown in section 2.1, Jeddah owes its importance to the existence of the two Moslem holy cities, namely Makkah located 80km east of Jeddah and the location of the Grand Mosque, and Madinah, about 400km to the north, the location of the Grave of the Prophet Mohammed (peace be upon him). These two cities are visited by millions of pilgrims each year in order to perform the pilgrim's rituals. Jeddah City is located in the most populous region of the country and it is considered to hold the key position in the whole of Saudi Arabia, especially from an economic point of view. Because Jeddah is the primary seaport in the country, its primary function is as the country's major location for the import and export of merchandise. For example, some 80 % of foodstuffs consumed in the kingdom arrived through the port of Jeddah (Sert Jackson, 1978).

In Jeddah, as with other Middle Eastern cities, there are great difficulties in establishing exact historical records and trends, this problem extending throughout the whole demographic sector. Even in recent times, population census data has not been recorded as accurately as in North America and in Europe. Population figures before 1962 were either local estimates or those made by travellers, either Arabs from neighbouring countries or Europeans who visited the city. Even census data collected after 1962 is considered inaccurate while government departments because of a possible political sensitivity may withhold some data.

One of the earliest estimates of Jeddah's population was given in 1050 AD by Nasir-1-Khosrow, who estimated Jeddah's population to be 5,000 males. This could suggest that the town's total population may have been roughly 10,000 adult inhabitants in the mid 11th century (Khosrow, 1945, p.74). One year before the first official census of 1962, the Consultant Engineering office stated that the World Health Organization's statistical research estimated the actual population of the city in 1959 at 106,000 inhabitants (Al Ansari, 1980, p.p. 115-117). The same report also asserted that the number of non-Saudis residing in Jeddah in the same year as constituting no less than 35 percent of the population, comprising workers and technicians. This percentage was expected to increase as the demand for more labour was also expected to rise.

The second population census was conducted in 1974 by the Central

Department of Statistics, a census considered more accurate and satisfactory than the first. According to the 1974 census, the City of Jeddah had a total population of 569,204 persons (Central Department of Statistics, 1974, p.87). In mid-1978, another socio-economic survey conducted by Sert Jackson International, indicated that the total population of Jeddah was 862,362 persons (Sert Jackson, 1978, p.5).

This remarkable urban population growth coincided with the period of economic growth based on the expansion of the international trade in crude oil. It is reflected in the urban landscape of Jeddah by a massive extension of the built up area and in the extent of the residential land use in the central areas. Furthermore, the increase in revenue derived from oil and its derivatives permitted a major growth in the socio-economic expenditure and implementation of a government five-year plan to increase job opportunities particularly those in urban centres. Moreover, in the light of the national importance of Jeddah, about 30 % of the government project investments were undertaken in the city during the Second and Third Five Development Plans (1975-1980; 1980-1985).

This period witnessed the rapid development of Jeddah. Many ambitious projects were implemented, making it one of the most attractive cities, not just in Saudi Arabia but also among her Arab neighbours. The indication of the massive development in the city can be seen in the expansion of urban boundaries and therefore the boundaries of Metropolitan Jeddah. In 1974 the urban area was 314 square kilometres. By 1979, this figure had expanded fourfold to reach 1,215 square kilometres (Sert Jackson, 1978, p.IX).

Jeddah has not only increased in size, but also in its urban function and socio-economic development due to the increase in the country's revenues. These aspects of development are intended to meet the increase in the size of the population and the city size. Some of the urban functions existed previously but have been expanded and modified. Examples can be found in the provision of public health, electricity, transport, education, commercial facilities and welfare facilities.

Many job opportunities have been created from the establishment of more social services and public utilities. The improved facilities and job opportunities have encouraged further inward migration resulting in a continued increase in population. This increase, as Al-Hamadan (1987) reports, is due to the following factors:

1. The massive influx of migrants from the rural areas to the city, where they can find better life and better facilities which have been brought about as a result of

economic development.

2. Security and stability, so that people in the cities can live in a peaceful and secure environment, in terms of personal safety or in terms of wide spread availability of social services, health and welfare facilities.
3. The considerable progress that has taken place in the communication sector throughout the country has enabled the population of Jeddah to grow considerably by facilitating easy movement to the city.
4. The government has been able to overcome the problem of water resources shortage by building a large desalination plant situated to the north of Jeddah on the edge of the Red Sea. The assurance of a reliable supply of fresh water provided a further stimulus for development.
5. As Jeddah developed, new job opportunities emerged, especially after the First and Second Five Year Development Plans (1970-1975; 1975-1980). This, however, lead to huge numbers of Saudi migrants from other cities of the kingdom to move to Jeddah and also to the large scale immigration of foreign labour force in response to the demand for labour within the city (Al-Hamadan, 1987).

The most recent census was conducted in 1413 A.H. (1992 AD), and was carried out by the Central Department of Statistics, Ministry of Finance and National Economy. The population of Jeddah was calculated as 2,046,251 persons of which Saudi nationals comprise: 999,124 persons, equivalent to 48.8% of the total population and 1,047,127 Non-Saudi persons equivalent to 51.2% of the total population. These are the only official figures published from the 1992 population of Jeddah.

With regard to Jeddah's population distribution among its districts, the city has witnessed different patterns of population densities and distribution through the past decades. The main concentration of population was historically located in the centre of the city, surrounded by the protective wall. Gradually, the increase in the population, at first from natural increase and later as a result of the huge influx of migrants, resulted in a movement to new zones (*haras*) which were built well away from the old commercial and residential centre and now form the extensive suburban areas of the city, see Figure 2.3.

### 2.4.2 Population Density

The population of Jeddah shows a wide spatial variability in its population density. Table 2.5 and Figure 2.16 show the population density in the districts of the Jeddah governorate as revealed by the data produced by the 1992 census data.

From Table 2.6, the most densely populated district was Ghulayl district (443.46 persons per hectare) and the lowest density was recorded in Al Wazareyyah district (1 person per hectare). Table 2.6 and Figure 2.13 also shows four distinct groupings for population density:

1. Districts with the highest density (267 - 444 persons per hectare), for example, Ghulayl, Al Sharafeyyah, and Al Sabeel. Only one of these districts is located in south of the city (Ghulayl), this district forming part of the old city and in which planning control has been minimal. In this district the socio-economic level is low. There were also two densely peopled districts surrounding the core of the old commercial area, Al Sabeel and Al Saheefah. These districts are also among the oldest areas of Jeddah and, once again, the level of planning control has been applied irregularly. Both areas are characterised by the lowest socio-economic levels.
2. Districts with high density (167 - 278 persons per hectare). These districts again possess the lowest income and living, such as Al Hindaweyyah, Al Ammareyyah, Al Kandara, Al Jameah, Al Baghdaddeyah Al Sharqeyyah.
3. Districts with medium density (89 - 178 persons per hectare). Some of these districts are located in the old core of the city (Al Balad) while the others are located in the south (Al Qeryat, Al Thaalebah, Al Nuzlah Al Yamaneyyah, Al Nuzlah Al Sharqeyyah, Al Saghr, Al Rawabi). Inhabitants of these districts are characterised by the lowest levels of income and most of the inhabitants are immigrants. Some districts in this category are to be found to the north of the core of the city (Bani Malek, Mushrefah, Al Azizeyyah, Al Shrafeyyah, Al Ruwais Al Salamah, Al Bawadi, Al Nuzhah).

4. Districts with medium and low-level density (less than 89 persons per hectare). Some of these districts were represented by the lowest income such as Madain Al Fahd, Petromin, Al Naseem and Al Rehab, while others represented medium income such as Al Faysaleyyah, Al Safa, Al Rawdah and Al Marwah. Further variation could be found with districts such as Al Andalus, Al Nahdah, Al Shatee, Al Hamra'a and Al Zahra'a, Al Kahaldeyyah, which represented districts with a high income level. These districts showed good planning and good quality (high standard of houses), and were located in the north of Jeddah.

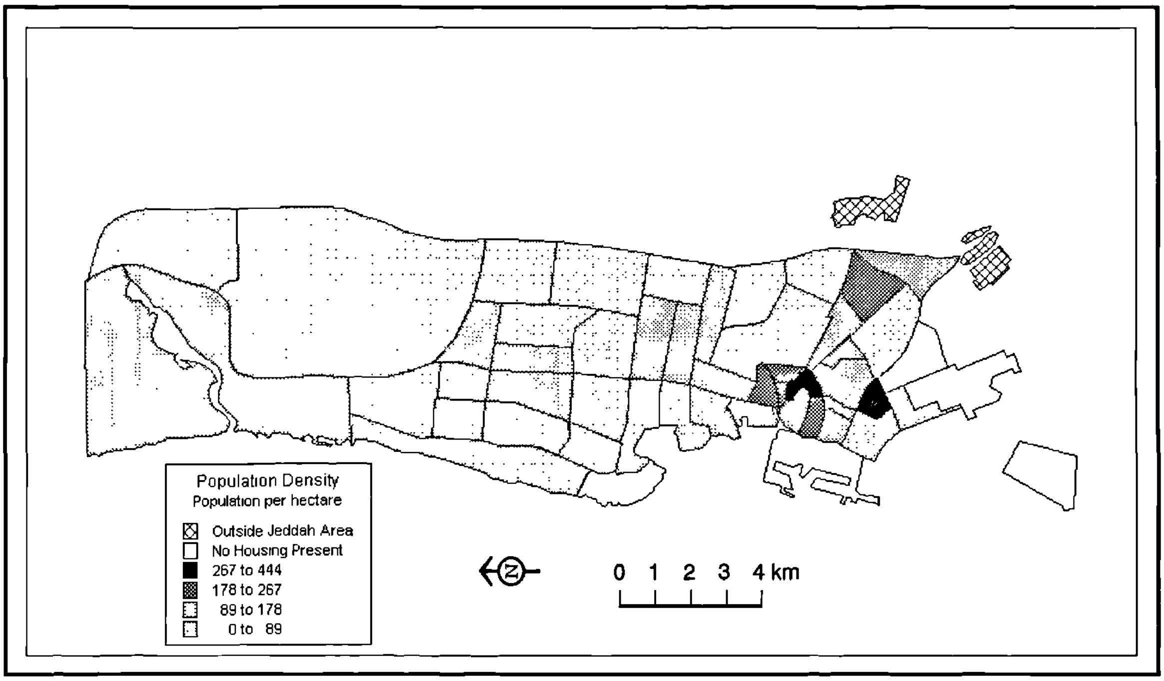



Figure 2.16 Population Density, Jeddah, Compiled from data between 1992 and 1999

In general, we can recognise that the higher population densities are concentrated around the core of the city (Central Business District) and to the south of the centre rather than the north.

Table 2.5: Population Density, Distribution in Jeddah, 1992.

| Districts | Population* | Area in hectares[x] | Population Density per Hectare | % Distribution |
|---|---|---|---|---|
| Petromin | 42345 | 704 | 60.15 | 2.4 |
| Ghulayl | 66519 | 150 | 443.46 | 3.7 |
| Al Mahjar | 7259 | 726 | 10.00 | 0.4 |
| Al Wazireyyah | 7 | 700 | 0.01 | 0.0 |
| Madain Al Fahd | 61704 | 792 | 77.91 | 3.5 |
| Al Rawabi | 80686 | 456 | 176.94 | 3.5 |
| Al Jameah | 109796 | 540 | 203.33 | 6.2 |
| Al Saghr | 40907 | 350 | 116.88 | 2.3 |
| Al Nuzlah Al Sharqeyyah | 22215 | 198 | 112.20 | 1.3 |
| Al Nuzlah Al Yamaneyyah | 59443 | 420 | 141.53 | 3.3 |
| Al Qeryat | 15188 | 165 | 92.05 | 0.9 |
| Al Thaalebah | 22420 | 154 | 145.58 | 1.3 |
| Al Hindaweyyah | 54083 | 210 | 257.54 | 3.0 |
| Al Balad | 56228 | 552 | 101.86 | 3.2 |
| Al Saheefah | 19609 | 56 | 350.16 | 1.1 |
| Al Sabeel | 24530 | 91 | 269.56 | 1.4 |
| Al Kandarah | 41319 | 180 | 229.55 | 2.3 |
| Al Ammareyyah | 13951 | 60 | 232.52 | 0.8 |
| Baghdadeyyah Al Sharqeyyah | 26042 | 144 | 180.85 | 1.5 |
| Baghdadeyyah Gharbeyyah | 12019 | 375 | 32.05 | 0.7 |
| Al Sulaymaneyyah | 17983 | 650 | 27.67 | 1.0 |
| Old Airport | 5429 | 650 | 8.35 | 0.3 |
| Al Naseem | 14903 | 931 | 16.01 | 0.8 |
| Bani Malek | 50771 | 500 | 101.54 | 2.9 |
| Al Rehab | 27878 | 620 | 44.96 | 1.6 |
| Mushrefah | 82977 | 574 | 144.56 | 4.7 |
| Al Azizeyyah | 102997 | 738 | 139.56 | 5.8 |
| Al Sharafeyyah | 49942 | 384 | 130.06 | 2.8 |
| Al Ruwais | 46395 | 450 | 103.10 | 2.6 |
| Al Hamra'a | 18082 | 345 | 52.41 | 1.0 |
| Al Andalus | 12609 | 420 | 30.02 | 0.7 |
| Al Khaledeyyah | 10677 | 468 | 22.81 | 0.6 |
| Al Rawdah | 41351 | 840 | 49.23 | 2.3 |
| Al Faysaleyyah | 61767 | 800 | 77.21 | 3.5 |
| Al Safa | 95609 | 1363 | 70.15 | 5.4 |
| Al Marwah | 34614 | 1050 | 32.97 | 1.9 |
| Al Rabwah | 84521 | 1216 | 69.51 | 4.8 |
| Al Nuzhah | 43636 | 527 | 82.80 | 2.5 |
| Al Bawadi | 51765 | 494 | 104.79 | 2.9 |
| Al Salamah | 52194 | 585 | 89.22 | 2.9 |
| Al Zahra'a | 26167 | 880 | 29.74 | 1.5 |
| Al Shate'e | 17543 | 1440 | 12.18 | 1.0 |
| Al Nahdah | 16327 | 500 | 32.65 | 0.9 |
| Al Naeem | 13829 | 468 | 29.55 | 0.8 |
| Al Mohammdeyyah | 10549 | 1134 | 9.30 | 0.6 |
| Obhur Al Janoubeyyah | 4545 | 4400 | 103.30 | 0.3 |
| Obhur Al Shamaleyyah | 2307 | 2200 | 104.86 | 0.1 |
| King Abdulaziz Intl. Airport | 5701 | 9300 | 61.30 | 0.3 |
| Al Amir Fawawaz Housing | 43681 | - | - | - |
| Quwaizah | 29695 | - | - | - |
| Eastern Park No.2 | 25890 | - | - | - |
| Eastern Park | 23296 | - | - | - |
| Kilo 11 | 23296 | - | - | - |

Table 2.5 continued

| Districts | Population* | Area in hectares x | Population Density per Hectare | % Distribution |
|---|---|---|---|---|
| Kilo 14 | 35579 | - | - | - |
| Makkah Road Kilo 4 South | 37732 | - | - | - |
| Sennaiyah | 12879 | - | - | - |
| Royal Palaces | 11054 | - | - | - |
| Naval Base | 10916 | - | - | - |
| South Iskan | 21588 | - | - | - |
| Column Totals | 2046251 | - | - | - |

Source: * Central Department of Statistics, 1992.

x Municipality of Jeddah Governorate, 1999. Districts with missed data in the bottom of the table are mostly not served by the municipality nor depicted in the map.

## 2.4.3 Population Distribution

From Table 2.6 and Figure 2.17 it is evident that the current distribution and density of the population of Jeddah shows great variation. In this respect, modern day Jeddah shows a population pattern that is as variable as at any time in the past and reflects the dynamic nature of the way in which the city has expanded since the early 1970s. At this point it is worth emphasising that some districts contain a very high proportion of the total population for Jeddah, notably; Al Jameah, (6.2 percent), Al Azizeyyah (5.8 percent), Al Safa (5.4 percent), Al Rabwah (4.8 percent), Mushrefah (4.7 percent) and Al Rawabi (4.5 percent). These numbers reflect the influence of the shifting immigrant population to the new districts, a feature supported by the low income and socio-economic figures for these districts, see Figure 1.9.

The districts containing a more moderate proportion of the total population are: Ghulayl (3.7 percent), Madain Al Fahd and Al Faysaleyyah (3.5 percent), Al Nuzlah Al Yamaneyyah (3.3 percent), Al Balad (3.2 percent), Al Hindaweyyah (3.0 percent), Al Salamah (2.9 percent) and Petromin (2.4 percent). Some of these districts are situated around the core of the city and have existed since the very first stage of development of Jeddah, for example, Al Balad, Al Hindaweyyah, Ghulayl, Al Nuzlah Al Yamaneyyah, Bani Malek and Al Ruwais. To the south of the city centre, other districts such as Madain Al Fahd and Al Saghr reflect the rapid growth that occurred because of internal city migration from other existing districts. Furthermore, there were some districts located in the north such as Al Faysaleyyah, Al Salamah, Al Bawadi and Al Nuzlah, that reflect the rapid development of the northern suburban and again owe their growth to the internal from other districts (Al Hamadan, 1987, p.83). The districts with the lowest populations are located in the old part of the city such as Al Saheefah, Al Ammareyyah and Al Sabeel. Most people who formerly lived in these areas have gradually relocated either to the north or to the south of the city stimulated by the development sponsored by the municipality.

The lowest proportion of population is to be found in the districts located to the north along the Red Sea shoreline, for example, Al Zahra'a, Al Hamra'a, Al Andalus, Al Nahdah and Al Khaledeyyah. These districts represent the best areas of Jeddah characterised by the highest standards of urban planning.

In summary it is possible to state that modern day Jeddah City is a typical metropolitan area displaying wide socio-economic differences between the districts. It is logical to ask the question *are these differences in ethnic composition, in socio-economic conditions and population density reflected in different spatial patterns of disease types and number recorded in the different districts of Jeddah?* It is known that one of the main objectives in medical geography is to study the provision of health care provision, but it is more often the case that study of the disease takes priority since we can acquire data on the incidence of disease more easily than on health care provision. If we are to attempt a study of medical ecology, then the relations straddling the physical and social networks need to be included in an attempt to identify the real patterns that exist between health and disease. We must also study disease and environment from a spatial view point, in a manner described by Learmonth, (1978, p.25) as a study of space environment including aspects of the biogeography and socio-economic infrastructure.

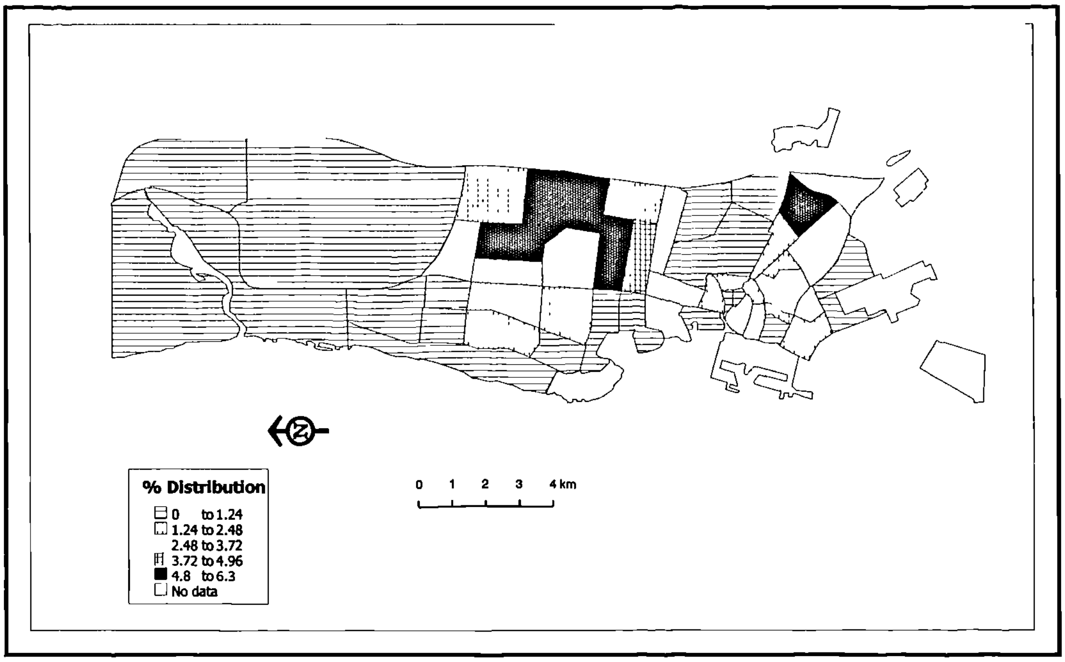



Figure 2.17 Population Distribution, compiled from 1992 data, made available 1999

### 2.4.4 Age and Gender Structure within the districts of Jeddah Governorate

The following information on the age and gender structure of population of Jeddah provides a useful indicator on the possible health needs of the population.

**Table 2.6 Data Distribution by Gender, 1992.**

| Gender | Population | Percentage |
|---|---|---|
| Male | 1.196,740 | 59.2 |
| Female | 824,355 | 40.8 |
| Total | 2,021,095 | 100 |

Source: Central Department of Statistics, 1999.

Table 2.6 shows a considerably preponderance of males over females. An explanation is easily provided for this discrepancy in that a far greater proportion of the immigrants to Jeddah are males because of the nature of the employment opportunities available.

Age structure is determined mainly by fertility level of the female population since the number of children being born within a country in any one year obviously affects the future age structure. Other variables such as immigration, war, famine and economic recession may also affect age structure, Table 2.7.

Age pyramids not only reflect long-term trends in fertility and mortality but also are also sensitive to short-term effects of wars, migrations, epidemics, baby-booms, population policies and other phenomena. With care, it is possible to extract considerable information from both the shape and many irregularities contained in age and gender pyramids (Clarke 1972, p.70). Table 2.8 and Figure 2.15 show the population pyramid for Jeddah. It reveals a shape that is typical of a rapidly growing industrial city, displaying a broad base that tapers gradually with age. Inspection of the pyramid reveals that the age structure of the population is significantly skewed towards the younger age groups. In particular, the group under 10 years of age includes one quarter of all the population of Jeddah. Above 10 years of age the pyramid show a nearly balanced and normal distribution

**Table 2.7 Age-Gender Data, 1992**

| | Total | | Males | | Females | |
|---|---|---|---|---|---|---|
| Age Group | No. | % | No. | % | No | % |
| 0 – 4 | 267,371 | 17.16915 | 136,730 | 11.43 | 130,641 | 15.85 |
| 5_9 | 245,480 | 12.1459 | 123,785 | 10.34 | 121,695 | 14.76 |
| 10_14 | 195,994 | 9.69742 | 99,955 | 8.35 | 96,039 | 11.65 |
| 15-19 | 144,536 | 7.15137 | 72,583 | 6.06 | 71,953 | 8.73 |
| 20-24 | 184,347 | 9.12114 | 106,231 | 8.88 | 78,116 | 9.48 |
| 25-29 | 241,769 | 11.9623 | 155,229 | 12.97 | 86,540 | 10.50 |
| 30-34 | 233,462 | 11.5513 | 155,809 | 13.02 | 77,653 | 9.42 |
| 35-39 | 182,043 | 9.00715 | 125,988 | 10.53 | 56,055 | 6.80 |
| 40-44 | 115,910 | 5.73501 | 84,357 | 7.05 | 31,553 | 3.83 |
| 45-49 | 73,298 | 3.62665 | 51,095 | 4.27 | 22,203 | 2.69 |
| 50-54 | 51,473 | 2.54679 | 33,702 | 2.82 | 17,771 | 2.16 |
| 55-59 | 29,481 | 1.45866 | 19,192 | 1.60 | 10,289 | 1.25 |
| 60-64 | 24,149 | 1.19485 | 14,746 | 1.23 | 9,403 | 1.14 |
| 65-69 | 11,545 | 0.57123 | 6,973 | 0.58 | 4,572 | 0.56 |
| 70-74 | 9,378 | 0.46401 | 4,908 | 0.41 | 4,470 | 0.54 |
| 75-79 | 4,002 | 0.19801 | 2,182 | 0.18 | 1,820 | 0.22 |
| > 80 | 6,857 | 0 | 3,275 | 0.27 | 3,582 | 0.43 |
| **TOTAL** | **2,021,095** | **100** | **1,196,740** | **100** | **824,355** | **100** |

Source: Central Department of Statistics, 1999.

of age structure because Jeddah has not experienced any unusual conditions such as war or epidemics that could have resulted in an under-representation of a specific age or gender group. However, a degree of abnormality is evidenced by the different agecurves for males and females. The male age groups between 25-44 years appears inflated for reasons which can be attributed to the age-sex selective migration described above and which includes a high proportion of young, adult male workers, in the above mentioned age group. Most of these workers came from other Arab countries such as Egypt, Syria, and Lebanon and from Asian countries such as Pakistan, India, Bangladesh and the Philippines. All of these countries can be categorised as under-developed. Commonly, when studying age structure, the population is usually divided into three groups for which data maybe presented as absolute numbers or as percentage of the total population (Clark, 1972). The categories are as follows:

- children or young people under 15 years;
- adults aged between 15-64, and often categorised as the economically active, and
- those aged 65 and over and retired.

**The Young (under 15 years):**

From Table 2.7 and Figure 2.18 it can be seen that in 1992 the city had a very youthful population with 35.1 percent of the total under 15 years. This reflects the high level of fertility and the rate of low mortality achieved through the improved social and medical facilities.

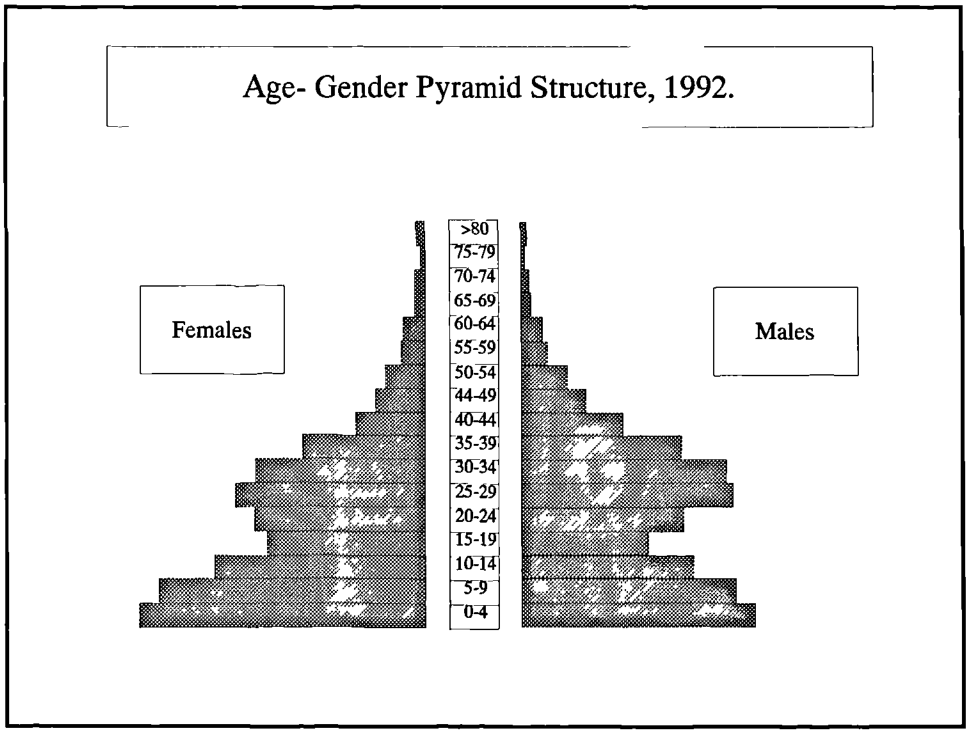



Figure 2.18: Age Gender Pyramid, Jeddah, 1992.
Source: Central Department of Statistics, 1992.

**The Adult Group (15-64 years):**

From Table 2.8, it can be shown that this group represented 63.4 percent of the total population in 1992. With almost two-thirds of the population in the economically active group it is clear that the attraction of Jeddah as a place of work exerts a marked influence on the population structure. Further subdivision of this category showed that the number of young adults of working age (15-34 years) was 804,114 or 62.8 percent of the adult group. Adults aged between 34 and 64 numbered 476,354 or 37.2 percent of the adult group. Clearly, the predominant age group in Jeddah is the 15-34 year old cohort.

**The Aged Group (65 and over):**

In general, the proportion of this group was very small when compared to other two groups. In percentage terms it constituted only 1.6 percent and reflects the shorter life span associated with the poorer provision of medical services that were available prior to 1970.

Table2.8 Age- Gender groups for Saudi.

| Age Group | Males Saudi | | Females Saudi | |
|---|---|---|---|---|
| | NO | % | NO | % |
| 0 - 4 | 82,976 | 16.23 | 79,652 | 17.13 |
| 5_9 | 75,800 | 14.86 | 74,161 | 15.96 |
| 10_14 | 63,931 | 12.53 | 60,581 | 13.04 |
| 15-19 | 48,161 | 9.44 | 46,867 | 10.09 |
| 20-24 | 51,516 | 10.10 | 46,452 | 10.00 |
| 25-29 | 47,100 | 9.23 | 43,823 | 9.43 |
| 30-34 | 39,778 | 7.80 | 30,031 | 6.46 |
| 35-39 | 28,824 | 5.65 | 24,142 | 5.20 |
| 40-44 | 18,366 | 3.60 | 14,219 | 3.06 |
| 45-49 | 13,931 | 2.73 | 11,884 | 2.56 |
| 50-54 | 11,502 | 2.25 | 10,315 | 2.22 |
| 55-59 | 8,588 | 1.68 | 6,741 | 1.45 |
| 60-64 | 8,395 | 1.65 | 6,085 | 1.31 |
| 65-69 | 4,316 | 0.85 | 3,044 | 0.66 |
| 70-74 | 3,235 | 0.64 | 2,921 | 0.63 |
| 75-79 | 1,513 | 0.30 | 1,265 | 0.27 |
| More than 80 | 2,323 | 0.46 | 2,444 | 0.53 |
| **TOTAL** | **510,255** | **100** | **464,627** | **100** |

Source: Central Department of Statistics, 1992.

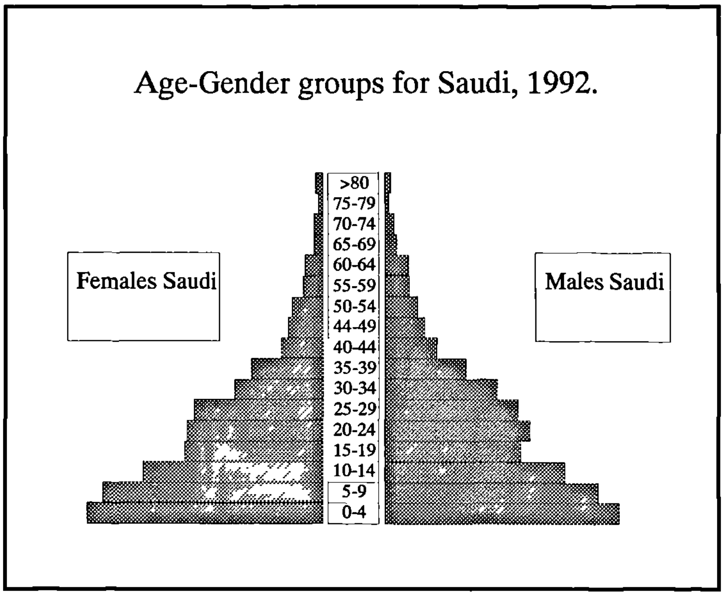



Fig 2.19 Age-Gender Groups for Saudi Population.

Source: Central Department of Statistics, 1992.

From Table 2.8 and Table 2.9 and Figure 2.19 and 2.20 it appears that the immigration of the non-Saudi element of the population can be considered to be the main factor that has caused deviation from a normal distribution pattern of the age groups. This is especially so in the age group 25-64 which represents 59.9 percent of the total non-Saudi cohort compared with Saudi element that contain 33.2 percent from the total of the Saudi cohort.

Table 2.9 Age groups for non-Saudi:

| Age Group Year | Gender | | | |
|---|---|---|---|---|
| | Males Non _Saudi | | Females non_ Saudi | |
| | NO | % | NO | % |
| 0-4 | 53,754 | 7.83 | 50,989 | 14.16 |
| 5_9 | 47,985 | 6.99 | 47,534 | 13.21 |
| 10_14 | 36,024 | 5.25 | 35,458 | 9.86 |
| 15-19 | 24,422 | 3.56 | 25,086 | 6.97 |
| 20-24 | 54,715 | 7.97 | 31,664 | 8.80 |
| 25-29 | 108,129 | 15.75 | 42,717 | 11.87 |
| 30-34 | 116,031 | 16.90 | 47,622 | 13.24 |
| 35-39 | 97,164 | 14.15 | 31,913 | 8.87 |
| 40-44 | 65,991 | 9.61 | 17,334 | 4.82 |
| 45-49 | 37,164 | 5.41 | 10,319 | 2.87 |
| 50-54 | 22,200 | 3.23 | 7,456 | 2.07 |
| 55-59 | 10,604 | 1.54 | 3,548 | 0.99 |
| 60-64 | 6,351 | 0.92 | 3,318 | 0.92 |
| 65-69 | 2,657 | 0.38 | 1,528 | 0.42 |
| 70-74 | 1,673 | 0.24 | 1,549 | 0.43 |
| 75-79 | 669 | 0.10 | 555 | 0.15 |
| More than 80 | 952 | 0.14 | 1,138 | 0.32 |
| **TOTAL** | **686,485** | **100** | **359,728** | **100** |

Source: Central Department of Statistics, 1992.

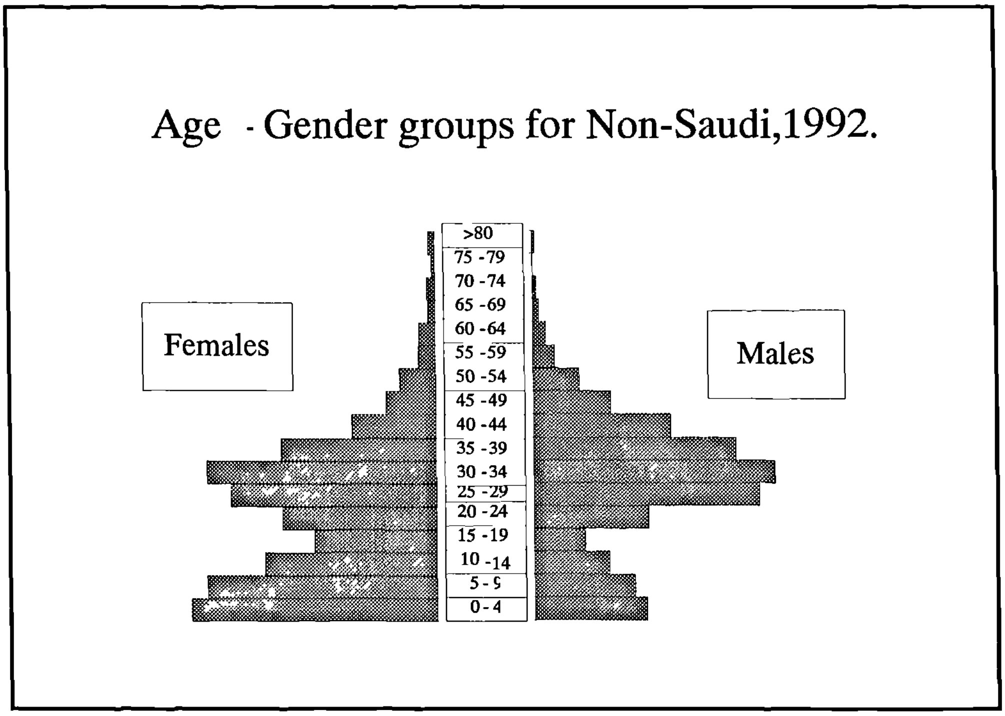



Fig 2.20 Age-Gender Distribution of Non-Saudi Population, 1992.
Source: Central Department of Statistics, 1992.

## 2.4.5 Family Structure in Saudi Arabia

The family is the most fundamental element in the social structure of Saudi society and is also the basis for all the social characteristics of society. The meaning of '*family*' to Saudis has far reaching importance because it means above all, that parents must be respected and obeyed because it is defined by religious law to behave correctly towards parents and to look after them especially when they reach their old age. The structure of the family also influences the fertility patterns and Al-Ghamdi (1991, p.227), proposed that the extended family structure helps to encourage a higher fertility rate than the nuclear family structure. As a result, children become the main source of insurance in life and subsequently women's reproductive behaviour will respond to the economic insecurity by producing more children. The objective is to have a maximum number of male children and, as a result, the production of female children may become incidental. This, in turn, encourages a high fertility rate (Al-Ghamdi 1991, pp.20, 21, 22 & p.228).

In 1987 a survey was undertaken by the National Child Health (NCHS) on the distribution of population enumerated by household and by current age and gender, according to marital status. The survey showed that very few females under age 15 are married and the proportion of the population that is single declines very rapidly with increasing age. By age group 25-29 years only about 13 percent of women are single, compared with 29 percent of men. By age 50, the percentage remaining single is two percent for women and just over one percent for men. These very low proportions show that marriage is almost universal in Saudi Arabia. Moreover, the result of the survey helps explain the high fertility rate and the age pattern of current fertility in Saudi Arabia. It is noteworthy that in Saudi Arabia, urban fertility is significantly lower than rural fertility with a difference of more than 1.7 children observed in the total fertility rate between urban woman (6.1 births) and rural woman (7.8 births). Moreover, the level of current fertility is lower in the west region (5.6 births), rising to 6.4 in the central region, to 7.2 in the eastern region and about 7.5 in the south and north regions (Al-Mazrou and Farid 1991, p.254).

The preference for large families still exists in contemporary Arab society. For example, the fertility rate in Arab countries can be divided into two groups. The first fertility group comprises families with more than 6 children. Countries following this pattern include Yemen, Palestine, Oman, Syria and Somalia. The second group contains families with fewer than 6 children, typically Jordan, Egypt, Morocco and Sudan (Al-Mazrou and Farid 1991, p.55). Arabs in general, like to have large families because in the old days, this symbolised power as well as bringing in more income and providing extra hands to work in rural communities. Thus, the larger the family, the more powerful it became. In addition, the large extended family system still exists in Saudi Arabia. Some families live together with their adult children and their grandchildren in one house, perhaps because the parents are aging and need to be looked after; or when the son is the only child and therefore continues to live in the family home.

Size of family is a very important factor in determining the levels of utilisation and satisfaction of the available health care service. Individuals with a small family are less likely to make use of the health services, but it is usually easier to satisfy them, because their needs are fewer than large families. Conversely, families with a larger number of children are likely to need more frequent access to health care facilities and therefore their utilisation rate increases.

As previously mentioned, Jeddah City has an important strategic location in the country as the main sea port for the whole country, the main access to the Holy City of Makkah and finally, Jeddah City was, and is still, the country's major trading and commercial centre. In the light of these special considerations, Jeddah City has experienced a massive programme of socio-economic development. The huge development in the city has created many commercial activities and job opportunities as well as high levels of prosperity and rising living standards. These factors have attracted significant immigration of Saudis from other villages, towns and cities, and even nomadic tribes people who have moved to Jeddah for various reasons, such as work or looking for a better life. Unfortunately, there is no reliable information relating to the magnitude of internal or external migration to Jeddah City (Al-Hamedan, 1987). It is known that the majority of the non-Saudi migrants to Jeddah are male. The bulk of internal (Saudi) migrants tend to work for the government services, commercial and transportation sectors, whereas foreign migrants are involved in quite different sectors of occupation in the city. All migrants are distributed throughout the city's districts, living together with the native population of Jeddah City in all types of dwelling, particularly in apartments that are now a predominant type of dwelling in the city. The entire population must be serviced by medical provision presented by and located in the many health centres throughout Jeddah City. Chapter Three will examine the provision of health care services in Jeddah.

# Chapter Three

## The Health Care Service in Saudi Arabia

### 3.1 The foundation of the Health Care System in Saudi Arabia

In order to present a picture of the elements of the Saudi Health Care Delivery system, this chapter will discuss the factors that have helped to support and develop this sector.

Public health services in Saudi Arabia, as in most developing countries, are of relatively recent origin and are often still in the preliminary stages of development. The early philosophy of introduced medicine in Saudi Arabia was strongly influenced by the ideas prevalent in the United States in the 1960's; that medicine should be specialist dominated, and hospital-based (Dodd, 1986). To understand the mechanism of the health care delivery system in Saudi Arabia it is necessary to take account of a number of factors, the most prominent being:

1. The development and dominant characteristics of the health delivery system;
2. The organisation of health care and the role of the Ministry of Health (M.O.H.);
3. Economic influence and health expenditure;
4. Network of health care services.

### 3.2 The development and dominant characteristics of the health care delivery system

The health system in Saudi Arabia remains in its relatively early stages of development and is still undergoing modification, expansion and improvement. It contains features and practices from health services of both the developed and developing countries and is delivered through two sectors, public (government) and private.

The main characteristics of the public sector maybe summarised as follows:

1 There is concentration on curative rather than preventive medicine, as in

many third world countries. This aspect of health care is costly to provide and its sophisticated technologies consume a large proportion of the total allocations for the health budget.

2 Far less attention has been given within preventive medicine to the prevention of the common-place diseases such as malaria, bilharzias and diarrhoea. This discrepancy is especially marked when compared to the time, effort and resources given to curative medicine This is partly because within developing countries in general only limited progress has been achieved in the field of health and safety education and preventive care. For example in Saudi Arabia, infant and child mortality rate remains high. For example, the rate of infant death in M.O.H. hospitals in 1994 was 17.8 per 1000 live births. Another example is shown by deaths and injuries from road accidents that constitute a major health care problem due in great part to inadequate road safety education (Hamour, 1984).

3 The planning, organisation and provision of the public health care sector is controlled by the government in an attempt to ensure free access to health care facilities for all the population. In addition, the private health care sector is supervised, encouraged and sometimes subsidised by the government and it delivered in the late 1990s an estimated 15 percent of the total health service provision in Saudi Arabia to those who can afford to pay. In this respect, the Saudi health system resembles that of the U.K. However, apart from the Ministry of Health, the Saudi system differs from many others in that health care is delivered through a total of 14 additional government agencies and departments, each with its own policies, priorities and restricted clientele (Al-Ammari and El-Torky, 1984).

4 The Saudi health system is highly centralised. The planning, financing and decision making of the health system is centralised in the headquarters of the Ministry of Health in Riyadh. In line with the administration division of the country, the health system is administered through 13 national Directorates, each headed by a director. However, the financial and administrative authorities of the directors are extremely limited and the major decision making process is in the hand of the King as the Prime Minister, and the

princes as governors of regions.

5 There is a concentration of health services in urban areas, a feature that the Saudi health system shares with many other developing countries. However, similarity with health development in other third world countries is only superficial, particularly as regards expenditure. Health expenditure is Saudi at 5 percent of GNP, is parallel to the level of other developing countries, but expenditure per capita is at much higher level in Saudi than in many developed countries due to the oil revenues of the Kingdom. As a result, there is a far better level of delivery of health care in rural and urban areas than in most developing countries and access to those services is better.

6 The Saudi health system shares some characteristics with the other oil producing Gulf countries. For example, due to a shortage of suitably qualified and skilled indigenous workforce at all levels, the Saudi health service relies heavily on foreign personnel (Sebai, 1984a). This reliance on outside staff has resulted in problems of establishing uniform quality of staff and this, in turn, leads to an uneven health care service. Moreover, although part of the health delivery system is very advanced and technology based, traditional medicine still plays a strong role in the provision of services (Moloney, 1984), although it has not been legally recognised by the health authorities. The system is, therefore, not integrated with the public and private health care sectors. It would be useful to consider if traditional (or alternative) medicine could be developed to provide a third tier of health care provision.

## 3.2 The development of health policy in Saudi Arabia

Despite Saudi Arabia remaining a poor country for the first decade after its creation in 1932, its founder, King Abdulaziz soon decreed that all government hospitals and health centres should provide the population with a free health care service. This decision still underpins the policy of Saudi Arabian government towards health care provision, that the government ....... *has always been attempting to provide the finest health care services free to all inhabitants of the Kingdom* (Ministry of Planning, 1980, p.344). Provision of free health care also extends to the millions of pilgrims who visit Saudi Arabia for Hajj and to visit the holy places of Islam.

The Saudi health system at first developed very slowly to meet its goals. Early growth occurred in a haphazard manner because a clear policy for the provision and development of health care provision was not available. In 1926, there were only two small hospitals in the whole country. These were in Makkah and Jeddah, mainly to provide curative health services to pilgrims where risk of disease was great during the Hajj. In 1927, these hospitals formed the basis of the newly formed Directorate of Health and Ambulance. Its services were expanded but it remained entirely a regional service in the West with its attachment to the office of the Agent Directorate in Hejaz. This rudimentary health care service was initially under the control of the Ministry of Interior. Gradually, its work spread to other parts of the Kingdom and in 1951 was reformed as the new Ministry of Health (Sadiq, 1965; Simmons *et al*, 1954). Its responsibility was to provide a national medical care and health service that would lead to an overall improvement in the health of the population.

It was not until the 1960's that the M.O.H. and the Central Planning Organisation (which was redesignated the Ministry of Planning in 1975), formulated a plan to provide comprehensive health services for all the people in the Kingdom. This was achieved with the technical assistance of the World Health Organisation. Since 1970 there have been a series of five-year development plans to guide the expansion of all sectors of the economy and the health care sector has become one of the more important components in these national development plans.

The first development plan prepared in 1970 included three main objectives for the field of health care. These were:

1 To increase the number of doctors and technicians and expand health training programmes;
2 To expand preventive health service;
3 To commence new medical facilities and the reconstruction of old ones in accordance with the requirements of a general network for the country that will provide health care throughout the Kingdom (Central Planning

Organisation, 1970, p.146).

The first development plan of 1970-75 led to some success in the improvement of health care, as well as other social services. However, the programme of development was hampered by a number of factors, particularly the acute shortage of skilled personnel at all levels. In addition, there were organisational and management difficulties and there was a lack of information and research on quite basic characteristics of the country. As a consequence, there was a lack of detailed knowledge on what constituted the appropriate form and size of an effective health system. There was a lack of integration for the preventive, curative and educational components of the health system and finally, the number of graduates produced by the Kingdom's medical training schools was insufficient both in terms of numbers and quality. For example, in the period of 1970-1974, only 152 female nurses and 357 technical assistants graduated from the Kingdom's nursing schools and health institutes (Ministry of Planning, 1975, p.375).

When the second development plan (1975-80) was launched several measures were adopted to rectify the deficiencies in the first plan. These measures were intended to improve management and administrative arrangements in the health service, to expand the skilled manpower resource, to increase the number of hospital beds and to enlarge the network of dispensaries, health centres and health points, and improve health education. For the first time, an emphasis was placed on the integration of curative and preventive medical care. The plan stated:

> *A primary objective of the development of the health sector in the period of 1975-1980 is to provide the Kingdom's population in all regions with a comprehensive range of preventive and curative health services so that the people may, through higher levels of health, both contribute to and benefit from the socio-economic progress of the Kingdom* (Ministry of Planning, 1975, p.376-377).

While the second development plan made some progress in the integration of preventive and curative medical care at the health centre level and in the hospitals, most of the emphasis in health services provision remained concentrated in the curative field rather than on preventive medical facilities and primary care. This was largely the result of the necessary priority during the first and second plan period to provide immediate treatment for people suffering from a disease.

As a result, by the end of the second development plan, health care remained one of the Kingdom's crucial problems. Al Bakr (1983) noted that infant mortality and communicable diseases remained at a high level. There were wide discrepancies in accessibility to health services and facilities. Health service personnel remained in short supply and were used inefficiently, and there was an insufficient allocation of resources directed towards preventive health care.

The third, fourth and fifth development plans (covering the period 1980-1995) gave priority to a dispersal of social development, on both the spatial and social scales, across the Kingdom and with a major emphasis given to a much wider interpretation of health care services than in the past. A broad range of new health care objectives were established. In summary, these were:

1. To improve the health conditions of the population, in particular by ridding the country of endemic diseases;
2. To provide the population in every region with a fully integrated and comprehensive system of free medical services;
3. To strengthen primary health care as the basis of a comprehensive health service network, and to place a greater emphasis on preventive medicine and environmental health programmes, including health education, maternal and child health care, public immunisation and occupational health programmes;
4. To develop further the emergency medical services with special attention to the requirements of the influx of pilgrims in the Hajj season;
5. To encourage the private sector to provide additional medical services for both Saudi citizens and foreign residents in the Kingdom;
6. To establish a National Health Council to determine the Kingdom's health policies to guide the development and improvement of all health services in the Kingdom, and to delineate the responsibilities of individual government health care agencies and the private sector, and to co-ordinate their activities;

7 To increase the number and improve the quality of medical personnel and, in particular, to encourage young Saudi's to take up careers in the medical profession;

8 To expand exchanges of medical expertise between the Kingdom, the Gulf Co-operation Council and International Health Organisations (Ministry of Planning, 1980, pp.347-348 and 1985a, p.329).

## 3.3 Development in the Primary Health Care and Health Centres

Attainment of good health is a goal of every human being and to achieve that aim certain strategies should be followed. In 1977, the General Assembly of the World Health Organisation (WHO) stated that *attainment of health for all the people by the year 2000 under the Health for All (HFA) scheme should be an international goal to be undertaken by all governments of all countries in the world as well as WHO* (M.O.H., 1986).

In September 1978, an International Conference on Health Care held at Alma Ata and organised by WHO and UNICEF defined eight essential elements necessary to provide the minimum level of health services. This programme, known as the Promotive, Preventive, Curative and Rehabilitative medical programme was the centre-piece of health care provision to be delivered initially at Primary Health Care Centres (PHCC) and subsequently, at all levels of the health care system. Until 1979 health services in Saudi Arabia had been delivered through two separate channels, those of Curative and Preventive services. From 1980 the Ministry of Health began the gradual implementation of a radically new approach, and which incorporated many of the guidelines proposed at the Alma Ata conference. Implementation of a Primary Health Care (PHC) programme was seen to be the means of attaining health for all the people of Saudi Arabia by the year 2000 (M.O.H., 1986, p.16).

The elements of the programme followed the eight key points proposed at the Alma Ata meeting and were as follows:

1 Education of the community concerning health and health related problems that prevail in the community along with definition of appropriate solutions;

2 Promotion of food supply and proper nutrition;

3 Provision of adequate supply of safe drinking water and basic sanitation;

4 Provision of comprehensive maternal and child health care;

5 Immunisation of children against the major communicable diseases;

6 Prevention and control of locally endemic diseases;

7 Appropriate treatment of common diseases and injuries as well as conduction of simple surgical procedures and normal deliveries;

8 Provision of essential drugs.

(M.O.H., 1986, p.16).

The above eight essential health services were to be provided on the basis of the following four PHC (Primary Health Care) principles; Equitable Distribution, Appropriate Technology, Multi-sectoral Approach, and Community Participation.

In order to spread the benefits of the developing health services to all the population, the Fifth Plan (1900-95) recognised that primary health care must be brought to the level of the individual locality. This would mean increasing the network of primary health centres and an improvement of services at the household level. A proper system of family health record and hospital referral system would be required in order that the expanding network of health care centres could be linked to the hospital system. It was also recognised that special attention must be given to the increasing demand for infant and child health services. Finally, better co-ordination between the M.O.H. and other social agencies of the Kingdom were planned (Ministry of Planning, 1995).

Table 3.1 shows the number of the Primary Health Care Centres (PHCC) by region from 1991-1993. Some of the inter-annual variation in Health Centre numbers has been due to changes in the position of regional boundaries and the consequent transfer of health centres to adjacent regions. Regions are subsequently subdivided into districts and, in general, the PHCC are distributed geographically so as to facilitate the presence of a PHCC in each district. Health centres are generally staffed for two shifts, a morning shift from 7:30 am to 1:00 pm and afternoon shift between 4:00 - 7:00 pm. Health centres are closed on Friday.

**Description of the PHCC system**

The implementation of the Health for All programme in Saudi Arabia requires that facilities in the PHCC must be adequate to deliver the fundamental

Table 3.1 Primary Health Care Centres (PHCC) by Region in Saudi Arabia, 1991-1995

| Region in Saudi Arabia | No. of Primary Health Care Centres in 1991 | No. of Primary Health Care Centres in 1992 | No. of Primary Health Care Centres in 1993 | No. of Primary Health Care Centres in 1994 | No. of Primary Health Care Centres in 1995 |
|---|---|---|---|---|---|
| Riyadh | 268 | 268 | 271 | 276 | 277 |
| Makkah | 76 | 78 | 74 | 75 | 75 |
| Jeddah | 103 | 103 | 100 | 101 | 103 |
| Taif | 92 | 93 | 95 | 97 | 98 |
| Medina | 123 | 123 | 123 | 123 | 122 |
| Qaseem | 132 | 132 | 134 | 137 | 137 |
| Eastern | 108 | 110 | 110 | 109 | 108 |
| Al-Ahsa | 54 | 54 | 54 | 54 | 54 |
| Hafr Al-Baten | 27 | 27 | 25 | 25 | 26 |
| Aseer | 237 | 208 | 208 | 208 | 206 |
| Bisha | - | 30 | 30 | 30 | 30 |
| Tabouk | 41 | 41 | 41 | 41 | 43 |
| Hail | 83 | 83 | 84 | 83 | 84 |
| Northern | 39 | 40 | 40 | 40 | 40 |
| Jizan | 124 | 125 | 127 | 131 | 132 |
| Najran | 57 | 59 | 59 | 59 | 60 |
| Al Baha | 79 | 79 | 80 | 81 | 81 |
| Al Jouf | 31 | 31 | 31 | 31 | 31 |
| Qurayyat | 18 | 18 | 18 | 10 | 18 |
| TOTAL | 1692 | 1702 | 1702 | 1719 | 1725 |

Source: M.O.H. Annual Health Report, 1991, p.54.
M.O.H. Annual Health Report, 1992, p.36.
M.O.H. Annual Health Report, 1993, p.167
M.O.H. Annual Health Report, 1994, p.86
M.O.H. Annual Health Report, 1995, p.90

health services at primary care level. In addition, there may also be more sophisticated facilities present in selected centres, and which act as a nucleus for a number of outlying satellite centres. The special facilities may include ultra-sound and x-ray facilities.

Every patient that visits a PHCC should, if necessary, be able to have access to a doctor. Nurses are not permitted to treat a patient unless they have instructions from the physician. The total population of patients allocated to a specific health centre determines the number of doctors allotted to that health centre. The ratio of patients to doctors is calculated at a central, or regional, level and takes into account the amount of money available to operate the health centres, the level of use of the health service and the availability of medical resources. A reallocation of physicians may be necessary to ensure the provision of a correct level of medical care. Normally, a patient must use the health centre to which they are allocated although in case of emergencies a patient can use any health centre. Patients with serious illness are transferred via the Saudi Red Crescent who co-ordinate the movement of patients to the next most appropriate level of health care provision. There are four groups of government agencies which provides a reasonable comprehensive set of health facilities at a selected locations:

1. The Ministry of Defence and Aviation, the Ministry of Interior and the National Guard provides full health care at all levels for their arsenal and their dependants. Some of their facilities also treat ordinary citizens on a referral basis, but these services are only available at a limited number of points around the Kingdom.
2. The University Teaching Hospitals and University Health Units provide health services for university students and personnel and for their families. They also provide some facilities for the general public, including both primary and specialised treatment, but these facilities only exist in the few location where the universities are located.
3. The King Faisal Specialist Hospital and Research Centre in Riyadh operates separately from the M.O.H. and provides specialised treatment of selected ailments to the highest international standards and is available to anyone on a referral basis.
4. There are other government ministries or quasi-government organisations that provide more limited health care. These are as follows:
   a. The Royal Commission of Jubail and Yanbu provides general health care for employees in its own hospitals and health centres at the two industrial cities
   b. The Ministry of Labour and Social Affairs provides basic health services in some rural area through community development centres.
   c. The Ministry of Education and the General Administration of Girls Education provide some primary health care for students through the school

health units.

d. The General Administration of Youth Welfare provides specialised treatment for sports injuries in Sports Medical Centre in Riyadh.

e. The Saudi Red Crescent Society provides emergency services across the Kingdom including roadside clinics and ambulances.

f. The Ministry of Municipalities and Rural Affairs and the Meteorology and Environmental Agency has a general responsibility for environmental health. This includes funding municipal water supply projects, but does not include treating individual patients.

g. The flying hospital services operated by the Ministry of Defence and Aviation, which act as flying ambulances to lift civilians or military patients to specialist hospitals from remote areas.

With the exception of the rural community projects of the Ministry of Labour and Social Affairs and the Saudi Red Crescent, most of the facilities of this wide range of agencies are located in the main urban areas, especially in Riyadh and Jeddah. Only the M.O.H. provides health services to the small towns, villages and remote area.

It is a general rule that physicians working in Primary Health Care Centres (PHCC) are not permitted to have private clinics or surgeries.

## M.O.H. Appropriate Budget in Relation to Government Budget

It is clear from Table 3.2 that the government committed about 5 % of the total annual government budget during the period 1989 - 1994. Primary Health Care Centre (PHCC) programmes are supported financially by the Saudi government. Each fiscal year, all regions in the Kingdom, including the Jeddah governorate are required to calculate its resource requirements for the ensuing year based on its regional plan of action. The eventual budgets and staffing resources are assigned centrally by the Ministry of Health and distributed to the different regions according to priorities.

Table 3.2 Budget Appropriation for M.O.H. in Relation to Government Budget (by SR million), 1989-1995.

| Year | Government Budget (SR million) | Financial Appropriations for M.O.H. | Percentage |
|---|---|---|---|
| 1989 | 141 | 7,591,590 | 5.4 |
| 1990 | 143 | 8,597,000 | 6 |
| 1991 | 143 | 8,597,000 | 6 |
| 1992 | 196 | 10,283,400 | 5.2 |
| 1993 | 160 | 8,110,680 | 5.1 |
| 1994 | 160 | 8,110,680 | 5.1 |
| 1995 | 150 | 7.364.762 | 4.9 |

Source: M.O.H. Annual Health Report, 1995, p.78.

**Hospitals**

Hospitals form the most specialised section of the health care system. There is no clear classification of hospitals in Saudi Arabia as there is for primary health care centres but it is possible to group hospitals according to the number of beds and to their level of specialisation, see Table 3.3.

Table 3.3 M.O.H. Hospitals and Number of Beds by Regions, 1994

| Regions | Hospitals | Beds |
|---|---|---|
| Riyadh | 26 | 5013 |
| Makkah | 7 | 2027 |
| Jeddah | 11 | 3022 |
| Taif | 9 | 1854 |
| Medina | 15 | 2112 |
| Qaseem | 15 | 1928 |
| Eastern | 13 | 1792 |
| Al-Ahsa | 5 | 726 |
| Hafr Al-Baten | 1 | 270 |
| Aseer | 16 | 1942 |
| Bisha | 3 | 455 |
| Tabouk | 9 | 754 |
| Hail | 7 | 576 |
| Northern Frontier | 4 | 576 |
| Jizan | 12 | 1393 |
| Najran | 5 | 615 |
| Al Baha | 8 | 1073 |
| Al-Jouf | 4 | 502 |
| Qurayyat | 3 | 248 |
| TOTAL | 173 | 26878 |

Source: M.O.H. Annual Health Report, 1994, p.102.

Table 3.4 Other Government Sector Beds by Specialties in 1993

| Institutions | Beds |
|---|---|
| King Abdulaziz University in Riyadh (K.A.U.H.RY) | 102 |
| King Khalid University Hospital (K.K.U.H.) | 658 |
| King Abdulaziz University in Jeddah (K.A.U.JD) | 283 |
| King Fahd University Hospital (K.F.U.H.) | 420 |
| Armed Forces Hospital (Armed F.H.) | 4123 |
| National Guard Hospital (National G.H.) | 900 |
| Security Forces Hospital (Security F.H.) | 426 |
| King Faisal Specialist Hospital (K.F.S.H.) | 518 |
| Royal Commission for Jubail & Yanbu Hospital (R.C.J.Y.H.) | 343 |
| ARAMCO Hospitals | 584 |
| TOTAL | 8357 |

Source: M.O.H. Annual Health Report, 1994, p.126.

a. Small Local Hospitals exist in small towns with less than 50,000 population, for example in Qurayyat Region.

b. Local General Hospitals are also a common type of hospital in middle sized urban areas of up to 50,000 population, for example in Hafr Al-Baten, Bisha and Najran. There are a total of ten hospitals throughout Saudi Arabia of this kind with a total of 1,570 beds, giving an average of 157 beds each.

c. Central General Hospitals. There are 31 of these larger general hospitals throughout Saudi Arabia and together they have almost as many beds as the local hospitals because each is a much larger unit. The smaller of these hospitals, with between 500 and 999 beds are in the smaller regions like Taif, Al-Ahsa, Tabouk, Hail, Northern and Al-Baha. Hospitals with over 1000 beds are found in the major cities with more than 100,000 population such as Riyadh, Jeddah and Makkah and also in other regions such as Medina, Qaseem, Eastern, Aseer and Jizan. There are 87 hospitals in this category with a total of 13,630 beds. The lowest grade of Central General Hospitals can deal with simple hospital cases and provides an out-patient clinic and auxiliary services such as pathology tests and x-ray services which are not usually provided by health centres. In addition to out-patient clinics, higher grade general hospitals have wards for general surgery, gynaecology, obstetrics, ENT, children's diseases, urology and ophthalmology. Advanced and sophisticated forms of surgery such as neurology, cardiology and plastic surgery are available in only a few of these hospitals, mainly in the major cities.

d. Hospitals of the Armed Forces and the National Guard. This type of hospital provides highly specialised services and can also receive certain cases referred from M.O.H. hospitals. There are four hospitals in this category with a total of 5,448 beds. In addition there are two hospitals for the Armed Forces, one in Riyadh and the other in Jeddah each with less than 250 beds and there are eight hospitals for the National Guard; these hospitals are located in Jeddah, Riyadh, Taif, Tabouk, Najran, Khamis Mushayt, Al Zahrah and Al Jubail.

e. National Specialist Hospitals. The M.O.H. runs 45 specialist hospitals that receive patients from all regions of Saudi Arabia. They include the Leprosy Hospital in Makkah (200 beds); eighteen Psychiatric Hospitals (2,564 beds), seven Chest and Fever Diseases Hospitals (616 beds), two Specialist Eye Hospitals, one in Jeddah and the other in Riyadh (387 beds). There are 16 Paediatric Hospitals (3,891 beds). The King Faisal Specialist Hospital in Riyadh has its own category because it is operated as an independent government hospital (500 beds) and provides several specialist health services, including open heart surgery, kidney transplants, and cancer treatment and test tube baby and infertility procedures. This hospital receives referrals nationally, often when patients are at advanced stage of illness.

f. The University Teaching Hospitals. There are four hospitals with 1,390 beds providing specialist health services. Two of the hospitals are in Riyadh City with (761 beds), one in Jeddah (252 beds) and one in Al-Khobar (377 beds). These hospitals provide health services for university students and staff and families. They also provide some facilities for the general public, including both primary and specialised treatment. Treatment at these hospitals is often provided by university consultant or specialist staff numbering less than 150. There are also collective surgeries; a new phenomenon, in which a group of three or more specialists work together to deliver several kinds of specialised medical care usually integrated with each other. At present there are only 14 of these clinics but, if successful, their number is likely to increase. These clinics are usually well equipped with diagnostic facilities such as laboratories, x-ray and ultra-sound equipment

It is clear, therefore, that health care provision in Saudi Arabia is now planned on a hierarchical structure with the patient being transferred through the system to an increasingly specialist level of service. All health care treatment in government-run health care centres and hospitals is offered free of charge to patients. The free service includes all medicines that are prescribed and extends to all Saudi citizens and to non-Saudi's who are working in the government sector and as house labourers, e.g., servants, gardeners and cooks.

## 3.4 Health Organisation in Jeddah

The complete history of the growth of the modern medical services in Saudi Arabia has not yet been officially documented. The date at which the practising of modern medicine began is unknown. In the Hijaz Region, particularly in Makkah, Jeddah and Madinah, a modern medicine services began before that of any other area in the country. This was due to characteristics specific to the cities including the religious importance and location on the trade routes. The oldest health post, at a location called Quban in Makkah, was built during the Ottoman reign, and continued to provide health services until the early days of the formation of the Kingdom. The health post was part of a multi-functional building; and was partly used as a school, as a mosque and as a health centre. Most of the available literature relating to health services in the Hijaz Region suggests that 1881 was the date at which modern medicine began. In that year the first hospital, Jiad Hospital, was built in Makkah. This hospital still functions under the same name and providing its services in the same place.

For Jeddah, several historians have commented on conditions and provision of health services in the city. Nasif (1930) and Al Ansari (1980), for example, mentioned that in 1911, there were some sources of medical care available, including centres for "quarantine" where pilgrims could be checked and held in case of detection of any communicable diseases. These patients were isolated and treated for a period of time until further examination proved to the health authority that the individuals concerned was free of disease.

In 1955, the Saudi Arabian Health Authority built a new quarantine headquarter covering an area of 229,000 square meters, furnished with all necessary equipment and with a capacity of 70 beds. Its function was to screen and treat pilgrims and also to provide some aspects of health care to local residents when not in use for pilgrims. Jeddah had also other sources of medical care. One of these was through foreign embassies, some of which provided health care for their people as well as for the population of Jeddah in general (Al-Magrabi, 1982).

The situation today has changed. Medical care is provided by both the public and private sectors. In the public sector, the Ministry of Health (M.O.H.) takes the lead in provision of medical and health care, and without discrimination of any of the patients. Other government organisations and institutions deliver medical care on a limited scales, making their facilities available to the public. The following section provides an explanation of both public and private sectors.

### 3.4.1 Primary Health Care in Jeddah

The Jeddah region, which in addition to Jeddah City, includes other small cities, towns and villages such as Rabigh and Al-Leith has a total of 73 primary health care centres (M.O.H. 1995), of which 40 are located in Jeddah City. The distribution of the Jeddah health centres occurs across the city, see Figure 2.1, with each district nominally having one health centre. A small number of districts share a health centre with other districts and these shown in italic type in Table 3.5. Some primary health centres are open on a temporary basis, for example; Jeddah Islamic Seaport, open only during Hajj period. This centre opens one month before and remains open until one month after the end of Al Hajj). Some of the health care centres function only as a dispensary, for example; King Abdulaziz International Airport and Obhur Al Shamaleyyah, see Table 3.5.

In general, the idea of an equitable distribution of health services via the primary health care program has been achieved partially by providing one health centre in each district. The boundaries of the health care districts coincide with the boundaries for the districts that form the municipality of Jeddah region. Thus the PHCC boundaries have been designated on a geographical base rather than on the population density. As the area encompassed by Jeddah city has grown then so the number of primary health care centres has increased. As explained in an

Table 3.5 The Primary Health Care Centre (PHCC) in Jeddah and the Districts Served. (Districts without their own PHCC facilities shown in italic type font)

| The PHCC | Districts Served |
|---|---|
| Al Saheefah | Al Saheefah Al Ammareyyah |
| Al Kandarah | Al Kandarah |
| Al Sabeel | Al Sabeel |
| Al Hindaweyyah | Al Hindaweyyah |
| Al Balad | Al Balad |
| Al Nuzalh Al Yamaneyyah | Al Nuzlah Al Yamaneyyah & *Al Nuzlah Al Sharqeyyah* |
| Al Qeryat | Al Qeryat |
| Petromin | Petromin & *Al Thaalebah* |
| Ghulayl | Ghulayl |
| Industrial City | Industrial City |
| Al Mahjar | Al Mahjar & *Warehouse* |
| Madain Al Fahd | Madain Al Fahd & *Al Wazireyyah* |
| General South Housing | General South Housing |
| Al Rawabi | Al Rawabi |
| Quwaizah | Quwaizah |
| Al Jameah | Al Jameah |
| Al Saghr | Al Saghr & *Old Airport* |
| Al Sulaymaneyyah | Al Sulaymaneyyah |
| Bani Malek | Bani Malek & *Al Naseem* |
| Al Sharafeyyah | Al Sarafeyyah |
| Al Baghdadeyyah | Al Baghdadeyyah Gharbeyyah & *Al Sharqeyyah* |
| Al Ruwais | Al Ruwais |
| Jeddah Islamic Seaport | Jeddah Islamic Seaport (Open during Hajj period) |
| Al Rehab | Al Rehab |
| Al Safa | Al Safa |
| Al Marwah | Al Marwah |
| Al Mushrefah | Al Mushrefah |
| Al Azizeyyah | Al Azizeyyah |
| Al Faysaleyyah | Al Faysaleyyah |
| Al Rabwah | Al Rabwah |
| Al Nuzhah | Al Nuzhah |
| Al Bawadi | Al Bawadi |
| Al Hammra'a | Al Hammra'a & *Al Andalus* |
| Al Salamah | Al Salamah |
| Al Naeem | Al Naeem & *Al Mohammdeyyah* |
| Al Zahra'a | Al Zahra'a, *Al Rawdah* & *Al Khaledeyyah* |
| Al Nahdah | Al Nahdah |
| Al Sahte'e | Al Shate'e & *Obhur Al Janoubeyyah* |
| King Abdulaziz International Airport | Named as dispensary and open all the year |
| Obhur Al Shamaleyyah | Named as dispensary and open all the year |

Source: General Directorate of Primary Health Care Affairs in Jeddah, Department of Statistics, 1995.

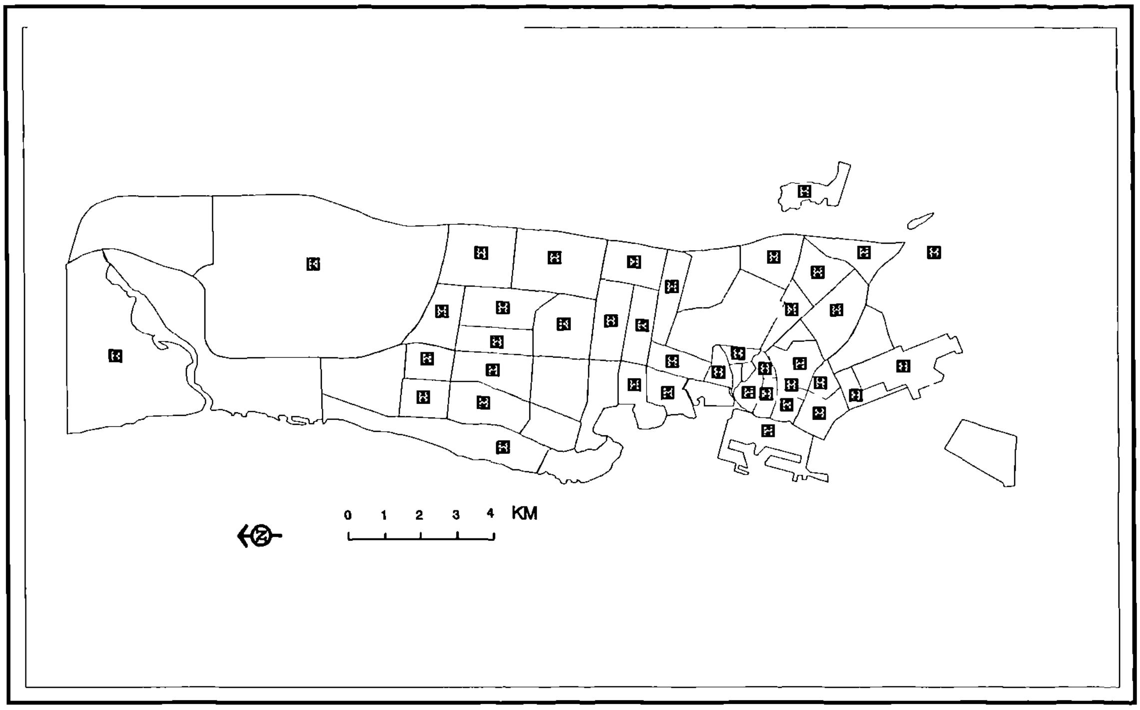



Figure 3.1 Location of primary Health Care Centres in Jeddah City. **H** represents the location of a Primary Health Care Centre.

earlier section, the Saudi health authorities have adopted a comprehensive approach to the provision of health care facilities (Al-Swailem and Al Mazrou, 1986). The services provided by PHCCs include, at a minimum level, appropriate treatment for common diseases and injuries, maternal and child care, immunisation against the major infectious diseases, promotion of proper nutrition, prevention and control of endemic diseases, education concerning prevailing health problems, and promotion of mental health and provision of essential drugs (WHO/UNICEF, 1978).

The very significant numbers of non-Saudi population are not generally permitted to obtain treatment from the public health care service and instead, must be provided with compulsory membership of the private health institutes by their employment sponsor.

In the mid 1990s the primary health care centres in Jeddah city were staffed at levels shown in Table 3.6.

Each PHCC centre has a pharmacy to dispense drugs to patients, free of charge. Most health centres are located in rented accommodation that was not built specifically to accommodate health facilities. Some of the health centres are not easily accessible and are located in crowded areas without parking facilities, for example: Ghulayl, Al Balad, and Al Nuzlah Al Yamaneyyah.

Table 3.6 Number of staff employed in all PHCCs in Jeddah, 1995

| Category | Saudi | | Non-Saudi | | Total |
|---|---|---|---|---|---|
| | Male | Female | Male | Female | |
| Specialist physicians | 1 | 2 | 7 | 1 | 11 |
| General practitioners | 2 | 30 | 63 | 40 | 135 |
| Dental physicians | 1 | 6 | 14 | 16 | 36 |
| Nurses | 43 | 159 | 2 | 139 | 363 |
| Assistant pharmacists | 16 | 0 | 23 | 22 | 61 |
| Laboratory technicians | 13 | 5 | 25 | 7 | 49 |
| X-ray personnel | 12 | 0 | 9 | 0 | 21 |
| Health inspectors | 32 | 0 | 9 | 0 | 41 |
| Statistical technicians | 6 | 1 | 0 | 0 | 7 |
| Admin. personnel | 99 | 5 | 0 | 0 | 104 |
| Others | 183 | 148 | 1 | 0 | 332 |
| Total | 407 | 355 | 174 | 225 | 1161 |

Source: General Directorate of Primary Health Care Affairs in Jeddah, Department of Statistics, 1995.

Patients and their families who wish to use the health centre must register with their respective district health centre. For Saudis, registration requires presentation of official documents, such as proof of identity and residence. A telephone or electricity bill is also required. For non-Saudi Arabian citizens, similar documents are required and, in addition, a letter of confirmation from the individual's employer or sponsor (*qafil*). The sponsor is usually a Saudi citizen who will be responsible for the provision of employment and legal protection of the expatriate worker. This must including the arrangement of entry visas and work permits and must indicate that there is no alternative medical coverage. This arrangement is only available for companies or private households that employ fewer than twenty persons. In addition, registration of non-Saudis is only permitted for certain groups. In practice, most non-Saudis will not make use of M.O.H. facilities and non-Saudis, whatever their economic status, usually opt for the private sector.

When a patient or family registers with the PHCC centre, they automatically gain access to all the other levels of the medical and health network. A system of record cards comprising family files has traditionally formed the means of recording the use of health centre facilities. Recently, trials have been undertaken to store patient records on a computer data base.

The method of record keeping appears to be of an accurate level. Records at individual health centres are checked randomly by regional supervisors during frequent visits and the data is compiled twice a year by trained statisticians to form a complete data record for the whole of Jeddah. Each family that registers at a health centre has its own family file and each file has its own code number that is exclusive to that health centre. If any patient moves to another area of Jeddah and registers in a new PHCC then a new code number is allocated. Appendix 1 provides an example of a family health profile. When it is necessary for the patient to be transferred to another level of treatment within the government system then the case history and code number of the patient will be retained and transferred with the patient.

Each primary health care centre operates a standard health information system. The administrative staff prepare a summary data sheet on which the symptoms and treatment of each patient are recorded. Until recently, this data sheet comprised a hand written log. Each PHCC submits to medical headquarters a monthly summary of statistics. All data are subsequently processed, collated, and analysed centrally at the computer and statistics department of the PHCC administration unit. The analysis and interpretation of the results form the basis of the medical programme for the following year.

The monthly reporting sheet was constructed by M.O.H. staff and can accommodate most of the patient cases dealt with by the PHC centres. The comprehensive analysis made possible by the monthly reporting sheet can be shown from the annual data report for 1995 (1415 A.H.). Of the 2,311,844 patient cases recorded at the 40 PHCC sites in Jeddah only a small proportion were categorised as "others" representing 8.5 per cent (195,895 cases) of all cases (Ebraheam, Primary Health Centre in Jeddah, 1995).

### 3.4.2 General Hospitals

The second level in the healthcare network is provided by the general hospitals. In Jeddah there are four general hospitals run by the M.O.H., with a capacity of 1,452 beds. King Abdulaziz Hospital & Cancer Centre is the newest, opened in 1990, and the largest in terms of capacity and number of medical personnel. It is located in Al Mahjar district and is operated under contract by Saudi Catering & Contracting. The hospital is built on an area covering more than 220,000 sq. meters. It is equipped with advanced medical technology and highly qualified medical personnel comprising both natives and foreign staff. The hospital provides a wide range of general and specialised medical care. Is has a link with the Faculty of Medicine in King Abdulaziz University for training students. Moreover, member of the faculty practice in the hospital and are also responsible for conducting some of the operations. King Fahd Hospital is also considered as a teaching hospital, because students from the Faculty of Medicine at King Abdulaziz University train and practice in this hospital. This hospital is located in Al Hammra'a district. Table 3.7 shows the distribution of general hospitals in Jeddah with their bed capacity. King Abdulaziz Hospital & Cancer Centre is located in the south of the city whereas King Fahd Hospital is situated in the north. King Saud Hospital is located in the west and Al-Thaquor in the east. Each hospital will work specifically with a number of the PHCC in the same geographic area. For example, all the PHC centres in the northern section of the city will be linked to King Fahd General Hospital. However, this does not mean that PHCC centres will be confined to only one particular hospital. Patients can be referred to any of the general hospitals in the city.

Table 3.7 Distribution of M.O.H. Hospitals in Jeddah by Number of Beds.

| Hospitals | No. of Beds |
|---|---|
| King Abdulaziz Hospital | 500 |
| King Fahd Hospital | 602 |
| Al-Thaquor | 160 |
| King Saud Hospital | 70 |
| TOTAL | 1332 |

Sources: Ministry of Health (1987), Annual Medical Report, Ministry of Finance and National Economy (1990 Statistical Year Book).

The four hospitals in Table 3.7 differ not only in bed capacity but also in the number of medical personnel and types of provision of medical care. For example, Al-Thaquor Hospital, with its limited facilities, is unable to provide the range of medical care delivered by King Abdulaziz Hospital or King Fahd Hospital. The two latter hospitals provide a wide range of general as well as specialised medical care.

### 3.4.3 Specialist Hospitals

Specialised medical care is provided through the tertiary level of the health service system. There are seven hospitals which provides specialist medical care. Table 3.8 shows these hospitals and the type of medical care delivered through them. As mentioned above, some general hospitals in Jeddah provide specialised medical care. As shown from Table 3.8 the patients who attend these hospitals are categorised as special patients who require a very specific type of medical care or advice.

Table 3.8 Distribution of Specialist Hospitals in Jeddah by Type of Medical Care and Number of Beds.

| Hospital | No. of Beds |
|---|---|
| Maternity & Paediatric | 627 |
| Ophthalmic | 128 |
| Maternity & Child Care | 150 |
| Psychiatric | 178 |
| Quarantine | 179 |
| Al-Amal (Hosp.) | 238 |
| TOTAL | 1362 |

Sources: Ministry of Finance and National Economy (1990) Statistical Year Book, Ministry of Health. (1987), Medical Annual Report.

The maternity and paediatric hospital was established in the early 1960's in Al-Amariah district in a rented building and in the late 1970's was moved to its new location in Al-Hammra'a district. In its current form, the hospital offers the greatest capacity of all the specialist providers. It offers out-patient clinics as well as in-patient facilities. It is linked with the PHCC by means of the referral system. The remaining maternity and child care hospital included Table 3.8 while having a much small bed capacity, caters specifically for delivery, including deliveries with complications and a post natal follow-up service. Out-patient clinics offer a variety of medical services specifically for children.

The third specialised hospital provides ophthalmic facilities. It operates both in- and out-patients clinics not only for the population of Jeddah but also for the surrounding areas of the western province. This hospital is one of the three of its type in the Kingdom and provides training facilities for medical students from King Abdulaziz University, Faculty of Medicine.

As with most other societies that have undergone rapid urbanisation, Saudi Arabia has experienced an increased number of psychiatric illnesses, giving rise for the need of psychological treatment facilities. The health authority has established this type of service in several cities. Public resistance to using hospitals providing psychiatric treatment were, initially, shunned, but these hospital are now well recognised and no stigma is attached to anyone receiving treatment. In Jeddah, there are two hospitals with a total capacity of 416 beds. As well as providing psychiatric care, they also treat people with addiction problems including smoking especially in Al-Amal hospital.

The quarantine hospital deals only with infectious diseases, particularly during the Hajj seasons. This source of care was established in the late 19th century, but the first purpose built quarantine hospital in Jeddah was built in 1911. After the introduction of vaccination and improvement in the pilgrim's health, this hospital was used only in emergency, e.g., outbreaks of cholera. Nowadays, the quarantine hospital is used to receive any referred case of communicable diseases from other hospitals or PHC centres in Jeddah.

Al-Amal Hospital provides a new source of medical care and deals with the increasing numbers of drug addicts. In addition to members of public seeking help with drug problems, the hospital receives referrals directly from the police when they arrest addicts. The attitude among the medical profession in Saudi Arabia is increasingly that of offering medical and psychiatric treatment to drug addicts and not to insist on 'punishment'. Length of stay depends on the individual situation and level of addiction, as does the treatment. There are other specialist centres, which through their out-patient clinics deliver particular medical care, for example diabetes and hypertension centre, the toxic centre and centre for early detection and treatment of cancer.

### 3.4.4 Other Government Health Organisations

As in the other major cities of Saudi Arabia, Jeddah has a number of other government organisations and institutions providing health and medical care services to their staff and their dependants. They also provide a limited service to the public. A brief summary of these facilities include:

- The National Guard delivers medical services to its staff and their dependants as well as to the public through King Khaled Hospital which is equipped with 310 beds. This hospital is run by 100 doctors, 525 nurses, 207 technicians and 263 civil employees. Admission for the public is made through health units belonging to the National Guard. After an initial examination, patients who need further care would be referred to the hospital which situated 25 kilometres outside the city on the Makkah Road. This hospital provides a wide range of medical care.
- The Ministry of Defence and Aviation has one huge hospital in Jeddah, but treats only member of the military and their dependants.
- The third source of medical care is the King Abdulaziz University Hospital, which renders medical services to the university staff and their families, as well as to the public. Essentially, this hospital is a teaching and training hospital for the Faculty of Medicine in King Abdulaziz University. Therefore, most of the staff and the providers of medical care in this hospital are lecturers, resident doctors or graduate students. The hospital provides primary and secondary medical care through in- and out-patient clinics and has a capacity of 234 beds to deliver in-patients care. This hospital is run by 157 doctors, 76 of which are Saudis while 81 are non-Saudis.
- Fourthly, the Ministry of Education has two school health units to provide primary health care for students as well as other members of Educational General Directorate in Jeddah. Doctors of these units sometimes visit some schools to conduct general check-ups or to immunise students against diseases. Also, the General Presidency for Girls Education has one health unit in Jeddah to deliver health care and to refer students to the Ministry of Health hospitals for future care.

## 3.5 Private Sector Hospital, Dispensaries, Private Clinics in Saudi Arabia

Although this study is concerned exclusively with the availability of health care services within the public sector, for completeness sake, a short review of private health care facilities in Saudi Arabia generally and Jeddah specifically, is included below. The Ministry of Health has encouraged the private sector to provide medical care and this opportunity has allowed businessmen to invest in this field. Throughout Saudi Arabia the following private facilities exist: 75 hospitals, 7,477 dispensaries and 673 private clinics. All operate under the supervision of the General Health Administration ensuring a consistently high quality of medical services (M.O.H., 1993).

From Table 3.9 it can be seen that Jeddah region has the greatest number of private hospitals, whereas Riyadh has the greatest number of private dispensaries and clinics. Private sector hospitals provide several specialist health services, including General and Internal Medicine, Surgery, Orthopaedics, Urology, Dental and Jaws, Obstetrics and Gynaecology, Paediatrics, Intensive Care, E.N.T., Ophthalmology, Chest, Skin and Venereal, Plastic and Burns, Psychiatry and Neurology and Isolation.

Table 3.9 Private Sector Hospital, Dispensaries and Private Clinics by Regions, 1993

| Regions | Hospitals | Beds | Dispensary | Private Clinics |
|---|---|---|---|---|
| Riyadh | 10 | 1,409 | 157 | 225 |
| Makkah | 7 | 394 | 23 | 51 |
| Jeddah | 29 | 2,437 | 102 | 205 |
| Taif | 4 | 230 | 29 | 18 |
| Medina | 5 | 456 | 22 | 38 |
| Qaseem | 1 | 29 | 17 | 13 |
| Eastern | 13 | 2,027 | 52 | 40 |
| Al Ahsa | 1 | 80 | 21 | 21 |
| Hafr Al-Baten | - | - | 6 | 4 |
| Aseer | 3 | 135 | 22 | 13 |
| Bisha | - | - | 4 | 5 |
| Tabouk | - | - | 11 | 23 |
| Hail | 1 | 60 | 8 | 4 |
| Northern | - | - | 7 | 2 |
| Jizan | 1 | 30 | 8 | 4 |
| Najran | 1 | 40 | 6 | 1 |
| Al Baha | - | - | 9 | 2 |
| Al Jouf | 1 | 100 | 5 | 1 |
| Qurayyat | - | - | 1 | 3 |
| TOTAL | 75 | 7477 | 510 | 673 |

Source: M.O.H., 1993, p.219.

## 3.6 Private Sector

The private medical sector in Jeddah is one of the oldest providers of health care in the country and larger then that in other cities. In recent year, this sector has witnessed a massive enlargement in both hospitals and single clinics. The private medical sector in Jeddah exceeds all the other providers of medical care, even the M.O.H. in terms of the number of facilities of all types, and levels of medical care services. For instance, the M.O.H. runs 11 general and specialised hospitals in Jeddah, while the private sector runs more than 29 hospitals. The M.O.H. delivers primary health care through 40 health centres, while the private sector operates 102 health centres. It is clear that the private medical care sector in Jeddah flourishes.

### 3.6.1 Private Clinics

The private clinics in Jeddah can be classified into general and specialised practice. The former are usually run by one general practitioner, who maybe Saudi or non-Saudi (as the M.O.H. regulations permit non-Saudi to practice) along with a male or female nurse. In 1985, the number of these clinics was one and by 1999, it had increased to 91. These clinics usually operate from flats situated in residential buildings and it is common to find several clinics located in one building. The specialised clinics are similar to the former in various respects, except that they provide specific types of specialised medical care via specialist practitioners. In 1974, the number was two; it reached 190 in 1999. There are also collective clinics, a new phenomenon, in which a group of three or more specialists work together from one clinic to deliver several kinds of specialised medical care usually integrated with each other, or for several doctors to provide the same type of medical care. The number of these clinics is modest, only 14, as it is a relatively new service. These clinics usually have diagnostic facilities such as laboratory, x-ray and ultra-sound, while the former two do not posses such facilities. They co-operate with external laboratories and patients are usually referred to private hospitals for x-ray or ultra-sound scans.

### 3.6.2 Private Health Centres

There are 82 private health centres in Jeddah. Table 3.10 shows the growth of this sector during the 1980's.

Table 3.10 Growth of Private Health Centres in Jeddah During 1980's.

| Year | No. of Health Centres | No. of Doctors |
|---|---|---|
| 1980 | 4 | n.a. * |
| 1981 | 9 | n.a. * |
| 1982 | 18 | 115 |
| 1983 | 20 | 192 |
| 1984 | 26 | 257 |
| 1985 | 31 | 268 |
| 1986 | 26 | 211 |
| 1987 | 52 | 360 |
| 1988 | 57 | 543 |
| 1989 | 64 | 606 |
| 1990 | 75 | 749 |
| 1991 | 82 | 751 |

* Number of doctors is not available because it was included with the total number of doctors who were employed in private hospitals.
Source: Ministry of Health, Annual Medical Report, Ministry of Finance and National Economy, Statistical Year Book, Various Issues and Unpublished Report by the General Directorate of Health Affairs in Jeddah.

Table 3.10 reveals the growth of private facilities from a modest start in the early 1980s to the latest figures in the early 1990s. The increase in these facilities undoubtedly reveals the strong demand for their services. Privatisation of service provision has become a phenomenon of the late twentieth century, and only became widespread in Saudi Arabia in the last decade of the twentieth century. Concern exists that privatisation of the health service might lead to duplication of services between public and private sectors. Even more worrying is that without proper supervision and control, the profession becomes a matter of business rather than concern for the provision of high quality health care. Competition between private health care providers might drive down costs to such an extent that the standard of private health care might become unacceptably poor. To ensure the highest standards are maintained within private medicine, M.O.H. staff, as the supervisor and reference body for the private sector, make periodic visits to these facilities for the purpose of standard setting. As an indication of the level of satisfaction with private health care facilities, patients rarely complain about malpractice in these facilities. However, rather than report any dissatisfaction, they may prefer to switch to other private medical facilities.

While the majority of these health centres provide specialist and general medical care, paediatrics, gynaecology and obstetrics, general or internal medicine and dentistry. Most of these health centres have diagnostic facilities, such as laboratory and x-ray facilities. Usually, a choice of female physician is available for female patients who do not want to be seen by a male doctor, particularly so for gynaecological or obstetrics. It is not uncommon to find two gynaecological and obstetrics clinics operating side by side, one run by a man and the other by a female physician.

### 3.6.3 Private Hospitals

In the late 1950s, the first private hospital in the country was established in Jeddah under the direction of Dr. Khalid Idress. It specialised in gynaecological, obstetrics and paediatric care. This hospital was staffed until the late 1970s by Lebanese missionaries. At the same time, another Lebanese hospital was opened, Al Mustashfa Al-Labnani, and which provided a wider range of medical services. This hospital closed in the mid-1970s.

In the late 60s several private hospitals opened in Jeddah to provide a wide range of general and specialised medical care. With the increase in oil revenues, and the accompanying influx of foreign manpower, this sector blossomed until the number of private hospitals peaked at 26 in 1990. The decline in the price of oil on the international market, combined with greater operational efficiencies in the oil industry has led to a levelling off in the number of foreign workers and, in turn, a halt in the growth of private health facilities.

A number of private health care centres were upgraded to hospitals, with enlarged and improved facilities, more staff and a wider range of medical care provision. The 1980's witnessed the most rapid growth of private hospitals in Jeddah. Table 3.11 shows the development of number of hospitals and bed capacity.

Table 3.11 The Growth of Private Hospitals and Number of Beds in Jeddah 1980-99.

| Year | No. of Hospitals | No. of Beds |
|---|---|---|
| 1980 | 9 | n.a. * |
| 1981 | 10 | 1031 |
| 1982 | 11 | 1201 |
| 1983 | 12 | 1225 |
| 1984 | 13 | 1296 |
| 1985 | 18 | 1499 |
| 1986 | 19 | 1784 |
| 1987 | 20 | 1906 |
| 1988 | 23 | 2252 |
| 1989 | 24 | 2357 |
| 1990 | 26 | 2281 |
| 1991 | 27 | 2337 |
| 1992 | 29 | 2437 |
| 1993 | 29 | 2437 |
| 1994 | 29 | 2437 |
| 1995 | 32 | 2713 |
| 1996 | 33 | 2773 |
| 1997 | 33 | 2773 |
| 1998 | 33 | 2773 |
| 1999 | 33 | 2773 |

* Data not available.

Sources: Ministry of Health, Annual Medical Report, Ministry of Finance and National Economy Statistical Year Book, (1980 until 1999)

Table 3.11 reveals the growth in the number of hospitals in Jeddah from 9 in 1980 to 27 in 1991, an increase of more than 188 % during the decade. As a consequence, the number of beds increased considerably and more than doubled from over the time period from 1981 to 1991.

More than 90 per cent of the private hospitals in Jeddah occupy purpose built, modern permanent premises. As such, they are well designed and this helps facilitate service provision. These hospitals are equipped with highly qualified personnel, mostly specialists or consultants from the Arab World, western countries or from other countries such as Pakistan and India. Furthermore, these hospitals sometimes invite consultants specialised in a particular field of medical care to visit the country and to work for a short time, usually a month or so. The arrival of such specialists is announced in local newspaper and prospective patients must book in advance for a consultation.

These hospitals possess sophisticated medical technology that enables them to provide advanced medical care and to carry out delicate surgery. This has enabled a reduction in the number of seriously ill patients travelling to western countries for specialist treatment. The efficiency with which the private hospitals are run has enabled costs to be reduced and as such, allowed many people to take advantage of the services. One major advantage of the private system is the reliability of the appointment system that makes access to a doctor easier and faster than in the public sector. Waiting time for an initial appointment in some specialised hospitals may take more than two weeks.

Although the treatment in private health care is expensive, especially when compared to the free public health service, the private health care sector remains buoyant and many patients from outside Jeddah come to the city to obtain medical care.

## 3.7 Health Care Services in Jeddah

Jeddah clearly enjoys the provision of a large number of medical care services provided by many different sources. In this respect, Jeddah is not different from other modern industrialised cities. Where it does differ however is in the breadth of service provision, which ranges from a comprehensive PHC approach, freely available to all Saudi citizens, to an extremely high quality of service in some of the more expensive private hospitals. In this respect, the provision of health care facilities in Jeddah must be judged to have been extremely successful.

Having established the ubiquitous availability of health care services in Jeddah, this thesis will now examine the accessibility, quality and distribution of health centres for the population as a whole. Good *et. al.* (1979) and Kleozkowski (1976) postulated that, unlike the advanced health care delivery available in the urban and industrialised nations, the inhabitants of the less developed countries faced a health service that was spatially and temporally inaccessible to some or all of the population. This hypothesis will be tested in Chapters Five and Six by means of a selection of PHCCs located within the boundary of the Jeddah governorate. Chapter Four will examine the Methodology used in the work.

# Chapter Four

## Methodology

This chapter will discuss the preparation for the field study, and will give an outline of the procedures that were undertaken in order to carry out this study. The choice of the study's site, the questionnaire design, the sample selections, pilot study, main study, difficulties encountered during the whole process and data analysis, will all be explained.

In most research a combination of the nature of the study and the site of the study determine the choice of methodology to be used. In this study, the nature of the population of Jeddah and the society, which it formed, shaped the methods that were used to collect the field data.

### 4.1 Introductory background and justification for choosing the study site:

Jeddah City was chosen as the location of the area because of its great contemporary significance as an important strategic location relative to Saudi Arabia, functioning as the main seaport for the whole country, and providing the main access to the Holy City of Makkah. In addition, Jeddah City has traditionally functioned as the country's pre-eminent trading and commercial centre, a position it still occupies today. In the light of these special considerations, Jeddah City has experienced a massive programme of socio-economic development over the past thirty years. The huge development programme undertaken in the city has created many commercial activities and job opportunities as well providing high levels of prosperity and rising living standards. These factors have attracted significant immigration of Saudis from other villages, towns and cities, and even nomadic tribes people who have moved to Jeddah for various reasons, such as work or looking for a better life. Unfortunately, there is no reliable information relating to the magnitude of internal or external migration to Jeddah City (Al-Hamedan, 1987). It is known that the majority of the non-Saudi migrants to Jeddah are males. The bulk of internal (Saudi) migrants tend to work for the government services and commercial and transportation sectors, whereas foreign migrants are involved in quite different sectors of occupation in the city. Migrants are distributed throughout the city's districts, living together with the native population of Jeddah City in all types of dwelling, particularly in apartments that are now a predominant type of dwelling in the city. In terms of health care, the entire Saudi population can obtain the services provided by the many health centres located throughout Jeddah City. The situation for non-Saudis is different and will be explained in section 3.4.1.

The primary research conducted for the thesis investigated the provision and use of primary health care services in Jeddah. It was also concerned to determine the elements that affect the geographical distribution of a sample selection of common diseases that occur in the different districts of Jeddah City. Although primarily intended as a study in medical geography, it became inevitable during the period of field research to include the use of the health care facilities. The work involved an understanding of the varied socio-cultural characteristics of the population of Jeddah. The population of Jeddah is cosmopolitan with many representatives of peoples originating from many different parts of the country and with very different social backgrounds. The phenomenal expansion of Jeddah City as an *entrepôt* and as industrial and commercial centre, as a place of study and as a place of economic wealth has drawn people not only from within Saudi Arabia but also from throughout the Islamic world. In addition, Jeddah is the point of arrival for in excess of one million religious pilgrims each year, destined for pilgrimage to Mecca. All of these socio-economic factors have given the population of Jeddah a unique structure that, in turn, may create a specific pattern of demand for primary health care. Not least, it will influence such basic factors as the age structure of the population, the educational level and the housing conditions, which in turn, may influence the predominant types of disease and the means by which disease is transmitted. The relatively unsophisticated social background of the incomers to Jeddah may also influence the level of demand placed upon the services of the primary health care centres and also influence the level of patient's satisfaction with the level of service provision.

## 4.2 Data Sources

The process of collecting health data in developing countries presents difficulties less often found in developed countries, and Saudi Arabia is no exception to this (Al Ribdi 1990, Bakashwain 1995). There is a gross lack of detailed data on vital statistics for the population and their socio-economic characteristics. There is no central detailed source on health facilities and almost nothing on their patterns of use.

As a result, several methods of data collection were used in this study. This involved visits to the main libraries in Jeddah including those at King Abdulaziz University, the Ministry of Planning, the Ministry of Health, the Ministry of Finance and National Economy's Central Department of Statistics, the Statistical Year Book of the Central Department of Statistics and the Annual Health Reports of the Ministry of Health.

The main body of data on Jeddah health services was collected from the General Directorate of Primary Health Care Affairs. These data include variables such as number of facilities, distribution, location and staff for each hospital and health centre. Many interviews and discussions were held with prominent figures and officials in the General Directorate of Primary Health Care Affairs in Jeddah, particularly the technical and statistical departments. Also, discussions and meetings were held with some administrators and managers of PHC centres, as well as with some health personnel practising in those health centres.

## 4.3 Selection of Samples

Consideration of the different ways of collecting data to amplify the official information obtained from the PHCCs suggested that a large-scale sample survey of patients using the PHCCs was the only way to obtain the relevant data. A questionnaire survey of a sample of patients was judged to be appropriate for the study. Once it had been decided to use a questionnaire survey other questions had to be answered including the following:

As there were 40 PHCCs covering the whole Jeddah City, a sample of sites would be required. How would individual PHCCs be selected? By random sampling? By stratified random sampling? By deliberate identification of sites that took account of the known variation in the socio-economic hierarchy of Jeddah? Jeddah City can be readily divided into two parts, old and new, the old section consists of 22 districts, all of which existed before the oil price boom in the mid-1970s. The other part of the city (new districts) consisted of 28 districts that post-date the 1970s. The final choice of districts should also take account of the historical growth patterns of Jeddah.

- Before a decision could be reached on the number of PHCCs to sample, a decision had to be made about the sample size, bearing in mind the number of questions to be included in the questionnaire, the time available to complete the questioning of patients, the time required to analyse the data and the available software and hardware to allow the analysis to take place.
- Consideration had also to be given to the way in which a sample of patients could be drawn from the total number of patients attending the Health Centres in a given time.

An initial research hypothesis made at the outset of this thesis was that different cohorts of population lived in the different socio-economic areas of the city and consequent upon this would be a varying pattern of health, and a varying pattern in demand placed upon health care services provided by the PHCC network. The different districts of the city displayed distinctive visual signals - age of buildings, urban design and level of planning, urban function and ethnic variation in the population being among the clearest. To confirm the experience of the researcher who had lived all her life in Jeddah a photographic survey was made to verify the existence of visual differences between the districts. In addition, primary health care centres were visited and short interviews were conducted with the physicians and administrators in order to determine the predominant socio-economic background of the patients attending the clinic.

Taking into account all of the above factors it was determined that a sample size of 1000 patient questionnaires would be a realistic figure in terms of the time necessary to make the survey. Most of the data to be collected would be nominal or ordinal data. A total sample size of 1000 would allow subdivision into a number of

PHCC sites and still retain individual population sizes that would offer statistical relevance. The classification of the districts as defined by Al Farsi (1983) has been combined with the local knowledge of the author of this thesis. To provide a range of socio-economic sites and a geographic spread, a total of eight primary health care centres were selected. Because some health centres served more than one municipal district the final number of municipalities (districts) was 14. These are summarised in Table 4.1 below and shown visually in Figure 4.1.

Al Balad PHCC is located in the old core of the city and has the lowest socio-economic level. Al Thaalebah PHCC is located in the Southwest of Jeddah and serves two districts, Al Thaalebah and Petromin. These districts also display characteristics associated with the lowest socio-economic level. Al Nuzlah Al Yamaneyyah Primary PHCC is located to the south of Al Balad district. This primary health care centre serves two districts, Al Nuzlah Al Yamaneyyah and Al Nuzlah Al Sharqeyyah, both of which display features of the lowest socio-economic level. Madain Al Fahd PHCC is located in the Southwest of Jeddah and serves both Madain Al Fahd and Al Wazireyyah districts. The first district represented the lowest and medium socio-economic level, but the second represents the medium socio-economic level. Bani Malek PHCC is located to the Northeast of the old centre and serves Bani Malek and Al Naseem districts. Both of these districts represent the lowest socio-economic level.

Al Ruwais PHCC in the Northwest of the old part of the city lies immediately behind the seashore. It serves the Al Ruwais district and represents the lowest socio-economic level. Al Safa PHCC is located in the Northeast of Jeddah and serves the single district of the same name. This district is a newer district and represents the medium socio-economic level. Al Zahra'a PHCC is located in the northwest of Jeddah and serves three districts, Al Zahra'a, Al Rowdah and Al Kaledeyyah. These districts represent the high and medium socio-economic level and are also representative of the more recent development in the city. (Al Farsi, 1983, p.21). Having chosen the eight primary health care centres a test was then made to evaluate if they occupied a random distribution.

Table 4.1 Primary Health Care Centres (PHCC) used for the questionnaire survey

| **Primary Health Care Centre (PHCC)** | (1) Populati on Size | (2) The Area (Hectares) | Population Density by Hectare | (3) Subjective Socio-Economic Assessment | Position Within Jeddah | (4) **subjective socio-economic assessment made by the researcher** |
|---|---|---|---|---|---|---|
| Al Balad (Serving Al Balad District) | 56228 | 552 | 101.86 | Low | Centre of the City | Low & medium |
| Al Thaleba (Serving Al Thaleba & Petromin Districts) | 64765 | 858 | 75.48 | Low | Southwest | low |
| Al Nuzlah Al Yamaneyyah (Serving Al Nuzlah Al Yamanneyah & Al Nuzlah Al Sharqeyyah Districts) | 81658 | 618 | 132.1 | Low | South | low |
| Madain Al Fahd (Serving Madain Al Fahd & Al Wazirreyah Districts) | 61711 | 792 | 77.9 | Low + Medium | Southeast | Low & medium |
| Bani Malek (Serving Bani Malek & Al Naseem Districts) | 65674 | 1431 | 45.89 | Low | Northeast Centre of the City | low |
| Al Safa (Serving Al Safa District) | 95609 | 1363 | 70.15 | Medium | Northeast of the City | Medium |
| Al Zahra'a (Serving Al Zahra'a, Al Rowdah & Al Kaledeyyah Districts) | 78195 | 2188 | 35.74 | High | Northwest of the City | High + Medium |
| Al Ruwais (Serving Al Ruwais District) | 46395 | 450 | 103.10 | Low | Northwest | Medium + low |

Source: (1) Central Department of Statistical,1992.
(2) Municipality of Jeddah Governorate, 1999.
(3), Al Farsi, 1983.

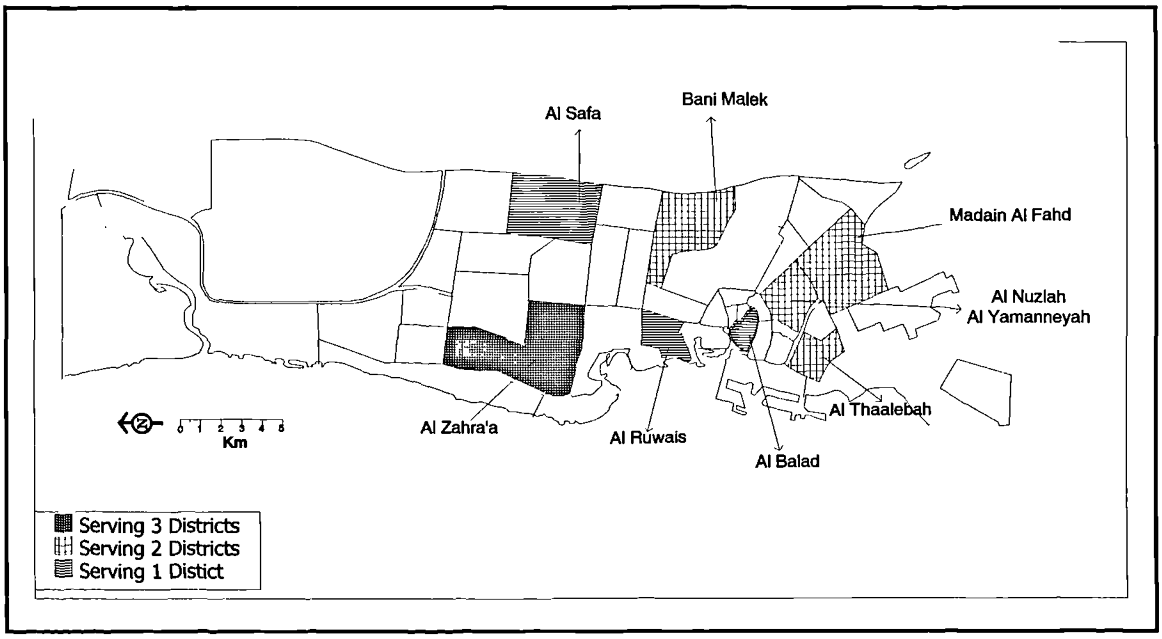



Figure: 4.1, The Fourteen Districts served by Eight PHCCs.

## 4.4 Nature of the Data

The process of collecting health data in developing countries presents difficulties that are found less often in developed countries, and Saudi Arabia is no exception to this. The main problem is there is a gross lack of detailed data on vital statistics describing the population and their socio-economic characteristics. In Saudi Arabia not only is basic population census data withheld from publication but also, for medical geography research, the availability of published health statistics is minimal in quantity, quality and availability. Often, data is collected but is then left to lie in filing cabinets until it is outdated. Only by asking for specific data do you unexpectedly come across relevant data. Most Primary Health Care Centres work without the availability of baseline data describing the population of the health centre catchments area. To overcome this problem each PHCC team is required to conduct a simple community survey of their area so that baseline data can be compiled and used to prepare the health centre programme of work. To promote data collection, certain registration forms have been developed and be used in PHCC, for example:

- The Family Health Record and its contents, e.g., family members sheets, ante-natal card, growth charts for infants and children. See Appendix 1.
- The "well-baby" card that will be kept with the Family Health Record and all information registered on this card is eventually transferred to the child's sheet in the family record.
- Vaccination card. Again, this is to be kept with the family and the information in it is transferred to the family record.
- Daily and monthly vaccination records.
- Out-patient records.
- Supportive units record, e.g. X-ray, laboratory and pharmacy.
- Epidemiological surveillance records.
- Inventories.
- Monthly compilation of *Application of Monthly Activities and Services in Health Centres*, and Annual Reports.

From 1996 onwards, all data have been processed and analysed centrally in the computer and statistics section of the Primary Health Care central administration unit and, depending upon the interpretation of the information, actions and recommendations are made. No attempt at geographical analysis of patient records is made on the official statistics by the Ministry of Health in Jeddah and also, no research relating to the socio-economic status of the patients using the primary health care centres is made.

## 4.5 Data Obtained from the Primary Health Care Centre

After having chosen the eight primary health care centres as described in section 4.4 data relating to the different kinds of diseases prevalent in Jeddah City was collected. As part of the fieldwork, visits were made to a selection of primary health care centres in order to learn at first hand how the PHCCs recorded the different types of diseases. The writer found that there was a compilation of the monthly activities and services that had been used at all the centres during each month (Hijri).

Data relating to twenty-five diseases were included in the monthly data summary. Each disease was given a special code, followed by the total number of patients diagnosed with each disease for each of the following patient categories: patient nationality (Saudi and Non-Saudi); the gender (male or female); age groups (1-4 years; 5-14 years; 15-44 years; 45-64 years and greater than 65 years), see Appendix 2.

The writer collected data from the Report of Monthly Activities and Services for the eight selected PHCCs. This data was collected for a four-year period beginning in 1992 and finishing in December 1995. The total data set comprised 48 monthly records for eight primary health care centres, 384 separate records in all. All records were entered in to SPSS for subsequent analysis. . The result of this data will be discussed in Chapter 5. From an analysis of this data it was intended to look for trends in disease patterns throughout the eight PHCCs. It was also the objective to search for any statistically different patterns of disease that might exist in the distribution of disease in these districts. It was intended that subsequent analysis would link socio-economic factors to the distribution pattern of the 25 diseases under consideration. An attempt would be made to investigate the relationships between the patient population and their socio-economic environments (Brown, 1980, p.vii).

The issue of concern in the current study was to investigate the reasons for the differences, if any existed, between the numbers of recorded incidents of the most common ailments that occurred in the chosen health care districts. The first problem faced by the researcher was that the observed values that form the numerator for calculation of incidence was actually the number of visits recorded for each disease rather than the number of patients. The same patient with a particular illness may visit the health centre with the same illness many times, and will be counted according to the number of visits. This situation has been discussed by Mausner and Kramer (1985, p 45). They stated that as regards specification of the numerator, in certain circumstances, more than one event could occur to the same person within a stated time period. This gives rise to two types of incidence rates from the same set of data; the first will assign a numerator as the number of people who developed the disease, the second will use the number of events. It is clear that the choice of numerator will result in a different statistic. The first will give the probability that any person will develop a specific ailment in a stated time; the second will provide the number of events to be expected among the group of people in that time, as the incidence rate represents a statement of probability or 'risk per person'. As the study is concerned with the comparison of incidence of disease between districts, we may assume that the repetitive visits made by a patient with the same disease to the health centre is not exclusive to a particular health centre, which implies that this behaviour is the case for all health centres, so the recorded values for the visits can be used for comparison.

Secondly, the choice of the denominator could be influenced by one of the following:

- The figures may be derived from the official census.
- The total number of visits may be for all diseases.
- The figures derived from the population census may be recorded on the basis of data available in the family files. Family files constitute a proportion of and not all of the community and this proportion may vary between districts.

In the first case, the denominator will not represent the population at risk. A definition of the formula for calculating incidence of a diseases states that the incidence level will equal the number of new cases or events divided by the population at risk.

As regards the second choice, the formula here will represent the proportional value of visits for a specific disease compared to the grand total of visits for all diseases.

For the purpose of this thesis it is the last of these choices that best fits as a denominator for calculating the incidence, representing as it does the population at risk of the studied diseases.

## 4.6 The Patient Samples

The official data collected from the Primary Health Care Centres - Application of Monthly Activities and Services - for the four-year time period included no socio-economic or geographical data. Neither was there any detailed information on where the patients currently lived nor their country of origin. To provide more data on the use of the PHCCs, the writer undertook a major survey of patients who used the health care facilities during a sixteen-week period (see Chapter 5 for full details). The next step involved selection of a suitable number of individuals to be interviewed at each health centre. In considering sample size and design, the writer had to consider the need for the sample to be representative of the total population, but at the same time, to allow for the practical and cultural difficulties of sampling a diverse population at each PHCC location included in the questionnaire survey.

It was decided to question a selected quota of patients as they left the doctor's consulting room. It was impossible to conduct a systematic sampling of patients as this would have required a list of patients from which to sample. These lists do not exist. Even if they had existed, in the interests on patient anonymity it would have proved undesirable to use such an approach. Even a systematic random sample, based on taking every fourth or fifth patient at the clinic, would have created many problems because a trial survey had shown a pronounced variation in the proportion of men, women, and children. Most patients were children; the second most frequent were women and finally were men. It was decided that the questionnaire survey should approximate the proportion of children, women, and men attending the clinics. The questionnaire survey used the stratified random method which separated the patient elements into non-overlapping groups called strata (children, women, men), and then selecting a simple random sample from each stratum which satisfied the numeric proportion observed in the trial survey.

The principal reasons for using stratified random sampling rather than simple random sampling are as follows:

1. Stratification may produce a smaller bound on the error of estimation than would be produced by a simple random sample of the same size, if the strata were homogeneous.
2. The cost per observation in the survey maybe reduced by stratification of the patients' elements into convenient groupings.
3. Estimates of patients' parameters maybe desired for sub-groups of the patients. These sub-groups should then be identifiable strata

The objective of sample survey design was to provide estimates with small variances at the lowest possible time input costs for the survey. In terms of the objective, the best allocation scheme is affected by certain extraneous factors. They are as follows:

1. The total number of elements in each stratum.
2. The variability of observation within each stratum.
3. The cost of obtaining an observation from each stratum (Scheaffer, et al, 1979 p.90).

This study had eight primary health centres; each centre had a different patient population size and therefore justified the use of the stratified random sampling approach. In addition, it was necessary to use proportional allocation in assigning sample size to the strata. The following equation was used (Scheaffer, *et al.*,1979,p.95):

$$s = n \frac{Ni}{N}$$

s = The sample size in the i th . . . . . . . . .
Primary Health Care Centre, where i = 1, . . . 8.

n = The total sample size [1000]

Ni = The total number for the patients that used the I th, Primary Health Care Centre, where i = 1, . . . 8.

N = The total number in population size (the total user for the 8 Primary Health Care Centre).

The allocation formula assumes a very simple form when the variances as well as costs are equal for all strata.

As previously noted this method for assignment of sample size to the strata is called proportional allocation. For that, we have selected eight Primary Health Care Centres from the total of 40 centres that cover the whole of Jeddah City. The total size (N) of the sample was 1000.

Table 4.2 Number of Patients in the Eight Selected Primary Health Care Centres Report of Monthly Activity and Services, 1994 - 95

| Primary Health Care Centre | Total Number of Patients who used the Primary Health Care Centre in 1994/1995 (Ni) |
|---|---|
| Al Balad | 11397 |
| Al Nuzlah Al Yamaneyyah | 18859 |
| Al Ruwais | 14058 |
| Al Zahra'a | 18987 |
| Bani Malek | 17010 |
| Al Thaleba | 11047 |
| Madain Al Fahd | 25406 |
| Al Safa | 8717 |
| Total | 125481 |

The equation was then applied to calculate the sample size in each Primary Health Care Centres, as follows, see Table 4.2

Table 4.3 The Sample Size in Each Primary Health Care Centre (PHCC).

| The Primary Health Care Centre | Sample Size (N) |
|---|---|
| Al Balad | 91 |
| Al Nuzlah Al Yamaneyyah | 150 |
| Al Ruwais | 112 |
| Al Zahra'a | 151 |
| Bani Malek | 136 |
| Al Thaleba | 88 |
| Madain Al Fahd | 202 |
| Al Safa | 70 |
| TOTAL | 1000 |

Based on the figure of use of the health centres by children, women and men it was determined that following interview ratio would be used:

One man: two women: three children.

Table 4.4 The Number of Patients Interviewed in each PHCC and number of days spent at each centre collecting data.

| Primary Health Care Centre | Man | Woman | Child | Days |
|---|---|---|---|---|
| Al Balad | 15 | 30 | 46 | 8 |
| Al Nuzlah Al Yamaneyyah | 25 | 50 | 75 | 13 |
| Al Ruwais | 19 | 37 | 56 | 10 |
| Al Zahra'a | 25 | 50 | 76 | 13 |
| Bani Malek | 23 | 45 | 68 | 12 |
| Al Thaleba | 15 | 29 | 44 | 8 |
| Madain Al Fahd | 34 | 67 | 101 | 17 |
| Al Safa | 12 | 23 | 35 | 6 |

The total number of days spent on the questionnaire survey was 87 days. The author of this thesis visited each Health Centre until sampling was completed. Before starting to collect the data, permission was requested from the General Directorate of Primary Health Care Centre in Jeddah and the doctor at each Health Centre was informed of the forthcoming patient survey. Every facility was provided for the research to proceed and all PHCC staff contributed freely of their time and energy. Without this assistance the questionnaire could not have taken place. At each centre at which interviewing took place, PHCC staff introduced the patients, especially the men, to the researcher following which the purpose of the interview was explained to each interviewee. The data collected from the patients were of nominal case and consequently, non-parametric methods were used for analysis. As explained in Ebdon (1985), the use of non-parametric tests assumes that the sample data is drawn by random samples and equally, inferential statistics are not applicable to data relating to total populations rather than to samples.

## 4.7 The Questionnaire:

Questionnaires are widely used in social research proving particularly useful for the collection of data from large, diverse, varied and scattered social populations (Sharma, *et al.* 1984, p.147). Provided that care is taken at all stages of questionnaire design, survey and analysis they have become established as reliable tools for data gathering subsequent to analysis. The questionnaire allows the researcher to itemise specific queries in the form of specific questions, answers to which provide the data for hypothesis testing (Nachmias & Nachmias 1981, p.209).

Pursuing research in the developing countries is very difficult due to the inadequacy of data and the lack of accurate census information and Saudi Arabia is not an exception. It is known that progress in the health services under the Saudi Five-Year Development Plan was hampered by a number of factors, one of them being the lack of adequate information and research in the country (Ministry of Planning 1975, p.375). Fatani and Basalamah (1980) describe the situation in an emotional manner when they write; "*statistical data, as we all know, is sadly lacking in the kingdom*" (p.375). Therefore, additional fieldwork must be conducted in the area of health care to fill the vacuum. For this purpose, the questionnaires undertaken for the study represents the major source of information about patients utilisation of primary health care services, demography, morbidity, socio-economic, housing and mobility characteristics, as well as their attitudes towards the use of modern and traditional health facilities. Gesler (1984) has pointed out that: "*In developing countries, information on individuals or groups of people is usually not available in official documents, so surveys are required to obtain this data*" (p.38). So, it became clear that the questionnaire interview should aim to collect data about the user of the health services. It also enabled information to be gained on the various sub-group of the study population and how they differed in terms of their basic characteristics as well as their common illnesses and medical beliefs. This allowed the detection of individual variations within each sample district as well as spatial difference between the districts. It also gave an indication of the elements that affect the geographical distribution of some diseases which are distributed in the districts of Jeddah city. Most significantly, the survey is the first detailed patient survey in Jeddah city.

The structured questionnaire was of the closed-form type that leaves only a few opportunities for alternative answers to be provided by the respondent. The informant is left with only a few choices to answer them. There are two choices:

1. the situation in which a question is provided with only two alternatives of saying “Yes” or “No”.
2. the other is where the respondent is provided with a limited number of answers from which a choice must be made.

The questionnaire contained 29 questions and was divided into three parts. Part one of the questionnaire consisted of the following questions relating to the patient's utilisation of the Primary Health Care Centres:

i. The type of illness that required the patient to visit the centre;
ii. The reasons for making the most recent visit to the centre or to other health care facilities;
iii. The use of modern and traditional medicine.

The second part of the interview tried to develop upon the first part by investigating aspects of patient accessibility. The next questions dealt with:

i. The mobility of patients;
ii. The time and distance travelled to reach the PHCC;
iii. The mode of transport used to reach the health centre.

The final part of the questionnaire collected data relating to the socio-economic conditions of the individual patients. The information was collected last as it was hoped that by the final stage in the interview the respondents might be more relaxed and willing to answer questions on their socio-economic status, their family and house environment. This information included age, nationality, marital status, place of residence, type of house, number of rooms, education level, occupation, income, size of family, availability of a telephone in the household, car ownership.

In general, the interviewing programme normally started at 9:30 A.M. and finished at 12:30 P.M. Sometimes interviews were also made in the afternoon from 4:30 P.M. until 7:00 P.M. The late afternoon sessions were used to assess whether the level of use of the Primary Health Care Centres varied between morning and afternoon.

## 4.8 Pilot Study

A pilot study was conducted between 15-30 June 1996 in eight of the Primary Health Care Centres. Each day a different primary health care centre was visited and 12 patients were interviewed in the ratio of two men, four women, and six children. The objective of pilot study was to provide experience of conducting questionnaires, and to determine whether the questionnaire was clear and understandable in its wording and structure. It would also show if any questions should be added or removed, and in addition, how long the planned sample survey might take place. On average, each interview took some 10-15 minutes but sometimes was extended up to 20 minutes when a patient required extra explanation of the questions.

A number of changes were subsequently made to the questionnaire. For example, the question that asked 'what type of electricity supply do you have in your house'? was deleted, as all the answers were the same - by the public utility. The question relating to the source of drinking water in the house was also deleted as all answers were 'by public utility'. In general, the pilot questionnaire worked well but it was at this stage that the questions relating to the socio-economic conditions of the patients were moved to the end of the questionnaire.

## 4.9 Interviewees and the Interview Schedule

Before starting the interview survey a precise schedule of visits was prepared in conjunction with the supervisors of each of the eight Primary Health Care Centres. The basic strategy involved visiting one Primary Health Care Centre a day, starting from the north of Jeddah with Al Zahra'a Primary Health Care Centre followed by Al Safa Primary Health Care Centre. Next came one health centre in the north-east of Jeddah City, Bani Malek, and then to the south-east to visit Madain Al Fahd. Western centres were next visited, Al Ruwais and Al Balad. Finally, interviews were conducted in the southwest, at Al Thaleba Primary Health Care Centre and in the southeast, Al Nuzlah Al Yamaneyyah, see Table 4.5.

This plan provided a structured arrangement and allowed patients to be interviewed in similar weather conditions. It was assumed that the weather might affect the occurrence of some kinds of diseases. Most of the interviews were done in the waiting room for women and children whereas men were sometimes interviewed inside the clinic or in the corridors. After the patients had visited the doctor, the centre nurse would help explain the purpose of the interview. In addition, the interviewer read-out at the start of each interview a brief introductory statement explaining the purpose of the interviews, and emphasising that the information provided would only be used for academic research purposes and would be treated confidentially. Before starting the interviews the researcher undertook extensive practice with the questionnaire using members of her family.

The fieldwork was completed on 30 October 1996. The preparation for the survey and conducting of fieldwork took a total of 122 days.

## 4.10 Treatment of the data and its processing

Once the questionnaires had been completed the data processing stage was started. After each day of fieldwork, the questionnaires for that particular day were coded by using the SPSS software package.

The questionnaire data for each respondent was entered into the database and thereafter, manipulated in a variety of ways, including the calculation of average scores, percentages, and cross-table analysis as well as the use of parametric and non-parametric statistical tests of significance such as analysis of variance (F-test) and chi-square. The use of statistical analysis enabled the data to be interpreted and tested against the hypotheses set out.

This research used also the logistic model statistic. The logistic model is based on the cumulative logistic probability as specified:

$$\text{Log}\left(\frac{P}{1-P}\right) = \emptyset + B_1 Q_1 + \dots\dots + B_n Q_n + \mu_i$$

$$n = 1, 2, \dots\dots, N$$

$\emptyset$ = constant

B= Log odds of regression coefficient.

Q= Independent variable observations

Altman (1996) has described the logistic regression as a model that uses a combination of the values of a group of explanatory variables to predict the value of a dependent variable. The statistic uses a transformation of the dependent variable that is called the *logit* transformation, written logit($p$) where $p$ is the proportion of individuals with the desired characteristic. The ratio $p/(1-p)$ is called the *odds* and thus

$$\text{logit}(p) = \log_e \left( \frac{p}{1-p} \right)$$

Independent variables included

Q15 How old are you?

Q18 How long have you been living in this place?

Q20 Nationality (Saudi - Non-Saudi)

Q 22 What of these categories describes you best?

Q23 Monthly income?

Q24A How many children under 12 years live in your house?

Q24B How many Males above 12 year live in your house?

Q 24C How many Females above 12 years in your house?

Q 26 Is the house you live in: owned by your family; Rented; or Provided by the employer?

Q 27A How many rooms are in your house?

Q 27B How many toilets are in your house?

The Null Hypotheses to be tested:
$H_o$ There is no relationship between the diseases and the variables.

$$H_o : B_1 = 0, B_2 = 0, B_3 = 0, \ldots \ldots, B_n = 0$$

The Working Hypotheses
$H_1$ There is a relation between the diseases and the variables.

$$H_1: B_1 \neq, 0, B_2 \neq, 0, B_3 \neq, 0,$$

## 4.11 Research Findings

In this research, the following variables were used in exploratory cluster analysis to derive an empirically based development taxonomy for occurrence of certain diseases with assumption that these diseases were intimately related and can be predicted from these variables which are already built in the collected data, these are:

Nationality: - Saudi or Non Saudi.

Age: - expressed in intervals which have been explained previously.

Type of house: - Villa, traditional house, flat or others.

Number of rooms: - As an index of crowded-ness.

How many toilets: - As an index of availability of personal hygiene facilities.

Level of education: - Illiterate, can read only, preparatory school, intermediate school, secondary school and university degree.

Occupation: - Governmental employee, private sector employee, student, house-wife, self employment, farmer, unemployed and child.

Monthly income: - expressed in intervals which have been explained previously.

These appropriately become independent variables when employing logistic regression to construct a model that would allow predicting the occurrence of examined diseases, i.e. most likely development of the disease.

Table 4.5 Schedule to Interview the Patients at each PHCC.

| | Primary Health Care Centre | 1st Visit | 2nd Visit | 3rd Visit | 4th Visit | 5th Visit | 6th Visit | 7th Visit | 8th Visit | 9th Visit | 10th Visit | 11th Visit | 12th Visit | 13th Visit | 14th Visit | 15th Visit | 16th Visit | 17th Visit | 18th Visit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Al Zahra'a | Jul. 1 | Jul. 13 | Jul. 23 | Aug. 4 | Aug. 14 | Aug. 26 | Sep. 7 | Sep. 16 | Sep. 25 | Oct. 2 | Oct. 9 | Oct. 15 | Oct. 21 | | | | | |
| | | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | | | | | |
| 2 | Al Safa | Jul. 2 | Jul. 14 | Jul. 24 | Aug. 5 | Aug. 17 | Aug. 27 | | | | | | | | | | | | |
| | | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | | | | | | | | | | | | |
| 3 | Bani Malik | Jul. 3 | Jul. 15 | Jul. 27 | Aug. 6 | Aug. 18 | Aug. 28 | Sep. 8 | Sep. 17 | Sep. 28 | Oct. 5 | Oct. 12 | Oct. 16 | | | | | | |
| | | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | | | | | | |
| 4 | Madain Al Fahd | Jul. 6 | Jul. 16 | Jul. 28 | Aug. 7 | Aug. 19 | Aug. 31 | Sep. 9 | Sep. 18 | Sep. 29 | Oct. 6 | Oct. 13 | Oct. 19 | Oct. 22 | Oct. 26 | Oct. 27 | Oct. 28 | Oct. 29 | Oct. 30 |
| | | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. |
| 5 | Al Ruwais | Jul. 7 | Jul. 17 | Jul. 29 | Aug. 10 | Aug. 20 | Sep. 1 | Sep. 10 | Sep. 21 | Sep. 30 | Oct. 7 | | | | | | | | |
| | | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | | | | | | | | |
| 6 | Al Balad | Jul. 8 | Jul. 20 | Jul. 30 | Aug. 11 | Aug. 21 | Sep. 2 | Sep. 11 | Sep. 22 | | | | | | | | | | |
| | | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | | | | | | | | | | |
| 7 | Al Thaleba | Jul. 9 | Jul. 21 | Jul. 31 | Aug. 12 | Aug. 24 | Sep. 3 | Sep. 14 | Sep. 23 | | | | | | | | | | |
| | | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | | | | | | | | | | |
| 8 | Al Nuzlah | Jul. 10 | Jul. 22 | Aug. 3 | Aug. 13 | Aug. 25 | Sep. 4 | Sep. 15 | Sep. 24 | Oct. 1 | Oct. 8 | Oct. 14 | Oct. 20 | Oct. 23 | | | | | |
| | Al Yamaneyyah | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | A.M. | | | | | |

## 4.12 The data sets

Having discussed the methodology it is now necessary to begin applying real data to test the hypotheses. Two data sets were used in this thesis. The first was the data collected by the primary health care centres and which was used to provide an indication of the main types of diseases recorded by the patients in each of the districts. For the purpose of this thesis, this data is called 'official data' to separate it from the questionnaire data collected by the author of this research. The official data set is examined in the next chapter.

# Chapter Five

## The Primary Health Care Data

Meade and Earickson (2000) have explained the difficulty of obtaining good quality data for the purpose of medical research. This is particularly so for research based on developing countries. In the case of Saudi Arabia, medical data was available although when this study was started the data was limited to basic paper based records that were collected at a central medical centre office. The data used in this chapter is based on patient visits to specific health centres in Jeddah. The information was made available by the General Directorate of Primary Health Care Affairs in Jeddah and was used to provide a general indication of the number of patients and the different types of diseases as recorded at the primary health care centres used in this study.

### 5.1 The Concept of Primary Health Care

Primary health care has been defined by the World Health Organisation (WHO) as:

> *Essential care based on practical, scientifically sound and socially acceptable methods and technology, made universally accessible to individuals and families in the community (WHO, 1978).*

The services provided by primary health care must include, at the very least, appropriate treatment for common diseases and injuries, maternal and child care, immunisation against the major infectious diseases, promotion of proper nutrition, prevention and control of endemic diseases, education concerning prevailing health problems, promotion of mental health and the provision of essential drugs (WHO/UNICEF, 1978).

The primary health care centre provides a focus for the means of delivering primary health care. It is a basic need for the majority of people living in a community. It can be argued that only the very rich can afford not to have a requirement for a primary health care service as they can obtain access to private health care. In Azarnoff and Seliger's (1982) terms, primary health care is a basic service necessary for survival. To ensure that the availability of the primary health care service matches the needs of society requires a continuous programme of research on health care services. By this means it is possible to evaluate the effectiveness of the service and to monitor the performance of the health care organisation. This requirement is particularly necessary in developing countries for the following reasons:

- The system of primary health care may be relatively new;
- The personnel responsible for delivering the service may have little experience;
- The general public may have a widely differing expectation and demands of a primary health care system;
- Population growth rate and age structure of the population may exert rapidly changing demands on the health care system, and
- Financial support for the system may be dependent upon outside sources.

The primary health care centre provides basic health care services and acts, in theory, as the first level of the health service. Primary health care is the entry point where patients have the first contact with the health care system and from where they are referred to other speciality care services (Moscovice, 1988). It is the means by which patients enter the system and, if necessary, are referred to the hospital for further treatment. To make referral possible and to carry out other primary health care tasks, a patient's record system is needed. The patient record card system did not exist before the mid-1980's in the primary health care centres in Saudi Arabia. Not until mid-1984 did twelve health centres in different parts of the country undertake trials for a primary health care record programme. By the end of 1986, 1,082 out of 1,431 health centres in the Kingdom were said to be applying a record-keeping program. Since that time the number of primary health centres has increased and by 1995 there were 1,725 primary health centres in Saudi Arabia (Ministry of Health Report, 1995, p.92).

In the Jeddah Governorate, which includes, in addition to Jeddah City, other small cities, town and villages such as Rabigh, Al Leath, Al Qunfadhah, there are 103 primary health care centres (Ministry of Health Report, 1995, p.92), 40 of which are located in Jeddah City. The centres provide a wide and diverse range of health and medical care services as a part of the comprehensive range of free health care service available to the Saudi population (Al-Swailem and Al Mazrou, 1986).

However, in Jeddah the primary health care centres, to a great extent, concentrate mainly on curative, preventive and primitive medical care and ignore the other essential element of the comprehensive PHCC approach which is the provision of rehabilitation services. Often, physicians in addition to medical tasks, also assume administrative responsibility for the health centre. Sometimes a health centre has the services of a civil servant or health inspector, and these persons might be involved in carrying out other tasks such as providing a reception service for patients. This job would be in addition to their primary involvement of managing or carrying out inspection of the health care service.

All PHCCs provide general medical treatment and some centres have the staff and facilities to provide a limited range of specialist services such as gynaecology and obstetrics, dentistry and paediatrics. The underlying philosophy for the provision of these types of medical care through PHC centres is that the M.O.H. views these units as equivalent to the family doctor in U.K. (Al-Hujalan, 1993).

The primary health care centres in Jeddah are run by a team comprising 11 specialised physicians, 135 general practitioner (GP's), 36 dental physicians, 363 nurses, 61 assistant pharmacists, 49 laboratory technicians, 21 X-ray personnel, 41 health inspectors, 7 statistician technicians and 104 administrative personnel (Ministry of Health, 1995). Only 23.7 percent of the total number of the physicians were Saudi nationals. The majority of the medical staff comprised ex-patriot Arabs originating mainly from Egypt, Sudan and Syria, while a few were from Pakistan and India. Each PHCC has a pharmacy to dispense drugs to patients, free of charge. Most, if not all, the health centres were located in rented houses, which were not specifically built to accommodate health facilities. Furthermore, the location of most of these health centres had easy accessibility, while some were in crowded areas with no parking facilities. The services provided at the PHCCs are listed in Table 5.1.

Table 5.1: Facilities at the PHCCs, Jeddah, 1995

| Index | No. of PHCC |
|---|---|
| Number of PHC centres | 40 |
| Providing dentistry service | 29 |
| Providing X-ray facilities | 13 |
| Equipped with laboratory | 33 |

Source: Ministry of Health, Department of Statistical, 1995.

All persons wishing to use the services offered by the PHCC must register with the health centre in the administrative district in which they live. For Saudis, residence within a district must be verified with official evidence, such as identity card. An electricity or telephone bill showing the name and address of the patient is also required. When an individual or family registers with the PHCC, then they gain access to all the other levels of the medical and health networks.

For non-Saudi Arabian citizens the situation differs. Utilisation of public health and medical organisations of M.O.H. facilities in Saudi Arabia as a rule is mostly restricted to Saudis. Non-Saudis, whatever their economic status, usually opt for the private medical sector, unless they work in the government apparatus or as domestic staff (such as housemaids, drivers, cooks, etc.) when they are allowed to register with the local PHCC. As proof of identity in addition to the documentation required by Saudi citizens they must also show a letter of confirmation from the individual's employer or sponsor to indicate that he has no private medical cover. In addition, the number of employees in the sponsor's firm must be less than twenty persons.

Many developing countries spend comparatively little on health and medical Care services. Comparative statistics obtained from the Internet reveal that the proportion of total expenditure allocated for health services varied from 5 % in Korea to 10.6% in Germany and 13.6% in the United States. The figure for Saudi Arabia was 5.1%, see Table 5.2. These allocations cover expenditure on hospitals, maternity and dental services and on national health and medical insurance schemes as well as on preventive and family planning cares. (Internet, 18/05/98, www.oecd.org/els/health/Fad-toc.htm).

The expenditure on health care services in Saudi Arabia for both curative and preventive health services is a fundamental element of Saudi government policy. General health services in Saudi Arabia are provided at three levels:

- At the primary level, primary health care provisions by the PHCC;
- At the secondary level, general medical services provided by a network of 'general' hospitals;
- At the tertiary level, highly specific treatment at strategically located 'specialist' hospitals.
- Table 5.2: Comparison of OECD countries and Saudi Arabia expenditure on health, % GDP, 1998.

| Countries | Total Expenditure on Health as % of GDP |
|---|---|
| Australia | 8.5 |
| Austria | 8.2 |
| Belgium | 8.8 |
| Canada | 9.5 |
| Czech Republic | 7.2 |
| Denmark | 8.3 |
| Finland | 6.9 |
| France | 9.6 |
| Germany | 10.6 |
| Greece | 8.3 |
| Hungary | 6.8 |
| Iceland | 8.3 |
| Ireland | 6.4 |
| Italy | 8.4 |
| Japan | 7.6 |
| Korea | 5.0 |
| Luxembourg | 7.0 |
| Mexico | 4.7 (1997) |
| Netherlands | 8.6 |
| New Zealand | 8.1 |
| Norway | 8.9 |
| Poland | 6.4 |
| Portugal | 7.8 |
| **Saudi Arabia** | **5.1** |
| Spain | 7.1 |
| Sweden | 8.4 |
| Switzerland | 10.4 |
| Turkey | 4.0 (1997) |
| United Kingdom | 6.7 |
| United States | 13.62 |

Source: Expenditures on Health, Internet, 18/05/98 (www.oecd.org/els/health/Fad-toc.htm).

Table 3.2 showed that between 1989 and 1995 the Saudi government spent about 5 percent from the total government budget on medical care. Primary health care centre programmes are included in the Saudi government financial allocation for medical care provision. Each fiscal year, all regions in the kingdom, including Jeddah governorate are required to decide its resources in the ensuing year based on its regional plan of action. Budget and resources are assigned centrally by the Ministry of Health to be distributed on the different regions according to priorities.

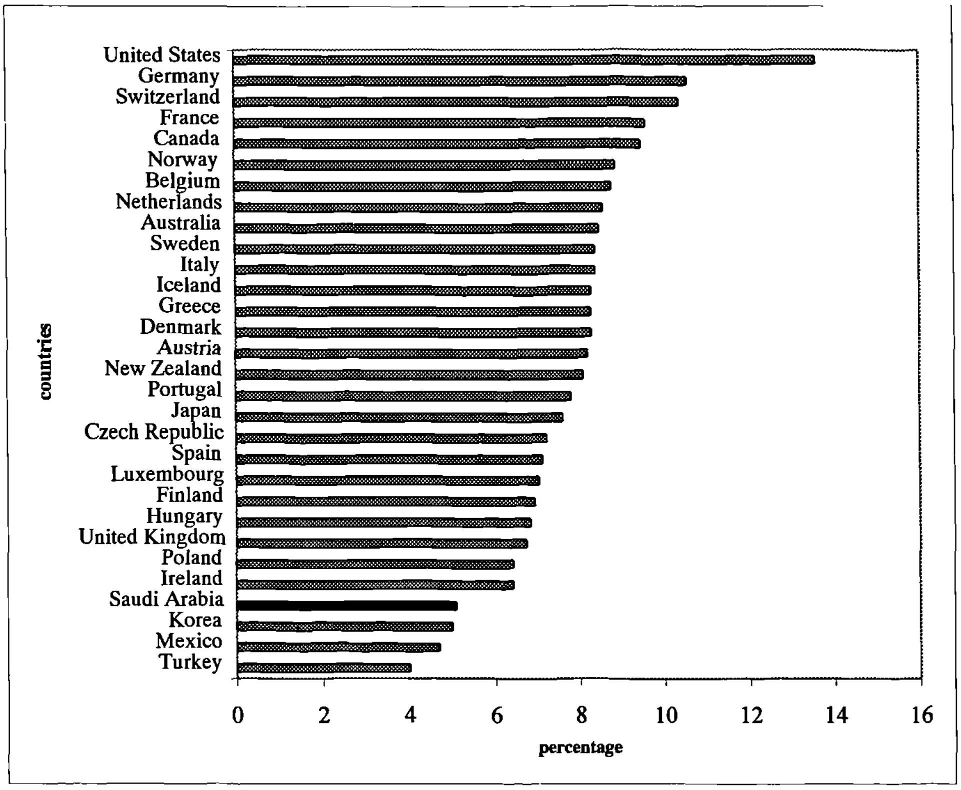



Figure 5.1: Comparative Total Expenditure on Health for OECD Countries and Saudi Arabia as a Percentage of GDP. 1998 data.

Source: www.oecd.org/els/health/Fad-toc.htm

## 5.2 Analysis of Official Data Sources

For analysis of the Census data, the official PHCC data and the questionnaire data, use was primarily made of the Excel spreadsheet package and the specialist questionnaire analytical package, SPSS. Mapping the data was by means of the MapInfo GIS software. By means of simple descriptive analysis of the data via Excel it was possible to construct charts to illustrate the relative importance of different ailments in the eight PHCCs over the four-year study period and individually for the four years of sample data. Analysis of variance and the chi-square techniques were applied to the three sets of data (all Saudi, all-Jeddah and the selected PHCC districts).

A fundamental assumption of this thesis was that socio-economic conditions might, in part, influence the use of the health care services. Density of population within the administrative districts might be an indicator of overcrowding, leading to conditions that might accelerate the spread of infectious disease or lead to poor quality of life that would be reflected in a poorer state of health, see Table 5.3. The density of population per district was calculated using MapInfo to determining the district area in square kilometres. The population of the respective districts was divided by each of the area values to provide a population per square kilometre. The data were further refined and Figures 5.2 to 5.8 show the population densities for all-Saudi, Saudi male, Saudi female, all non-Saudi, non-Saudi male and non-Saudi female. It is evident that there is considerable variation in the density pattern of ethnic and gender groups within Jeddah Governorate.

It had been hoped that the census data would also allow the construction of density maps for different age groups for all districts. However, data was not available at this level, the age group data population being applicable to the all-Jeddah region and not to the individual districts.

**Table 5.3 Analysis of Population Density by Gender and Nationality for Eight PHCC Districts of Jeddah**

| PHCC District | Al Ruwais | BaniMalek | AlSafa | AlZahra'a | AlBalad | AlThaalebah | AlNuzlah AlYammaneyyah | Madain AlFahad |
|---|---|---|---|---|---|---|---|---|
| Area sq /km | 4500 | 14310 | 13630 | 18480 | 5520 | 8580 | 6180 | 14920 |
| Population | 46395 | 65674 | 95609 | 53171 | 56228 | 64765 | 81658 | 61711 |
| Density per sq/km | 10.31 | 4.6 | 7.0 | 28.8 | 2.9 | 10.2 | 13.2 | 4.1 |
| All Saudi popn. | 17152 | 29807 | 60957 | 27407 | 10456 | 24753 | 41322 | 27711 |
| Saudi Density by District | 3.8 | 2.1 | 4.5 | 1.5 | 1.9 | 2.9 | 6.7 | 1.9 |
| All Non- Saudi Population | 29243 | 35867 | 34652 | 40226 | 45772 | 40012 | 40336 | 34000 |
| Non- Saudi Density in District | 6.5 | 2.5 | 2.5 | 2.2 | 8.3 | 4.7 | 6.5 | 2.3 |
| Males Population | 27370 | 43016 | 52005 | 28658 | 38448 | 38015 | 43532 | 36045 |
| Density Males Population /sq km | 6.1 | 3.0 | 3.8 | 1.6 | 7.0 | 4.4 | 7.0 | 2.4 |
| Females Population | 19025 | 22658 | 43604 | 24513 | 17782 | 34986 | 36126 | 25659 |
| Density Females Population /sq km | 1.9 | 1.0 | 2.2 | 0.7 | 0.8 | 1.4 | 3.2 | 0.9 |
| Males Saudi | 8643 | 15622 | 31242 | 14075 | 5933 | 12983 | 21533 | 14409 |
| Density Males Saudi in District | 1.9 | 1.1 | 2.3 | 0.8 | 1.1 | 1.5 | 3.5 | 1.0 |
| Females Saudi | 8509 | 14185 | 29715 | 13332 | 4523 | 11770 | 19789 | 13302 |
| Density Females Saudi in District | 1.9 | 1.0 | 2.2 | 0.7 | 0.8 | 1.4 | 3.2 | 0.9 |
| Females Non-Saudi | 10516 | 8473 | 13889 | 11181 | 13257 | 14980 | 16337 | 12357 |
| Density Females Non- Saudi in District | 2.3 | 0.6 | 1.0 | 0.6 | 2.4 | 1.7 | 2.6 | 0.8 |
| Males Non -Saudi | 18727 | 27394 | 20763 | 14583 | 32515 | 25032 | 21999 | 21643 |
| Density Males Non-Saudi in District | 4.2 | 1.9 | 1.5 | 0.8 | 5.9 | 2.9 | 3.6 | 1.5 |

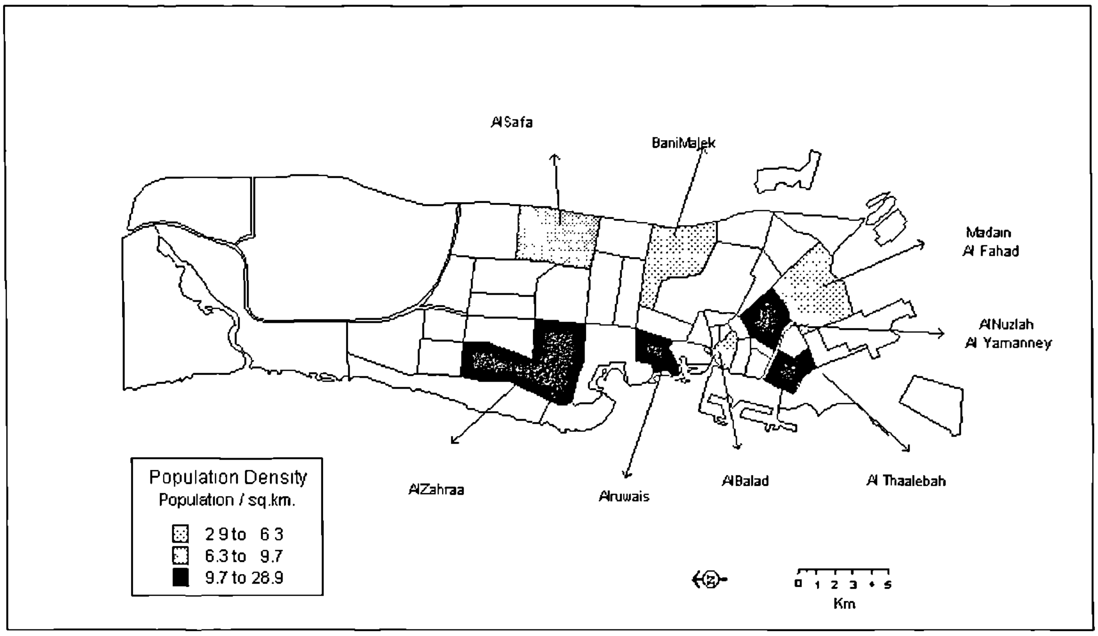



Figure 5.2 Population Densities for All Population Groupings In the Eight PHCC Districts

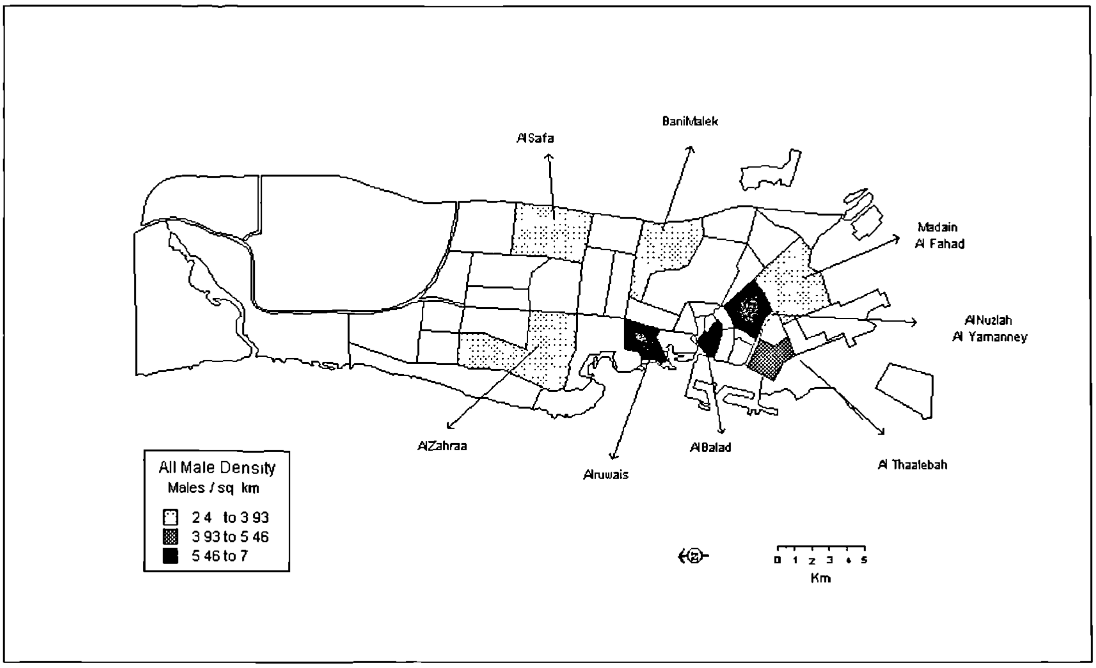



Figure 5.3 Population Densities for All Male Groupings In the Eight PHCC Districts

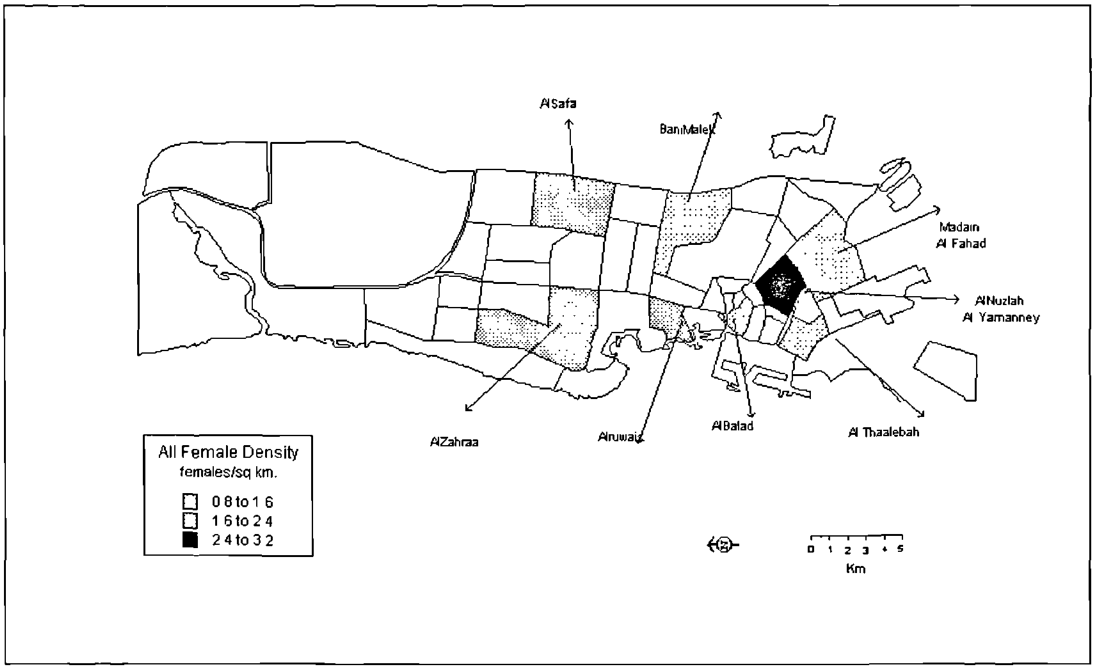



Figure 5.4 Population Densities for All Female Population Groupings In the Eight PHCC Districts

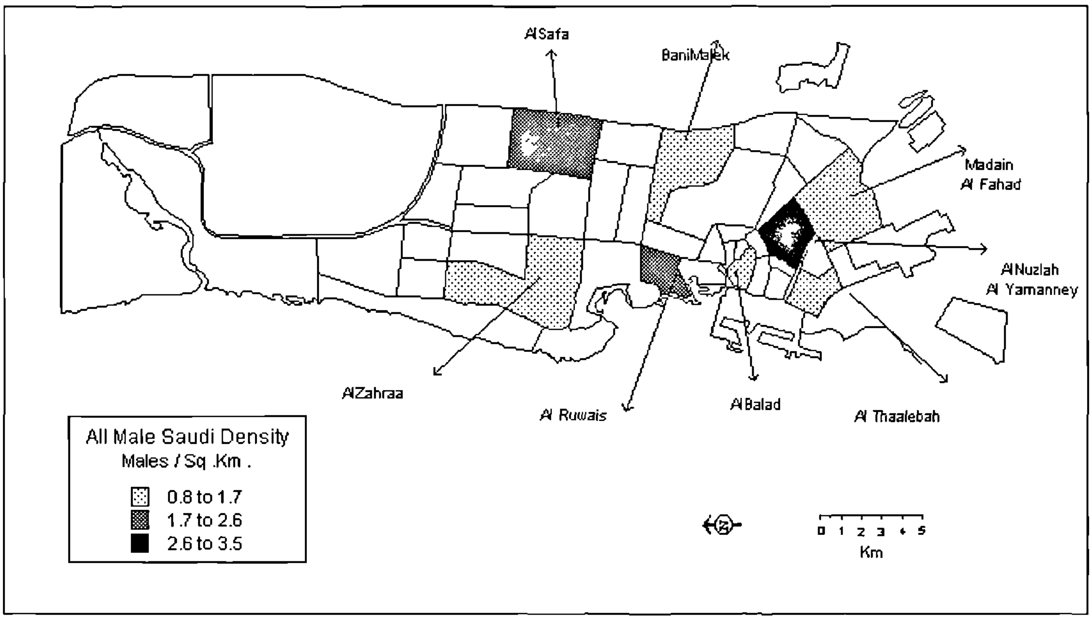



Figure 5.5 Population Densities for Male Saudi Population Groupings In the Eight PHCC Districts

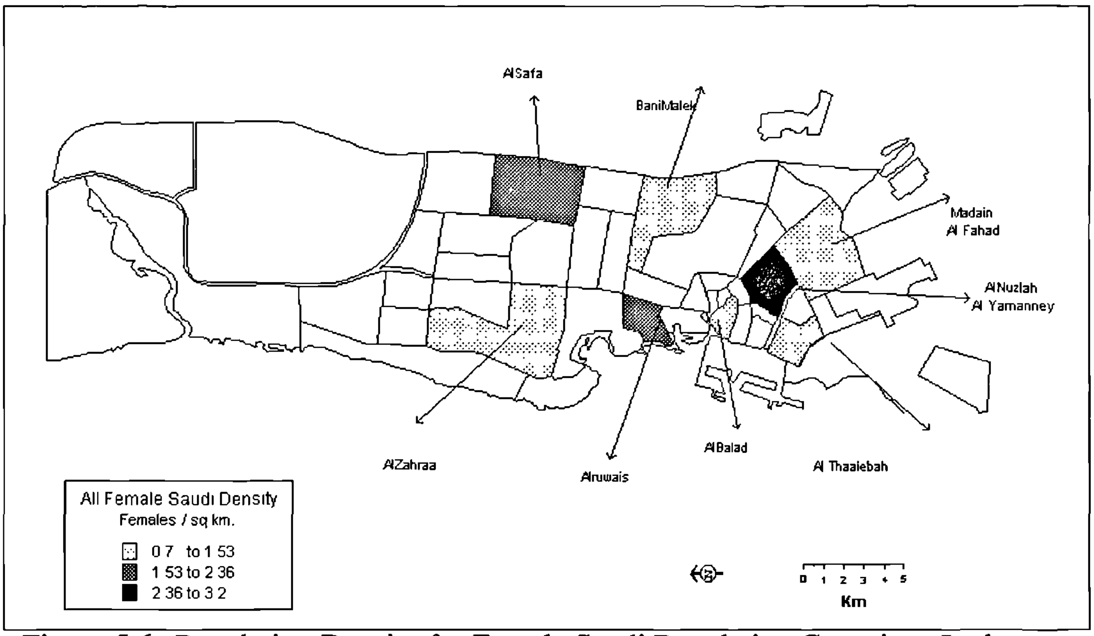



Figure 5.6 Population Density for Female Saudi Population Groupings In the Eight PHCC Districts

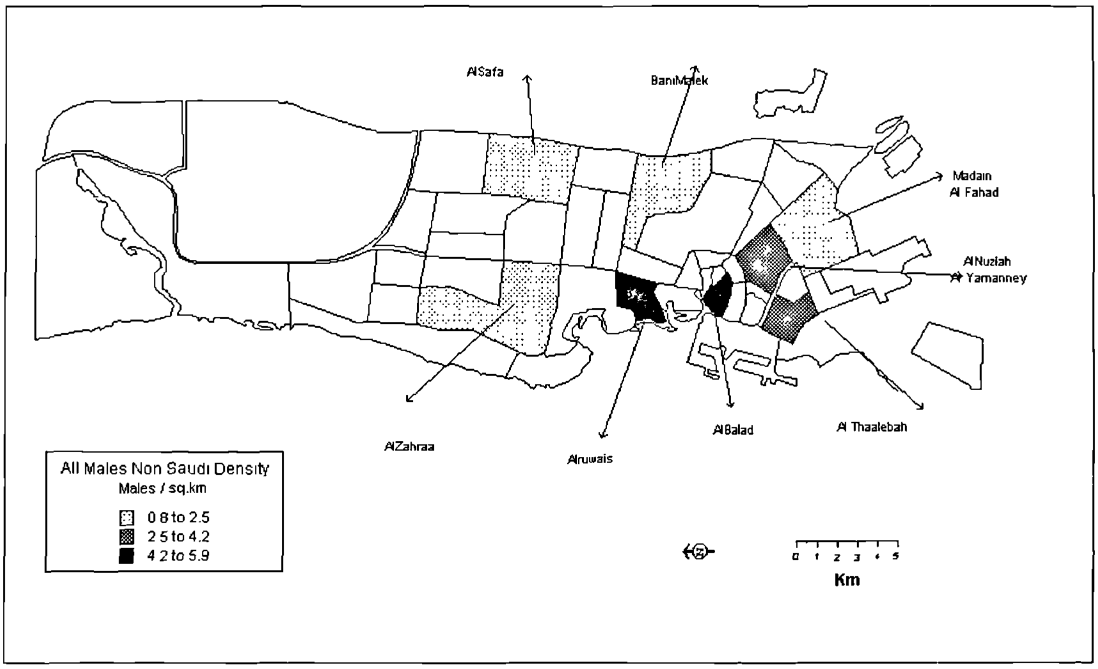



Figure 5.7 Population Densities for Males, Non-Saudi Population Groupings In the Eight PHCC Districts

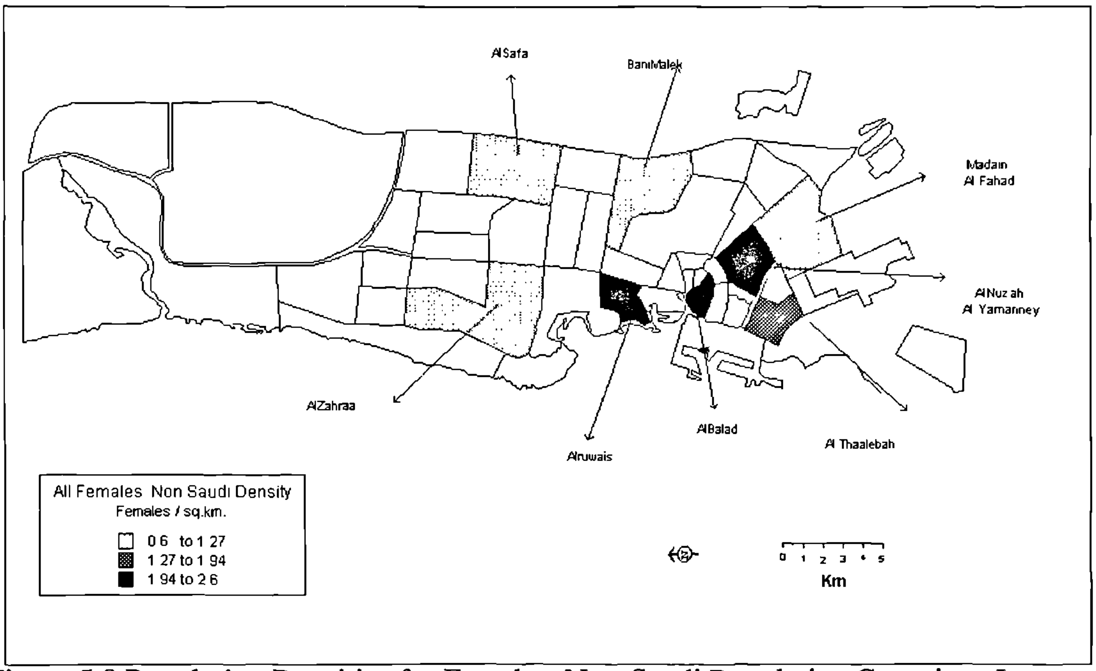



Figure 5.8 Population Densities for Females, Non-Saudi Population Groupings In The Eight PHCC Districts

## 5.3 The eight Primary Health Care Centres (PHCC)

### 5.3.1 Selection Process of the Health Centres

In order to test the two main research hypotheses (see page 7) of the thesis it was necessary to select a number of Health Centres from the total 40 PHCCs in Jeddah City. Interviews were conducted with senior health care managers in Jeddah in an attempt to select a representative number of primary health care districts. The final choice of eight districts used in this study is shown in Table 3.1 and in Figure 3.2. An initial assessment suggested that 13 primary health care centres representing 20 administrative districts would be required to cover all variations in the primary health care requirements of the city (note: some PHCCs included more than one district). After further analysis, this number was reduced to eight PHCC, serving 14 administrative districts of Jeddah City. The choice of eight districts was made on the basis of how representative the eight PHCCs were of the range of conditions found throughout Jeddah.

### 5.3.2 Utilisation of the eight selected PHCC, 1992-1995

From Table 5.3 it can be seen that the population densities of the selected PHC centres showed considerable variation and these differences were assumed to influence the level of use placed on the relevant health centres in each district. However, the situation is more complex due to the fact that the non-Saudi population does not normally make use of the PHCC facilities for reasons explained on page 95. Therefore, the actual number of patients recorded for the different ailment categories may be an under-representation of the true level of the incidence of diseases in the community. This is particularly true for the non-Saudi population.

Another factor that may affect the true incidence of ailments is the differing attitude that prevails among the different population groups of the community towards the services provided by the PHC. This, in turn, may influence the utilisation of PHCC services and will inevitably play an important role in the number of recorded patients at the health centres. It was of great importance therefore that the research conducted for the thesis was able to differentiate between the different utilisation ratios that existed among the different population groups in the eight PHCC districts. A preliminary account of this variation is shown below in Table 5.4. Tables 5.6 to 5.8 show the percentage utilisation ratios for the different population groups between 1992 and 1995.

Table 5.4 Total Numbers of PHCC Users, 1992-1995.

| Districts | 1992 | 1993 | 1994 | 1995 | Total |
|---|---|---|---|---|---|
| Al Balad | 33,439 | 8,692 | 11,094 | 11,990 | 65,215 |
| Al Nuzlah Alyamaniyya | 25,729 | 24,372 | 18,525 | 18,859 | 87,485 |
| Al Ruwais | 11,947 | 12,858 | 13,467 | 14,941 | 53,213 |
| Al Thaalebah | 6,432 | 9,133 | 10,538 | 11,270 | 37,373 |
| Al Zahra'a | 17,067 | 15,025 | 17,311 | 17,916 | 67,319 |
| AlSafa | 33,211 | 35,155 | 38,874 | 38,679 | 145,919 |
| Bani Malek | 19,935 | 20,389 | 21,192 | 17,113 | 78,629 |
| Madain Al Fahad | 24,380 | 44,404 | 21,184 | 26,910 | 116,878 |

Source: Data extracted from Official Monthly Activity and Services Returns.

Table 5.5 Total Numbers of PHCC Users by Nationality from 1992-1995.

| Centre | 1992 | | 1993 | | 1994 | | 1995 | |
|---|---|---|---|---|---|---|---|---|
| | Saudi | NS | Saudi | NS | Saudi | NS | Saudi | NS |
| Al Balad | 4148 | 29291 | 4762 | 3930 | 5238 | 5956 | 5503 | 6487 |
| Al Nuzlah | 23436 | 2293 | 19476 | 3796 | 15669 | 2856 | 15891 | 2968 |
| Al Ruwais | 8770 | 3177 | 9868 | 2990 | 10189 | 3278 | 10720 | 4221 |
| Al Safa | 21850 | 11361 | 23574 | 11581 | 26687 | 12187 | 12989 | 4927 |
| Al Thaalebah | 6092 | 340 | 8325 | 808 | 8969 | 1569 | 9443 | 1827 |
| Al Zahra | 11339 | 5728 | 11248 | 3777 | 12196 | 5115 | 12989 | 4927 |
| Bani Malik | 11616 | 8319 | 11923 | 8466 | 12393 | 8799 | 12662 | 4451 |
| Madain Al Fahad | 14541 | 9839 | 18221 | 2963 | 30671 | 3733 | 22583 | 3427 |

Source: Data extracted from Official Monthly Activity and Services Returns.

Table 5.6 Percentage Utilization Ratios in Selected PHC Centres 1992.

| Centre | Pop Census | PHCC Users | Percentage Utilization ratio |
|---|---|---|---|
| Al Balad | 56,228 | 33,439 | 59.5 |
| Al Nuzlah Al Yamaneyyah | 59,443 | 25,729 | 43.3 |
| Al Ruwais | 46,395 | 11,947 | 25.8 |
| Al Safa | 95,609 | 33,211 | 34.7 |
| Al Thaalebah | 42,345 | 6,432 | 15.2 |
| Al Zahra'a | 26,167 | 17,067 | 65.2 |
| Bani Malek | 50,771 | 19,935 | 39.3 |
| Madain Al Fahd | 61,704 | 24,380 | 39.5 |

Source: Data extracted from Official Monthly Activity and Services Returns.
Population data from Official Census, 1992

Table 5.7 PHCC Utilization Ratios by Nationality in Selected Centres 1992.

| Centre | Saudi | | | Non Saudi | | |
|---|---|---|---|---|---|---|
| | Pop Census | PHCC users | % Utilization ratio | Pop. Census | PHCC users | % Utilization ratio |
| Al Balad | 10,456 | 4,148 | 39.7 | 40,012 | 29,291 | 64.0 |
| Al Nuzlah | 41,322 | 23,436 | 56.7 | 34,652 | 2,293 | 5.7 |
| Al Ruwais | 17,152 | 8,770 | 51.1 | 35,867 | 3,177 | 10.9 |
| Al Safa | 60,957 | 21,850 | 35.8 | 45,772 | 11,361 | 32.8 |
| Al Thaalebah | 24,753 | 6,092 | 24.6 | 25,764 | 340 | 0.8 |
| Al Zahra | 27,407 | 11,339 | 41.4 | 29,243 | 5,728 | 22.2 |
| Bani Malik | 29,807 | 11,616 | 39.0 | 34,000 | 8,319 | 23.2 |
| Madain_Alfahad | 27,711 | 14,541 | 52.5 | 40,336 | 9,839 | 28.9 |

Source: Data extracted from Official Monthly Activity and Services Returns.
Population data from Official Census, 1992

Table 5.8 Percentage Utilization Ratio in Selected PHC Centres 1992-1995

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 59.5 | 14.8 | 17.4 | 17.8 | 27.38 |
| Al Nuzlah Al Yamaneyyah | 43.3 | 37.4 | 27.2 | 26.5 | 33.60 |
| Al Ruwais | 25.8 | 26.5 | 25.4 | 26.9 | 26.15 |
| Al Safa | 34.7 | 35.2 | 35.5 | 15.7 | 30.28 |
| Al Thaalebah | 15.2 | 20.6 | 21.7 | 22.2 | 19.93 |
| Al Zahra'a | 65.2 | 54.9 | 57.8 | 57.2 | 58.78 |
| Bani Malek | 39.3 | 38.4 | 36.5 | 28.2 | 35.60 |
| Madain Al Fahd | 39.5 | 32.8 | 48.7 | 35.2 | 39.05 |

Source: Data extracted from Official Monthly Activity and Services Returns.

It is evident that the eight PHCCs showed significant differences as regards the utilisation of health services, ranging from 15.2 in Al Thaalebah to 65.2 in Al Zahra (1992 data). An ANOVA test revealed that there was a highly significant difference between theses districts as regards utilisation of PHCCs ($P<0.01$). However, although there were apparent differences in the utilisation of services in the period 1992 to 1995 it was not statistically significant at the 95% level. Also, there was a significant difference between Saudi and Non Saudi data (Table 5.7) regarding utilisation of PHCC services based either on the chosen centres or across the time period 1992 to 1995. There was a clear preponderance of Saudi numbers over Non Saudi numbers.

### 5.3.3 Some observations about population density in Jeddah Governorate

Tables 5.3 and 5.9 below provide a general summary of population density within the eight selected districts. It was evident that:

- There was a homogeneously low density of population for Saudi and Non Saudi, males and females in the districts of Bani Malek and Madain Al Fahd.
- There was a homogeneously high density for all population criteria (except for Non Saudi males) in Al Nuzlah.
- There was an inverse distribution of Saudi and Non Saudi population in Al Safa, Al Thaalebah, Al Balad and Al Ruwais, while Saudi population density was higher than Non Saudi in Al Safa.
- In Al Thaalebah, Al Ruwais and Al Balad the reverse was the case with Non Saudi population exceeding Saudi population.

Table 5.9 Summary of Population Density by Nationality Among Chosen Districts. (Data values are index values)

| Centres | Female Total | Male Total | Grand Total | Saudi Total | Non-Saudi Total | Saudi Male | Saudi Female | Non-Saudi Male | Non-Saudi Female |
|---|---|---|---|---|---|---|---|---|---|
| Al Balad | 1 | 3 | 1 | 1 | 3 | 1 | 1 | 3 | 3 |
| Al Nuzlah | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| Al Ruwais | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 |
| Al Safa | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 1 |
| Al Thaalebah | 1 | 2 | 3 | 1 | 2 | 1 | 1 | 2 | 2 |
| Al Zahra'a | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 |
| Bani Malek | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Madain Al Fahd | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

1 Low density
2 Medium density
3 High density

Source: Derived from data in Table 4.3

### 5.4.1 Method of data collection from the eight PHCC's

Following the selection of the eight primary health care centres a start was made on the collection of official health care data. The source of data was the monthly activity returns made by the health centres. Data was collected from the first official record that commenced at the beginning of 1992 and the last data was taken from the returns for December, 1995. A total of 384 months of data for eight PHCCs was accumulated. Unfortunately, the patient records existed only in hard copy paper records. Not until 1998 did computerised data record storage begin. It was to this source of official material that the researcher was given access and the data was transcribed by hand to a computer held storage system. All records were entered into the Excel spreadsheet program in order to facilitate analysis. This package was chosen because of its flexibility in outputting data in formats different from .xls files. For example, ASCII files suitable for use with SPSS were generated while MapInfo could directly read .xls format files. This information allowed the preparation of annual figures for all the Jeddah PHCC districts. A total of six months was spent retrieving the data for the four-year period.

It was quickly discovered that the official data source was deficient in information describing the distribution of PHCC users by gender and age groups, there being inadequate data to calculate the actual incidence of different diseases by groups. Because all stages of analysis were dependent on the numbers of patients who attended the selected health centres it was imperative that an accurate base data was available.

### 5.4.2 Comparison of Main Diseases in all-Saudi Arabia, all-Jeddah and the eight Primary Health Care Centres in Jeddah City in 1995

Before starting to analyse the PHCC data it was necessary to obtain a picture of the general health levels of the total Saudi population and also of all the Jeddah population so that the sample data collected from the eight PHCCs could be set into a wider context. This was achieved in two ways. First, figures for the total number of patients for all 25 diseases were prepared, subdivided on the basis of nationality, gender and age groups for all Saudi Arabia. This data was derived from the Ministry of Health, Annual Health Report, 1995, see Table 5.10 and Figure 5.9. Table 5.11 provides a summary of the general state of health for the population of Saudi Arabia as a whole. From this table it can be seen that Upper Respiratory Infection was the main reason for patients throughout Saudi Arabia to visit their health centre and accounted for 35.9 percent of all visits. Of this figure 53.4 percent were males.

Second, the pattern of the 25 main diseases for all-Jeddah was examined and this data compared with the results for all Saudi Arabia and with for the eight PHCC districts for Jeddah. This was achieved by relating the total number of patients recorded for all 25 diseases in 1995, subdivided on the basis of nationality, gender, age groups for all 40 PHCCs in Jeddah, see Table 5.12, and Figure 5.10. Table 5.13 provides a summary of the general state of health for the population of all Jeddah City. From this table it can be seen that Upper Respiratory Infection was the main reason for patients throughout Saudi Arabia to visit their health centre and accounted for 38.0 percent of all visits. Of this figure 51.1 percent were males.

Finally, the total number of patients for all 25 diseases in 1995, subdivided on the basis of nationality, gender, age groups was prepared for the eight selected PHCCs in Jeddah and this data compared with the all-Saudi and all-Jeddah data, Table 5.14, Figure 5.11. Table 5.15 provides a summary of the general state of health for the population of all Jeddah City. From this table it can be seen that Upper Respiratory Infection was the main reason for patients throughout Saudi Arabia to visit their health centre and accounted for 38.0 percent of all visits. Of this figure 53.0 percent were males.

Table 5.10 The Common Diseases among Primary Health Centres Patients for all Saudi Arabia by Total Number of Patients, Nationality, Gender, Age Groups, in 1995

| | Diseases | Total | Saudi | Non-Saudi | Male | Female | < 1 Year | 1-4 Yrs. | 5-14 Yrs. | 15-44 Yrs | 45-65 Yrs. | > 65 Yrs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Infectious & Parasitic | 257395 | 215403 | 41992 | 139710 | 117685 | 9407 | 42027 | 79616 | 94562 | 25959 | 5824 |
| 2 | Intestinal Helminthiasis | 323701 | 271310 | 52391 | 169215 | 154486 | 6233 | 60542 | 119656 | 102145 | 28825 | 6300 |
| 3 | Diabetes Mellitus | 935357 | 793120 | 142237 | 513850 | 421507 | 914 | 2946 | 19726 | 279225 | 482132 | 150414 |
| 4 | Anaemia | 388018 | 330351 | 57667 | 150943 | 237075 | 7179 | 39761 | 74264 | 182790 | 57076 | 26948 |
| 5 | Eye Diseases | 1576965 | 1308782 | 268183 | 886785 | 690180 | 122986 | 221315 | 331736 | 582607 | 229333 | 88988 |
| 6 | Ear & Mastoid Diseases | 673849 | 569236 | 104613 | 370173 | 303676 | 41859 | 106906 | 178216 | 209166 | 83607 | 54095 |
| 7 | Hypertension | 643231 | 530896 | 112335 | 310264 | 332967 | 471 | 1661 | 10462 | 192140 | 307389 | 131108 |
| 8 | Anal & Perianal | 137658 | 101792 | 35866 | 80822 | 56836 | 4357 | 8851 | 14848 | 68758 | 31191 | 9653 |
| 9 | Upper Respiratory Tract Infections | 14049560 | 11954196 | 2095364 | 7500581 | 6548979 | 1287115 | 2701536 | 3426457 | 4701511 | 1453904 | 479037 |
| 10 | Pulmonary Infections | 294830 | 249601 | 45229 | 166707 | 128123 | 27251 | 40758 | 49642 | 69740 | 57742 | 49697 |
| 11 | Pulmonary Diseases | 958394 | 821509 | 136885 | 555460 | 402934 | 47413 | 118510 | 183391 | 340317 | 150789 | 117974 |
| 12 | Eye, Ear & Nose | 104544 | 85149 | 19395 | 64810 | 39734 | 4069 | 11721 | 24339 | 35213 | 14636 | 14566 |
| 13 | Dental & Gum Diseases | 1730354 | 1426448 | 303906 | 869729 | 860625 | 13732 | 121300 | 431981 | 827439 | 267399 | 68503 |
| 14 | Diseases of Stomach, Oesophagus & Intestines | 3822908 | 3181882 | 641026 | 2032766 | 1790142 | 297292 | 504944 | 661120 | 1555829 | 603731 | 199992 |
| 15 | Urinary Tract Infections | 797718 | 627631 | 170087 | 383938 | 413780 | 6881 | 27448 | 100702 | 408676 | 164935 | 87076 |
| 16 | Diseases of Female Breast | 98730 | 84142 | 14588 | 0 | 98730 | 8 | 35 | 4814 | 63388 | 13366 | 17119 |
| 17 | Inflammations of Female Pelvic Organs | 245290 | 209837 | 35453 | 0 | 245290 | 26 | 118 | 8359 | 202756 | 31175 | 2856 |
| 18 | Disorders of Menstruation & Bleeding | 304147 | 264917 | 39230 | 0 | 304147 | 0 | 0 | 19545 | 252048 | 26743 | 5811 |
| 19 | Diseases of Skin & Subcutaneous Tissue | 2293064 | 1841691 | 451373 | 1259312 | 1033752 | 148245 | 288053 | 465684 | 959240 | 289985 | 141857 |
| 20 | Diseases of the Musculoskeletal System | 3345156 | 2737021 | 608135 | 1774149 | 1571007 | 25298 | 200199 | 303889 | 1524123 | 870780 | 420867 |
| 21 | Fractures, Dislocation of Bones & Joints | 346022 | 283612 | 62410 | 241467 | 104555 | 4509 | 22367 | 96981 | 160715 | 47073 | 14377 |
| 22 | Burns | 151653 | 126404 | 25249 | 83387 | 68266 | 8344 | 29436 | 38824 | 54710 | 16022 | 4317 |
| 23 | Complications of Pregnancy | 857579 | 753557 | 104022 | 0 | 857579 | 0 | 0 | 11144 | 812366 | 31025 | 3044 |
| 24 | Open Wounds | 846261 | 690315 | 155946 | 571378 | 274883 | 24479 | 107503 | 254333 | 340326 | 89432 | 30188 |
| 25 | Others | 3949364 | 3233942 | 715422 | 1994892 | 1954472 | 529919 | 577064 | 701186 | 1528878 | 463586 | 148749 |
| 26 | Total | 39131748 | 32692744 | 6439004 | 20120338 | 19011410 | 2617987 | 5235001 | 7610915 | 15548668 | 5837835 | 2279360 |

Source: Ministry of Health, 1995, p.61, 62.

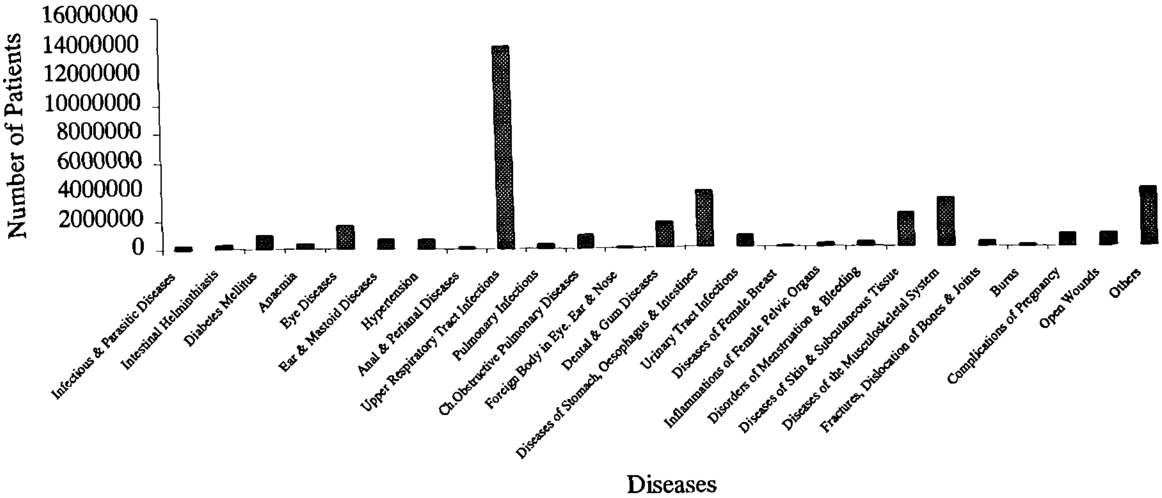



Figure 5. 9 Incidence of the 25 Main Diseases for all Saudi Arabia, 1995.

Table 5.11 Summary Table Showing Distribution of Most Prevalent Ailments in All Saudi Arabia by Nationality, Gender and Age Group, 1995.

| Diseases | Nationality % | Gender % | Age Group % |
|---|---|---|---|
| Upper Respiratory Infection | Saudi (85.1) | Male (53.4) | 15-44 (33.5) |
| Stomach, Oesophagus & Small Intestine Diseases | Saudi (83.2) | Male (53.2) | 15-44 (40.7) |
| Muscular & Bone Diseases | Saudi (81.8) | Male (53.0) | 15-44 (45.6) |
| Skin & Cellular Diseases | Saudi (80.3) | Male (54.9) | 15-44 (41.8) |
| Dental & Gingival Diseases | Saudi (82.4) | Male (50.3) | 15-44 (47.8) |
| Ophthalmic Diseases | Saudi (84.0) | Male (56.2) | 15-44 (37.0) |
| COPD | Saudi (85.7) | Male (58.0) | 15-44 (58.0) |
| Diabetes Mellitus | Saudi (84.8) | Male (54.9) | 45-64 (51.5) |

Source: Summarised from Ministry of Health, 1995.

Table 5.12 Common Diseases among Primary Health Centres Patients in Jeddah City By Total Number of Patients, Nationality, Gender and Age Group (1995).

| | Diseases | Total | Saudi | Non-Saudi | Male | Female | < 1 Year | 1-4 Yrs. | 5-14 Yrs. | 15-44 Yrs | 45-65 Yrs. | > 65 Yrs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Infectious & Parasitic Diseases | 6253 | 4820 | 1433 | 3299 | 2954 | 275 | 1310 | 2096 | 1956 | 532 | 84 |
| 2 | Intestinal Helminthiasis | 9867 | 8283 | 1584 | 4988 | 4879 | 243 | 2279 | 3839 | 2738 | 709 | 59 |
| 3 | Diabetes Mellitus | 31647 | 23536 | 8111 | 17064 | 14583 | 70 | 133 | 581 | 10242 | 17489 | 3132 |
| 4 | Anaemia | 10202 | 8137 | 2065 | 3517 | 6685 | 197 | 969 | 2263 | 5469 | 1138 | 166 |
| 5 | Eye Diseases | 35379 | 28800 | 6579 | 17695 | 17684 | 2238 | 4633 | 8671 | 14125 | 4792 | 920 |
| 6 | Ear & Mastoid Diseases | 17125 | 13747 | 3378 | 8732 | 8393 | 801 | 2745 | 4860 | 6516 | 1842 | 361 |
| 7 | Hypertension | 20655 | 14821 | 5834 | 8616 | 12039 | 33 | 104 | 333 | 7764 | 10337 | 2084 |
| 8 | Anal & Perianal Diseases | 4736 | 3590 | 1146 | 2489 | 2247 | 145 | 433 | 863 | 2401 | 774 | 120 |
| 9 | Upper Respiratory Tract Infections | 503759 | 418254 | 85505 | 257385 | 246374 | 46405 | 102537 | 137838 | 132054 | 44791 | 10134 |
| 10 | Pulmonary Infections | 16753 | 14017 | 2736 | 9210 | 7543 | 1270 | 3688 | 4556 | 5159 | 1735 | 345 |
| 11 | Ch.Obstructive Pulmonary Diseases | 23393 | 18385 | 5008 | 13600 | 9793 | 873 | 3553 | 6085 | 8437 | 3568 | 877 |
| 12 | Foreign Body in Eye. Ear & Nose | 2349 | 1844 | 505 | 1148 | 1201 | 50 | 223 | 560 | 1132 | 320 | 64 |
| 13 | Dental & Gum Diseases | 153658 | 122957 | 30701 | 71053 | 82605 | 816 | 12536 | 44295 | 66227 | 25392 | 4392 |
| 14 | Diseases of Stomach, Oesophagus & Intestines | 95864 | 77153 | 18711 | 46019 | 49845 | 5372 | 12499 | 19866 | 41513 | 14124 | 2490 |
| 15 | Urinary Tract Infections | 25526 | 20332 | 5194 | 11237 | 14289 | 204 | 1047 | 3994 | 15247 | 4379 | 655 |
| 16 | Diseases of Female Breast | 2879 | 2380 | 499 | 0 | 2879 | 0 | 0 | 130 | 2425 | 309 | 15 |
| 17 | Inflammations of Female Pelvic Organs | 9568 | 7449 | 2119 | 0 | 9568 | 0 | 0 | 303 | 8187 | 997 | 81 |
| 18 | Disorders of Menstruation & Bleeding | 9631 | 7507 | 2124 | 0 | 9631 | 0 | 0 | 488 | 8480 | 650 | 13 |
| 19 | Diseases of Skin & Subcutaneous Tissue | 88837 | 68970 | 19867 | 43213 | 45624 | 4780 | 12071 | 20953 | 39124 | 10243 | 1666 |
| 20 | Diseases of the Musculoskeletal System | 71734 | 55846 | 15888 | 33939 | 37795 | 599 | 2122 | 8480 | 37749 | 19082 | 3702 |
| 21 | Fractures, Dislocation of Bones & Joints | 8659 | 6877 | 1782 | 5446 | 3213 | 91 | 443 | 2238 | 4405 | 1291 | 191 |
| 22 | Burns | 4680 | 3764 | 916 | 2330 | 2350 | 260 | 973 | 1361 | 1603 | 415 | 68 |
| 23 | Complications of Pregnancy | 11311 | 7933 | 3378 | 0 | 11311 | 0 | 0 | 38 | 10718 | 555 | 0 |
| 24 | Open Wounds | 22627 | 18051 | 4576 | 14677 | 7950 | 759 | 2984 | 7610 | 8418 | 2489 | 367 |
| 25 | Others | 135536 | 102779 | 32757 | 60528 | 75008 | 24713 | 21831 | 23597 | 48402 | 14066 | 2927 |
| 26 | Total | 1322628 | 1060232 | 262396 | 636185 | 686443 | 90194 | 189113 | 305898 | 490491 | 182019 | 34913 |

Source: General Directorate of Primary Health Care Affairs in Jeddah, Department of Statistics, 1995.

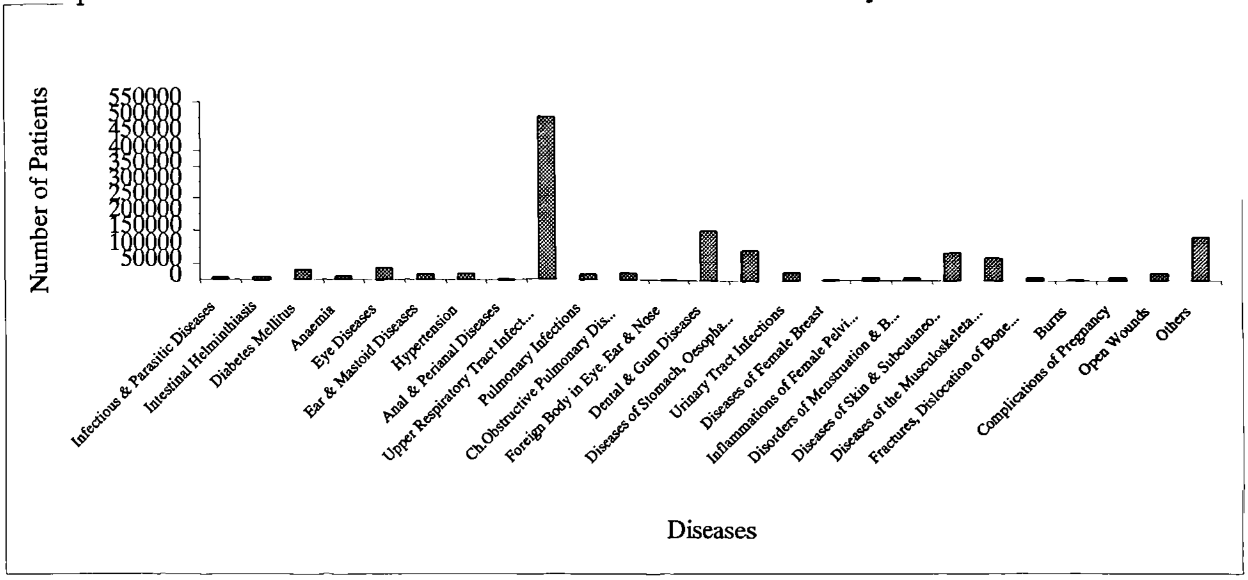



Figure 5.10 Incidence of the 25 Main Diseases for all-Jeddah, 1995

Table 5.13 Summary for Distribution of Most Prevalent Ailments in PHCC in Jeddah by Nationality, Gender and Age Group, 1995.

| Diseases | Nationality % | Gender % | Age Group % |
|---|---|---|---|
| Upper Respiratory Infection | Saudi (83.0) | Male (51.1) | 15-14 (27.4) |
| Dental & Gingival Diseases | Saudi (80.0) | Female (53.8) | 15-44 (43.1) |
| Stomach, Oesophagus & Small Intestine Diseases | Saudi (80.5) | Female (52.0) | 15-44 (43.3) |
| Skin & Cellular Diseases | Saudi (77.6) | Female (51.2) | 15-44 (44.0) |
| Muscular & Bone Diseases | Saudi (77.9) | Female (52.7) | 15-44 (52.6) |
| Ophthalmic Diseases | Saudi (80.3) | Male (51.0) | 15-44 (38.0) |
| Diabetes Mellitus | Saudi (74.4) | Male (53.9) | 45-64 (55.3) |
| Urinary Tract Infections | Saudi (79.7) | Female (56.0) | 15-44 (59.7) |

Source: The Monthly Activity Record in 8 PHCC in Jeddah, 1995

Table 5.14 Most Common Diseases in Eight Selected PHCC in Jeddah City, by Total Number of Patients, Nationality, Gender and Age Groups. (1995)

| | Diseases | Total | Saudi | Non-Saudi | Male | Female | < 1 Year | 1-4 Yrs. | 5-14 Yrs. | 15-44 Yrs | 45-65 Yrs. | > 65 Yrs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Infectious & Parasitic Diseases | 1524 | 1099 | 425 | 801 | 723 | 53 | 335 | 527 | 518 | 76 | 15 |
| 2 | Intestinal Helminthiasis | 1969 | 1493 | 476 | 1057 | 912 | 34 | 451 | 872 | 483 | 121 | 8 |
| 3 | Diabetes Mellitus | 12331 | 8446 | 3885 | 6796 | 5535 | 8 | 18 | 174 | 3660 | 7181 | 1290 |
| 4 | Anaemia | 2575 | 1937 | 638 | 655 | 1920 | 56 | 173 | 465 | 1622 | 229 | 30 |
| 5 | Eye Diseases | 10661 | 8177 | 2484 | 5260 | 5401 | 614 | 1236 | 2476 | 4559 | 1516 | 260 |
| 6 | Ear & Mastoid Diseases | 4497 | 3370 | 1127 | 2248 | 2249 | 248 | 635 | 1254 | 1890 | 408 | 62 |
| 7 | Hypertension | 7294 | 4919 | 2365 | 2838 | 4456 | 9 | 15 | 49 | 2706 | 3737 | 778 |
| 8 | Anal & Perianal Diseases | 942 | 682 | 260 | 524 | 418 | 19 | 14 | 53 | 656 | 177 | 23 |
| 9 | Upper Respiratory Tract Infections | 129897 | 100969 | 28928 | 68810 | 61087 | 9550 | 26986 | 37529 | 42798 | 9549 | 2174 |
| 10 | Pulmonary Infections | 2691 | 1951 | 740 | 1738 | 953 | 322 | 643 | 742 | 631 | 287 | 66 |
| 11 | Ch.Obstructive Pulmonary Diseases | 7358 | 5274 | 2084 | 4237 | 3121 | 345 | 1027 | 1598 | 2689 | 1282 | 417 |
| 12 | Foreign Body in Eye. Ear & Nose | 808 | 690 | 118 | 375 | 431 | 9 | 45 | 160 | 520 | 60 | 12 |
| 13 | Dental & Gum Diseases | 41308 | 31255 | 10053 | 19223 | 22085 | 46 | 2155 | 10312 | 18054 | 8367 | 2374 |
| 14 | Diseases of Stomach, Oesophagus & Intestines | 25053 | 18383 | 6670 | 12196 | 12857 | 1446 | 3032 | 4839 | 11605 | 3492 | 639 |
| 15 | Urinary Tract Infections | 7853 | 5697 | 2156 | 3068 | 4785 | 42 | 264 | 999 | 5160 | 1233 | 155 |
| 16 | Diseases of Female Breast | 499 | 374 | 125 | 0 | 499 | 0 | 0 | 17 | 446 | 34 | 2 |
| 17 | Inflammations of Female Pelvic Organs | 3136 | 2282 | 854 | 0 | 3136 | 0 | 0 | 89 | 2808 | 230 | 9 |
| 18 | Disorders of Menstruation & Bleeding | 2828 | 2030 | 798 | 0 | 2828 | 0 | 0 | 136 | 2610 | 79 | 3 |
| 19 | Diseases of Skin & Subcutaneous Tissue | 32025 | 23519 | 8506 | 14795 | 16657 | 1699 | 4172 | 7293 | 14830 | 2974 | 484 |
| 20 | Diseases of the Musculoskeletal System | 23199 | 16757 | 6442 | 11024 | 12175 | 74 | 318 | 2080 | 13685 | 5952 | 1090 |
| 21 | Fractures, Dislocation of Bones & Joints | 3163 | 2282 | 881 | 2065 | 1098 | 24 | 150 | 795 | 1731 | 421 | 43 |
| 22 | Burns | 1158 | 837 | 321 | 581 | 581 | 56 | 241 | 356 | 419 | 81 | 9 |
| 23 | Complications of Pregnancy | 2938 | 1756 | 1182 | 0 | 2938 | 0 | 0 | 31 | 2864 | 43 | 0 |
| 24 | Open Wounds | 5146 | 3741 | 1405 | 3553 | 1593 | 61 | 699 | 1762 | 2147 | 413 | 64 |
| 25 | Others | 43117 | 27731 | 15386 | 18208 | 25009 | 4397 | 6904 | 7198 | 18703 | 4150 | 1765 |

Source: Source: General Directorate of Primary Health Care Affairs in Jeddah, Department of Statistics, 1995.

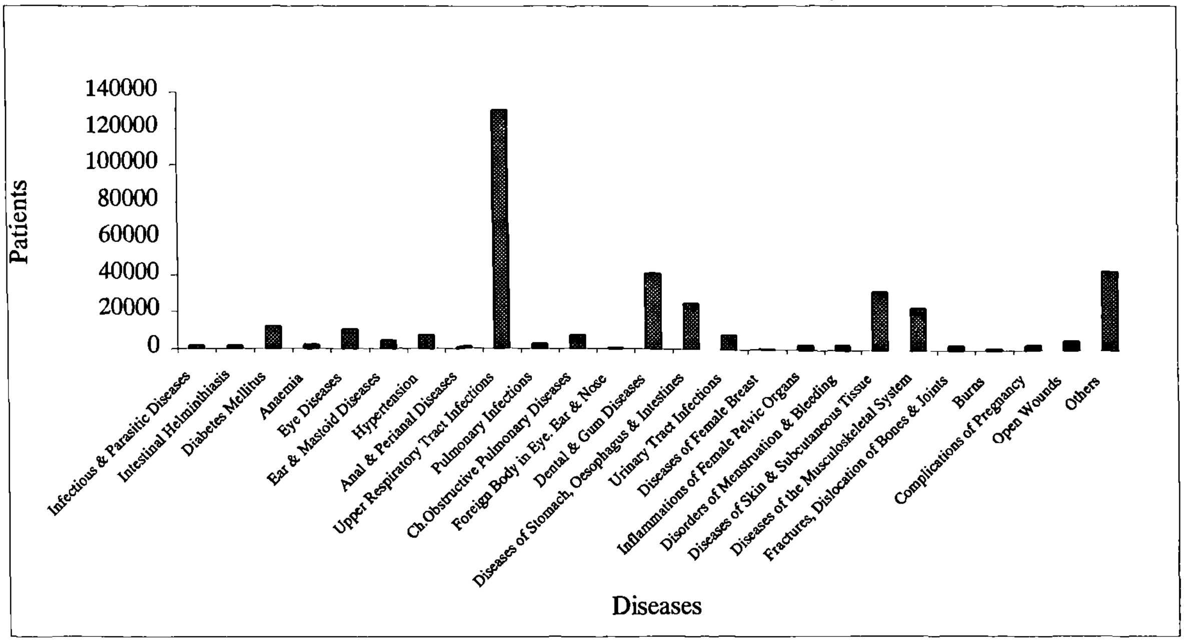



Figure 5.11 Incidence of the 25 Main Diseases for the eight PHCCs in Jeddah, 1995.

Table 5.15 Summary for Distribution of Most Prevalent Ailments in 8 Selected PHCC in Jeddah City by Nationality, Gender and Age Group, 1995.

| Diseases | Nationality % | Gender % | Age Group % |
|---|---|---|---|
| Upper Respiratory Infection | Saudi (77.7) | Male (53.0) | 15-44 (42.4) |
| Dental & Gingival Diseases | Saudi (75.7) | Female (53.5) | 15-44 (43.7) |
| Skin & Cellular Diseases | Saudi (73.4) | Female (52.0) | 15-44 (46.3) |
| Stomach, Oesophagus & Small Intestine Diseases | Saudi (73.4) | Female (51.3) | 15-44 (63.1) |
| Muscular & Bone Diseases | Saudi (72.2) | Female (52.5) | 15-44 (59.0) |
| Diabetes Mellitus | Saudi(68.5) | Male (55.1) | 45.64 (58.2) |
| Ophthalmic Diseases | Saudi (76.7) | Female (50.7) | 15-44 (42.8) |
| Urinary Tract Infections | Saudi (72.5) | Female (60.9) | 15-44 (65.7) |

Source General Directorate of Primary Health Care Affairs in Jeddah, Department of Statistics, 1995.

A comparison of the all-Saudi, all-Jeddah and the eight selected primary health care centres in Jeddah is provided in Table 5.16 and Figure 5.20. Examination of this table and figure shows that there was a remarkable accord between all three sets of data. A null hypothesis was prepared that stated *the incidence of the most common diseases per 100 population for all-Saudi, all-Jeddah and the eight selected PHCCs showed no similarity.* An ANOVA test revealed that there were no statistically significant differences between the three levels as regards the occurrence of the most common 25 diseases p<0.05 (0.949).

Comparing the incidence of disease for all Saudi and all- Jeddah, the latter records eight of the highest. The preliminary statistical analysis was considered necessary to help clarify and explain the inferential causes behind the wide variations in the number of patients attending the different PHCCs. It was hypothesised that the number of patients need not reflect the actual incidence of the studied diseases. In order to obtain an accurate comparison of the occurrence of different ailments between all-Saudi Arabia, all-Jeddah and the eight PHCC districts in Jeddah Governorate in 1995, it was necessary to calculate the incidence rate for the appropriate population figures. For all-Jeddah and the eight PHCCs the population figures used were the number of registered population at each PHCC, i.e. the actual users of PHCCs. The data for all-Saudi was calculated on the basis of official census data from 1992, as in this case the actual number of users of the PHCCs throughout the Kingdom was not available. The incidence of recorded diseases at the three geographic levels is depicted in Figure 5.12.

Table 5.16 Incidence of Diseases among All Saudi, All Jeddah and Eight Selected PHCC in 1995

| Diseases | Incidence/100pop-Kingdom | Incidence/100pop-Jeddah | Incidence/100pop-Eight PHCC |
|---|---|---|---|
| Infections & Parasitic Diseases | 1.33 | 0.98 | 0.97 |
| Intestinal Helminthiasis | 1.67 | 1.55 | 1.25 |
| Diabetes Mellitus | 4.83 | 4.97 | 7.82 |
| Anaemia | 2.00 | 1.60 | 1.63 |
| Eye Diseases | 8.14 | 5.55 | 6.76 |
| Ear & Mastoid Diseases | 3.48 | 2.69 | 2.85 |
| Hypertension | 3.32 | 3.24 | 4.63 |
| Anal & Perianal Diseases | 0.71 | 0.74 | 0.60 |
| Upper Respiratory Tract Infections | 72.51 | 79.06 | 82.38 |
| Pulmonary Infections | 1.52 | 2.63 | 1.71 |
| Ch. Obstructive Pulmonary Diseases | 4.95 | 3.67 | 4.67 |
| Foreign Body in Eyes, Ear & Nose | 0.54 | 0.37 | 0.51 |
| Dental & Gum Diseases | 8.93 | 24.12 | 26.20 |
| Diseases of Stomach, Oesophagus & Small Intestine | 19.73 | 15.05 | 15.89 |
| Urinary Tract Infections | 4.12 | 4.01 | 4.98 |

Table 5.16 continued

| | | | |
|---|---|---|---|
| Diseases of Female Breast | 0.51 | 0.45 | 0.32 |
| Inflammations of Female Pelvic | 1.27 | 1.50 | 1.99 |
| Disorders of Menstruation & Bleeding | 1.57 | 1.51 | 1.79 |
| Diseases of Skin & Subcutaneous | 11.83 | 13.94 | 19.95 |
| Diseases of the Musculoskeletal System | 17.26 | 11.26 | 14.71 |
| Fractures, Dislocation of Bones | 1.79 | 1.36 | 2.01 |
| Burns | 0.78 | 0.73 | 0.73 |
| Complication of Pregnancy | 4.43 | 1.78 | 1.86 |
| Open Wounds | 4.37 | 3.55 | 3.26 |
| Others | 20.38 | 21.27 | 27.34 |

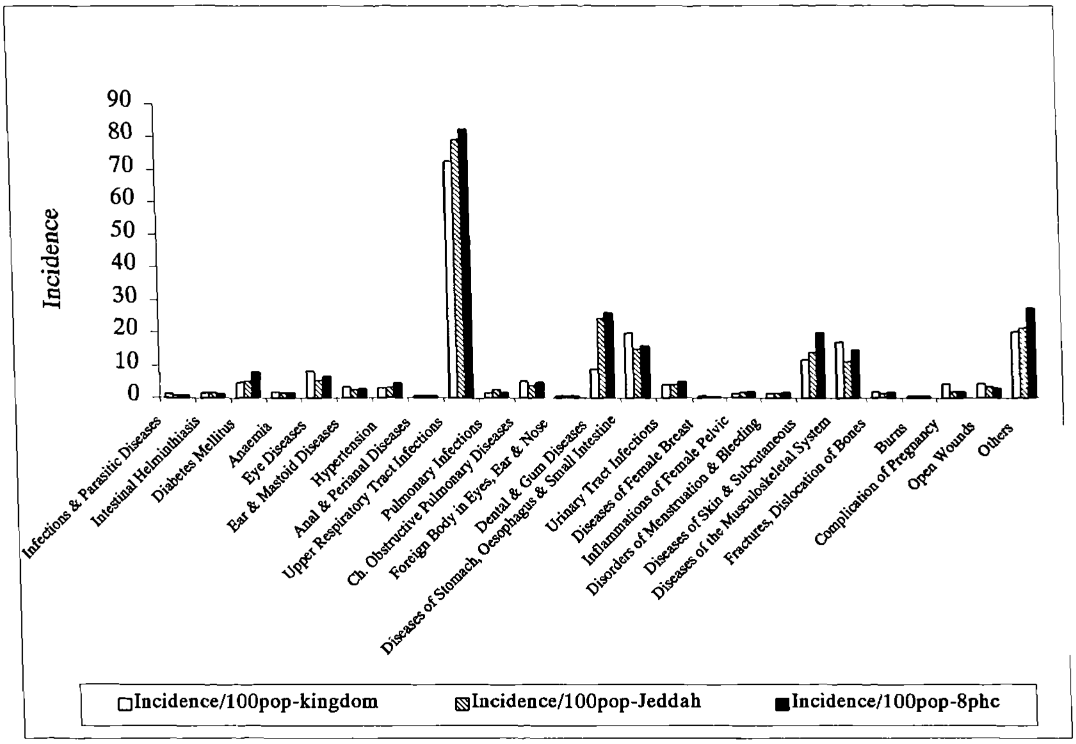



Figure 5.12 Incidence of Diseases among All Saudi, All Jeddah and Eight Selected PHCC in 1995.

## 5.5 Analysis of the seven most common diseases in the eight PHCCs.

From Table 5.16 and Figure 5.12 it was possible to identify the most common reasons for patients to visit the eight health centres in Jeddah. The most commonly occurring diseases were:

1. Upper Respiratory Tract diseases.
2. Dental and Gingival diseases.
3. Stomach, Oesophagus and Small Intestine diseases.
4. Muscular and Bone Diseases.
5. Skin and Cellular diseases.
6. Ophthalmic diseases.
7. Diabetes Mellitus.

An ANOVA test was made on the incidence of these seven diseases. The null hypothesis (Ho) used in the analysis was:

*The number of recorded occurrences for each ailment showed no difference between any of the eight selected PHCC districts.*

The alternative hypothesis (H1) was:

*The number of recorded ailments showed a statistically significant difference between the eight selected PHCC districts.*

It was hypothesised that the most prevalent ailments would show the most intimate relation with the spatial distribution of the population and also to the different ecological factors included in this study. A detailed analysis for the occurrence of the seven diseases in the selected eight PHCC's was conducted upon the data collected for these diseases in the selected centres along the period 1992-1995. The results are shown as follows:

### 5.5.1 Analysis of data for Upper Respiratory Diseases:

Table 5.17 Incidence of Upper Respiratory Diseases by centre from 1992-1995

| Centres | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 49.2 | 127.2 | 80.1 | 62.2 | 79.7 |
| Al Nuzlah Al Yammanyah | 69.0 | 82.1 | 113.9 | 108.2 | 93.3 |
| Al Ruwais | 89.0 | 76.3 | 65.3 | 56.3 | 71.7 |
| Al Safa | 60.8 | 71.8 | 66.4 | 58.0 | 64.3 |
| Al Thaalebah | 155.2 | 120.3 | 107.7 | 92.3 | 118.9 |
| Al Zahra'a | 61.5 | 74.1 | 61.9 | 60.4 | 64.5 |
| Bani Malek | 98.7 | 88.6 | 86.1 | 112.4 | 96.4 |
| Madain Al Fahd | 124.2 | 66.7 | 156.1 | 114.1 | 115.3 |

Source: General Directorate of Primary Health Care Affairs in Jeddah, Department of Statistics, 1995.

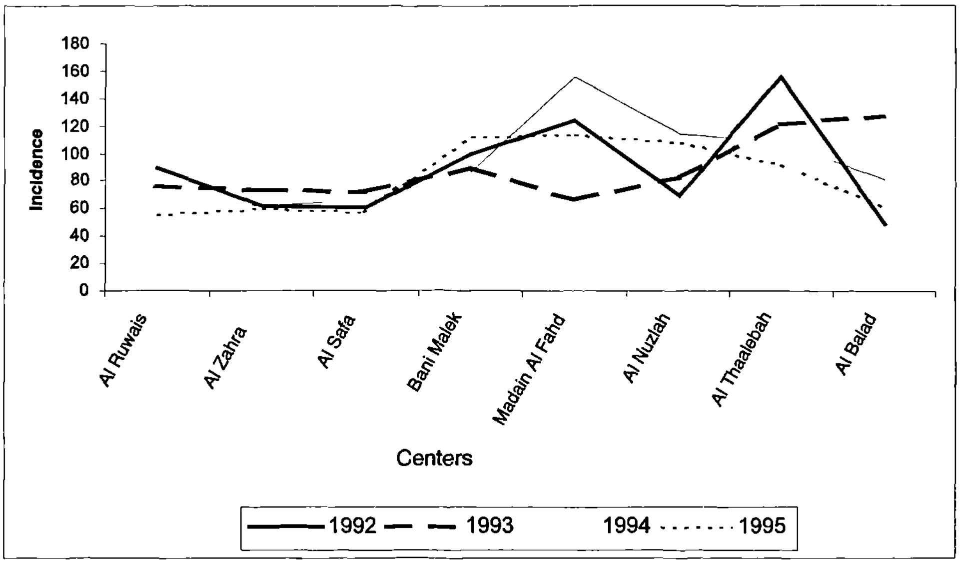



Figure 5.13 Graph for Incidence of Upper Respiratory Diseases

Figure 5.14 Average Incidence of Upper Respiratory Diseases in Selected Districts 1992-1995

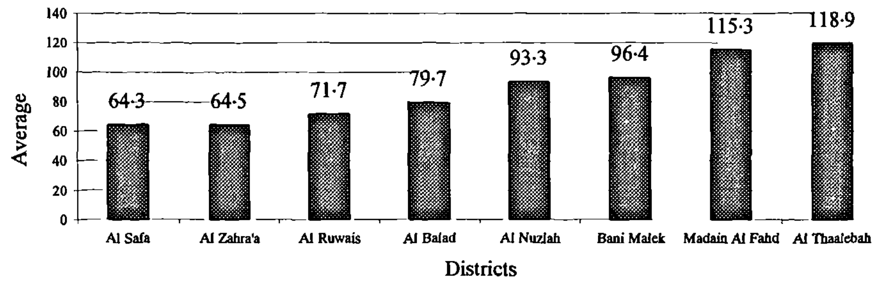



Table 5.17 Figures 5.13 and 5.14 shows incidence of Upper Respiratory diseases in the chosen districts from 1992 to 1995, it is obvious that Al Thaalebah had both the highest individual incidence of these diseases in 1992. The next centre was Madain Al Fahd, which had the highest incidence both in 1994 and 1995. It is also evident that Al Balad had a striking high incidence for Upper Respiratory Disease in 1993 especially when compared with the incidence in previous and ensuing years. An ANOVA test revealed that there were significant differences among these districts as regards to incidence of upper respiratory diseases $P< 0.05$, however there were no statistically significant differences in individual districts along the period from 1992 to 1995. It is also evident that the highest incidences in general were recorded in Madain Al Fahd, Al Thaalebah, Al Nuzla, Bani Malek and AlBalad, and the lowest incidences were recorded in Al Ruwais, AlZahra and Al Safa. From these results it can be concluded that the highest incidences of disease were in those districts located in the south of the Jeddah region. This area includes those districts characterised by the lowest socio-economic level and in contrast, the second group of districts located to the north of the Jeddah region are characterised by high socio-economic level. In the second region a lower incidence of upper respiratory disease was recorded. This emphasises the impact that socio-economic status can have on the occurrence of those diseases that are transmitted by lack of personal hygiene and poor quality of domestic sanitary facilities. One of the objectives of this thesis was to identify the possibility of mapping the different incidence of diseases as distinct geographical regions. The graph for the occurrence of upper respiratory disease showed that no substantial differences were recorded between 1992 and 1995.

Table 5.18 Incidence of Upper Respiratory Diseases among Saudi Population

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 134.1 | 104.3 | 71.3 | 64.9 | 93.7 |
| Al Nuzlah Yammanyah | 53.7 | 80.1 | 113.6 | 109.9 | 89.3 |
| Al Ruwais | 74.0 | 61.2 | 55.6 | 51.3 | 60.5 |
| Al Safa | 78.1 | 91.9 | 78.4 | 148.8 | 99.3 |
| Al Thaalebah | 128.0 | 101.2 | 92.6 | 84.8 | 101.6 |
| Al Zahra'a | 63.2 | 65.6 | 57.5 | 56.8 | 60.8 |
| Bani Malek | 130.2 | 120.0 | 110.1 | 118.8 | 119.8 |
| Madain Al Fahd | 165.4 | 127.5 | 85.6 | 109.2 | 121.9 |

Source: General Directorate of Primary Health Care Affairs in Jeddah, Department of Statistics, 1995.

Table 5.19 Incidence of Upper Respiratory Diseases among Non Saudi Population

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 37.2 | 154.9 | 86.5 | 60.0 | 84.6 |
| Al Nuzlah Yammanyah | 225.3 | 116.5 | 115.8 | 99.0 | 139.1 |
| Al Ruwais | 130.3 | 126.3 | 95.7 | 69.1 | 105.3 |
| Al Safa | 27.5 | 31.1 | 40.1 | 63.2 | 40.5 |
| Al Thaalebah | 641.8 | 317.3 | 194.5 | 130.9 | 321.1 |
| Al Zahra'a | 58.0 | 99.4 | 72.5 | 69.9 | 74.9 |
| Bani Malek | 54.8 | 44.4 | 52.2 | 94.2 | 61.4 |
| Madain Al Fahd | 63.2 | 215.1 | 182.6 | 176.4 | 159.3 |

Source: General Directorate of Primary Health Care Affairs in Jeddah, Department of Statistics, 1995.

Tables 5.18 and 5.19 show distribution of upper respiratory diseases in chosen districts by nationality, ANOVA test revealed that there was statistically significant difference among the selected districts as regards incidence of upper respiratory diseases between the Saudi and Non-Saudi elements ($P<0.05$). No significant difference in the incidence of these diseases was shown over the time period from 1992-1995. Generally there was no statistically significant difference between Saudi and Non-Saudi population as regards incidence of upper respiratory diseases. This may be attributed to the fact that both cohorts live within the same socio-economic and ecological environments.

### 5.5.2 Analysis of data for Dental and Gingival Diseases.

Table 5.20 Comparison of incidence of Dental and Gingival Diseases with Population Density Among Chosen PHCC in 1992

| Centres | No. | Population | Population Density | Incidence |
|---|---|---|---|---|
| Al Balad | 10419 | 33439 | 101.86 | 31.2 |
| Al Nuzlah Yammanyah | 8190 | 25729 | 141.5 | 31.8 |
| Al Ruwais | 6489 | 11947 | 103.3 | 54.3 |
| Al Safa | 8478 | 33211 | 70.15 | 25.5 |
| Al Thaalebah | 1985 | 6432 | 60.15 | 30.9 |
| Al Zahra'a | 184 | 17067 | 29.55 | 1.1 |
| Bani Malek | 9046 | 19935 | 101.54 | 45.4 |
| Madain Al Fahd | 10704 | 24380 | 77.91 | 43.9 |

Correlation coefficients for the different population densities in the eight PHCCs with the occurrence of the eight chosen diseases, (upper respiratory diseases, dental and gingival, gastro-intestinal diseases, ophthalmic diseases, musculoskeletal diseases, diabetes mellitus, complication of pregnancy, skin and cellular diseases) revealed that there were no significant correlations between different population densities and the occurrence of diseases, except that for dental and gingival diseases where modest positive correlation ($r = 0.6$) was observed, see Table 5.20. This may be attributed to the fact that the incidence of the number of reported cases of Dental and Gingival diseases may be seriously skewed towards those health centres that were provided with specialist dental treatment facilities. These dental surgeries would inevitably record patients with dental and gingival diseases whereas in the other health centres without specialist dental surgeries many patients would not be diagnosed for this disease. The data for dental disease is further skewed by the fact that centres without dental surgeries would refer patients to specialist health centres, resulting in an inaccurate recording of the origin of the patients with Dental and Gingival disease. An over-weighting of the incidence of dental diseases in some districts is therefore inevitable.

Table 5.21 Incidence of Dental Diseases by District from 1992-1995

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Ruwais | 54.3 | 36.6 | 36.3 | 32.9 | 40.0 |
| Al Zahra'a | 1.1 | 0.8 | 0.9 | 0.7 | 0.9 |
| Al Safa | 25.5 | 23.3 | 12.9 | 24.1 | 21.4 |
| Bani Malek | 45.4 | 59.3 | 26.9 | 33.8 | 41.3 |
| Madain Al Fahd | 43.9 | 22.6 | 49.2 | 38.3 | 38.5 |
| Al Nuzlah Yammanyah | 31.8 | 24.5 | 35.8 | 9.3 | 25.4 |
| Al Thaalebah | 30.9 | 19.7 | 22.5 | 45.5 | 29.6 |
| Al Balad | 31.2 | 36.2 | 40.1 | 33.3 | 35.2 |

Source: Health Information Centre, PHC Directorate, and Jeddah Governorate 1992-1995.

The above table shows incidence of dental and gingival diseases among the selected PHCCs between 1992-1995, An ANOVA test revealed that there was a statistically significant difference between the centres ($P<0.05$), although there was no significant difference over the period from 1992-1995. This can be explained by the inequity in distribution of dental facilities as mentioned above, which undoubtedly contributes to an over-weighted incidence of dental and gingival diseases in some districts compared to others. This feature was clearly shown in Al Zahra PHCC, where the incidence for Dental diseases ranged over the study period from 0.7 to 1.1. It is reasonable to hypothesis that this is not a reflection of the actual incidence of these diseases. The graph and the average for the occurrence of Dental and Gingival diseases from 1992-1995, Figures 5.15, 5.16 showed that there were no substantial difference along this period as regards the incidence of these diseases.

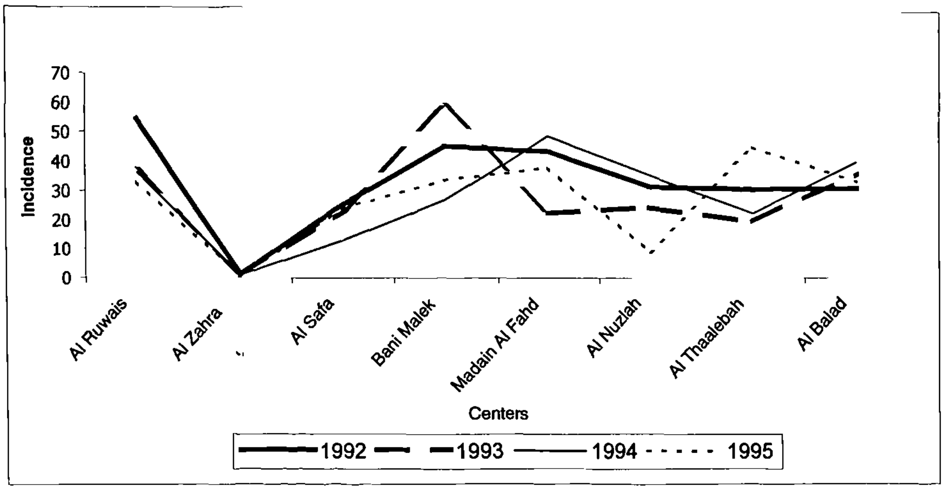



Figure 5.15 Graph for Incidence of Dental Diseases.

Figure 5.16 Average Incidence of Dental Diseases in Selected Districts, 1992 -1995

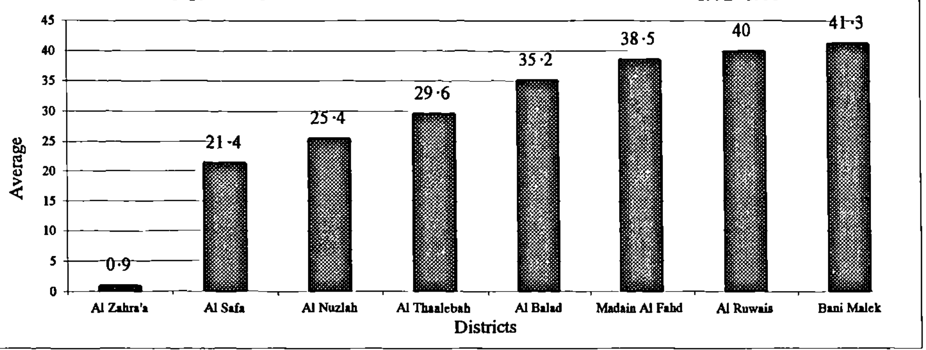



Table 5.22 Incidence of Dental Diseases among Saudi Population

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 126.7 | 33.9 | 37.2 | 35.6 | 58.4 |
| Al Nuzlah Yammanyah | 25.8 | 22.5 | 27.9 | 11.7 | 22.0 |
| Al Ruwais | 41.4 | 29.3 | 31.4 | 27.4 | 32.4 |
| Al Safa | 34.4 | 30.8 | 16.5 | 60.6 | 35.6 |
| Al Thaalebah | 25.6 | 14.8 | 20.2 | 51.1 | 27.9 |
| Al Zahra'a | 1.0 | 0.7 | 0.8 | 0.6 | 0.8 |
| Bani Malek | 47.8 | 63.4 | 29.5 | 32.5 | 43.3 |
| Madain Al Fahd | 56.9 | 42.2 | 26.4 | 35.7 | 40.3 |

Source: Health Information Centre, PHC Directorate, and Jeddah Governorate 1992-1995.

Table 5.23 Incidence of Dental Diseases among Non Saudi Population

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 17.6 | 39.1 | 42.0 | 31.3 | 32.5 |
| Al Nuzlah Yammanyah | 93.4 | 42.2 | 51.9 | 11.6 | 49.8 |
| Al Ruwais | 90.2 | 60.7 | 51.3 | 46.9 | 62.3 |
| Al Safa | 8.5 | 7.9 | 5.0 | 29.0 | 12.6 |
| Al Thaalebah | 125.9 | 70.8 | 35.6 | 16.5 | 62.2 |
| Al Zahra'a | 1.2 | 1.1 | 1.3 | 0.9 | 1.1 |
| Bani Malek | 41.9 | 53.6 | 23.4 | 37.3 | 39.0 |
| Madain Al Fahd | 24.7 | 79.5 | 62.1 | 65.9 | 58.1 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Tables 5.22 and 5.23 show distribution of Dental and Gingival diseases in chosen districts by nationality. An ANOVA test revealed that there was statistically significant difference among chosen districts as regards incidence of Dental and Gingival diseases for the Saudi and Non-Saudi groups, ($P<0.05$), however there were no significant difference in incidence of these diseases along the period from 1992-1995. Generally there was no statistically significant difference between Saudi and Non-Saudi groups as regards incidence of dental and gingival diseases.

### 5.5.3 Analysis of data for Skin Diseases.

Table 5.24 Incidence of Skin Diseases by District from 1992-1995

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 14.5 | 51.6 | 38.2 | 38.6 | 35.7 |
| Al Nuzlah AlYammanyah | 11.4 | 15.5 | 20.8 | 19.8 | 16.9 |
| Al Ruwais | 18.8 | 15.4 | 11.5 | 12.6 | 14.6 |
| Al Safa | 8.2 | 8.5 | 7.8 | 5.9 | 7.6 |
| Al Thaalebah | 42.2 | 29.7 | 27.3 | 20.7 | 30.0 |
| Al Zahra'a | 14.6 | 11.3 | 12.4 | 10.3 | 12.2 |
| Bani Malek | 15.6 | 14.5 | 13 | 19.2 | 15.6 |
| Madain Al Fahd | 36.3 | 20.4 | 49.9 | 42.6 | 37.3 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Table 5.24 shows incidence of skin diseases among chosen PHCCs from 1992-1995. An ANOVA test revealed that there was statistically significant difference between the eight centres as regards incidence of skin disease, ($P<0.05$). It was evident that the highest incidence was recorded in Madain Al Fahd, Al Balad, Al Thaalebah, and the lowest incidence were recorded in Al Safa, Al Zahra and Al Ruwais. The first group represented the low socio-economic social groups grouped in the southern districts of the Jeddah region and contrasted with the second group grouped in the northern districts and characterised by mid- and high socio-economic levels. The impact of low socio-economic status is again revealed, on this occasion, shown by its impact on the frequency of reported skin diseases.

The graph and the average for the occurrence of skin diseases from 1992-1995, Figure 5.17 and 5.18 showed that there were no substantial differences over this period as regards the incidence of these diseases. Nevertheless, it seems that there was a high incidence of skin disease in general and which could be attributed to the nature of the climate of Jeddah, characterised by high humidity and high temperature. These conditions are considered as important factors for the occurrence of some skin diseases such as Fungal diseases and Miliaria.

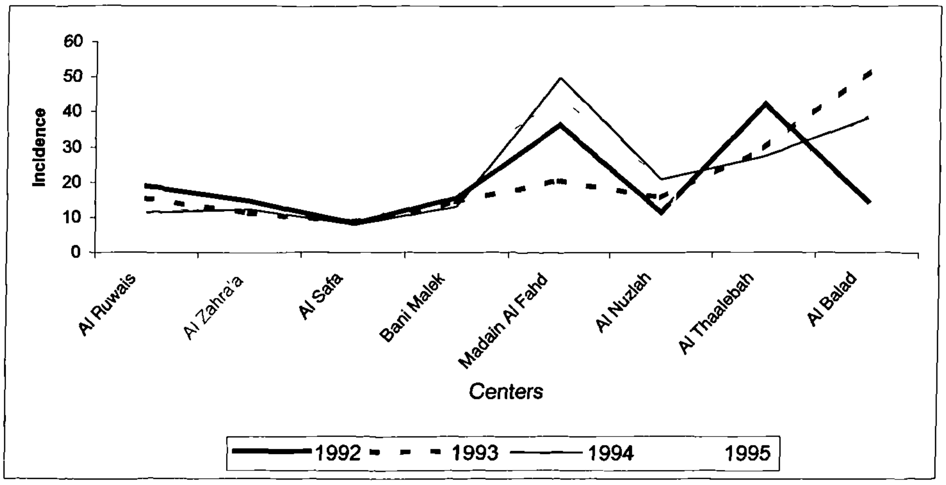



Figure 5.17 Graph for Incidence of Skin Diseases.

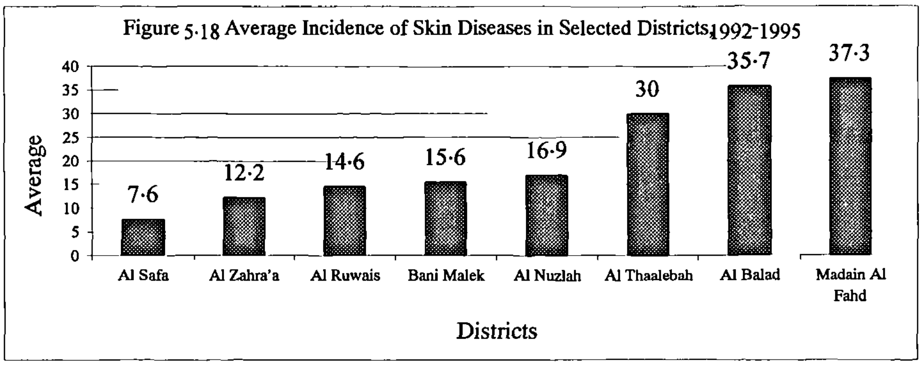



Table 5.25 Incidence of Skin Diseases among Saudi.

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 41.9 | 39.4 | 34.8 | 15.8 | 33.0 |
| Al Nuzlah | 8.6 | 14.3 | 19.3 | 15.9 | 14.5 |
| Al Ruwais | 14.7 | 11.3 | 9.2 | 14.6 | 12.4 |
| Al Safa | 10.5 | 11.0 | 10.1 | 19.9 | 12.9 |
| Al Thaalebah | 34.2 | 23.6 | 23.1 | 17.2 | 24.5 |
| Al Zahra'a | 13.5 | 8.5 | 10.2 | 7.2 | 9.9 |
| Bani Malek | 20.3 | 18.8 | 16.6 | 27.5 | 20.8 |
| Madain Al Fahd | 46.9 | 38.5 | 27.1 | 16.8 | 32.3 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Table 5.26 Incidence of Skin Diseases among Non Saudi

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 10.6 | 66.4 | 40.5 | 38.6 | 39.0 |
| Al Nuzlah AlYammanyah | 41.0 | 25.9 | 29.2 | 21.4 | 29.4 |
| Al Ruwais | 30.1 | 29.1 | 18.6 | 16.9 | 23.7 |
| Al Safa | 3.9 | 3.2 | 2.8 | 6.7 | 4.2 |
| Al Thaalebah | 186.5 | 92.6 | 52.3 | 31.4 | 90.7 |
| Al Zahra'a | 16.7 | 19.8 | 17.6 | 14.3 | 17.1 |
| Bani Malek | 9.0 | 8.3 | 7.9 | 17.3 | 10.6 |
| Madain Al Fahd | 20.7 | 69.0 | 60.7 | 66.4 | 54.2 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Tables 5.25 and 5.26 show distribution of Skin diseases in the chosen districts classified by nationality. An ANOVA test revealed that there was a statistically significant difference among the chosen districts for the incidence of Skin diseases between Saudi and Non Saudi P<0.05. However, there was no significant difference in incidence for these diseases over the period from 1992-1995. Generally there was no statistically significant difference between Saudi and Non Saudi as regards incidence of Skin diseases.

### 5.5.4 Analysis of data for Ophthalmic Diseases.

Table 5.27 Incidence of Ophthalmic diseases by District from 1992-1995

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 2.8 | 6.9 | 6.4 | 6 | 5.5 |
| Al Nuzlah AlYammanyah | 4.7 | 6.7 | 8.9 | 8.7 | 7.3 |
| Al Ruwais | 10.9 | 7.8 | 6.4 | 6.3 | 7.9 |
| Al Safa | 8.1 | 7.6 | 8.1 | 5 | 7.2 |
| Al Thaalebah | 15.6 | 11.2 | 9.3 | 7.6 | 10.9 |
| Al Zahra'a | 6.2 | 5.4 | 5 | 3.8 | 5.1 |
| Bani Malek | 8.3 | 7.3 | 6.3 | 8.7 | 7.7 |
| Madain Al Fahd | 9.6 | 5 | 9.9 | 8.8 | 8.3 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Table 5.27 shows incidence of ophthalmic diseases among the chosen PHCCs over the 1992-1995-time period. An ANOVA test revealed that there was a statistically significant difference between these centres (P<0.05), while there were no significant differences over the time period in the individual centres. The distribution of ophthalmic diseases displayed a similar pattern to that shown for some of the diseases already discussed in that the highest incidence was recorded in the southern, low socio-economic districts of Al Thaalebah and Madain Al Fahd. In contrast the higher socio-economic areas represented by the northern districts, notably Al Zahra'a and Al Safa, recorded lower incidence of the disease. This pattern may be attributed in part to the individual frequency of several different strains of Conjunctivitis A, the transmission of which among populations is related to poor personal hygiene.

Graph and the average for the occurrence of Ophthalmic diseases Figures 5.19, 5.20 shows that there was no significant difference over the three years for which data was collected. The high Incidence of this disease category can, in general, be attributed to the nature of the climate, which is characterised by the high dusty winds (Khamaseen wind) and high temperature, which predispose to the occurrence of some eye diseases, e.g. Spring Catarrh.

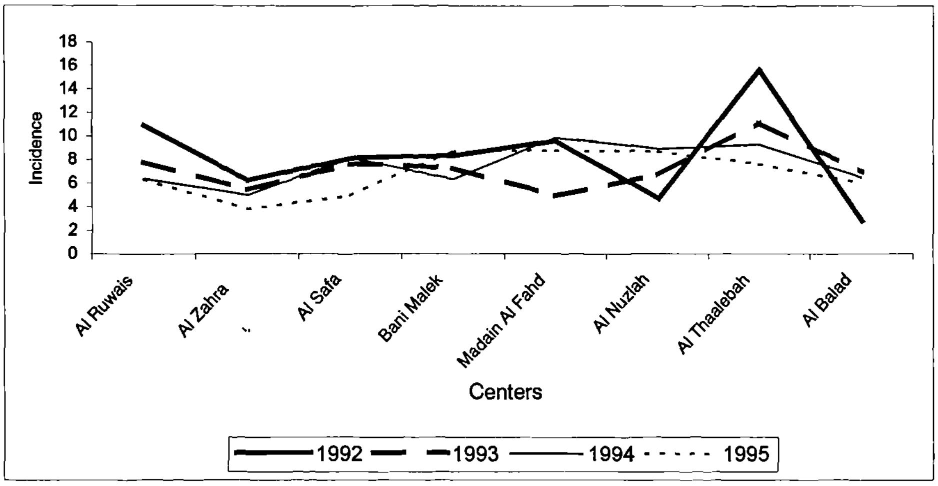



Figure 5.19 Graph for Incidence of Ophthalmic Diseases.

Figure5.20Average Incidence of Ophthalmic Diseases in Selected Districts 1992-1995

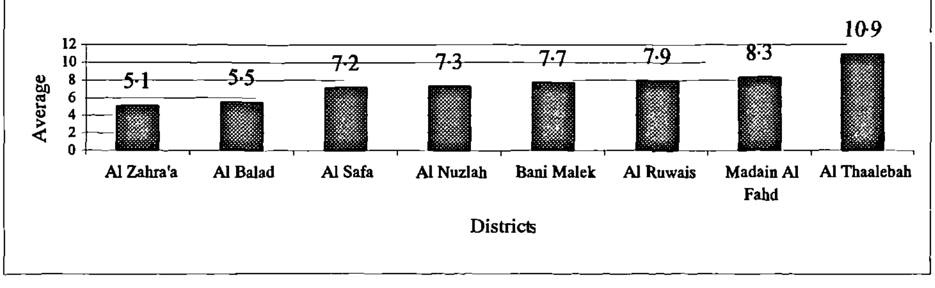


Table 5.28 Incidence of Ophthalmic Diseases among Saudi

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 8.4 | 4.9 | 5.1 | 6.0 | 6.1 |
| Al Nuzlah AlYammanyah | 3.7 | 9.5 | 8.8 | 8.9 | 7.7 |
| Al Ruwais | 9.4 | 6.5 | 5.6 | 6.1 | 6.9 |
| Al Safa | 10.7 | 10.1 | 10.6 | 13.2 | 11.1 |
| Al Thaalebah | 12.1 | 9.0 | 7.7 | 6.9 | 9.0 |
| Al Zahra'a | 6.0 | 4.6 | 4.6 | 3.1 | 4.6 |
| Bani Malek | 10.9 | 9.6 | 8.3 | 9.2 | 9.5 |
| Madain Al Fahd | 12.9 | 9.7 | 5.4 | 8.1 | 9.0 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Table 5.29 Incidence of Ophthalmic Diseases among Non Saudi

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 2.0 | 9.2 | 7.3 | 6.1 | 6.2 |
| Al Nuzlah AlYammanyah | 14.8 | 10.1 | 9.7 | 8.1 | 10.6 |
| Al Ruwais | 15.0 | 12.0 | 9.0 | 6.7 | 10.7 |
| Al Safa | 3.0 | 2.6 | 2.6 | 4.7 | 3.2 |
| Al Thaalebah | 78.2 | 33.4 | 18.1 | 11.3 | 35.3 |
| Al Zahra'a | 6.6 | 7.8 | 6.2 | 5.5 | 6.5 |
| Bani Malek | 4.7 | 4.1 | 3.5 | 7.3 | 4.9 |
| Madain Al Fahd | 4.8 | 15.7 | 12.1 | 15.5 | 12.0 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Tables 5.28 and 5.29 show the distribution of ophthalmic diseases in chosen districts by nationality. An ANOVA test revealed that there was a statistically significant difference among the chosen districts as regards incidence of ophthalmic diseases among Saudi and Non Saudi cohorts, ($P<0.05$). However there was no significant difference in incidence of this group of diseases over the period 1992-1995. Generally there is no statistically significant difference between Saudi and Non Saudi as regards incidence of ophthalmic diseases.

### 5.5.5 Analysis of data for Musculoskeletal Diseases.

Table 5.30 Incidence of Musculoskeletal diseases by District from 1992-1995

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 10.5 | 36.1 | 25.8 | 22.3 | 23.7 |
| Al Nuzlah AlYammanyah | 7.3 | 15.5 | 16.4 | 1.7 | 10.2 |
| Al Ruwais | 17.1 | 13.9 | 10.1 | 10.6 | 12.9 |
| Al Safa | 5.4 | 5.4 | 6.7 | 5.6 | 5.8 |
| Al Thaalebah | 32.7 | 33.2 | 28.4 | 22.4 | 29.2 |
| Al Zahra'a | 5.1 | 4.3 | 4.6 | 2.7 | 4.2 |
| Bani Malek | 13 | 15 | 13 | 22.9 | 16.0 |
| Madain Al Fahd | 20.1 | 13.1 | 30.3 | 24.7 | 22.1 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

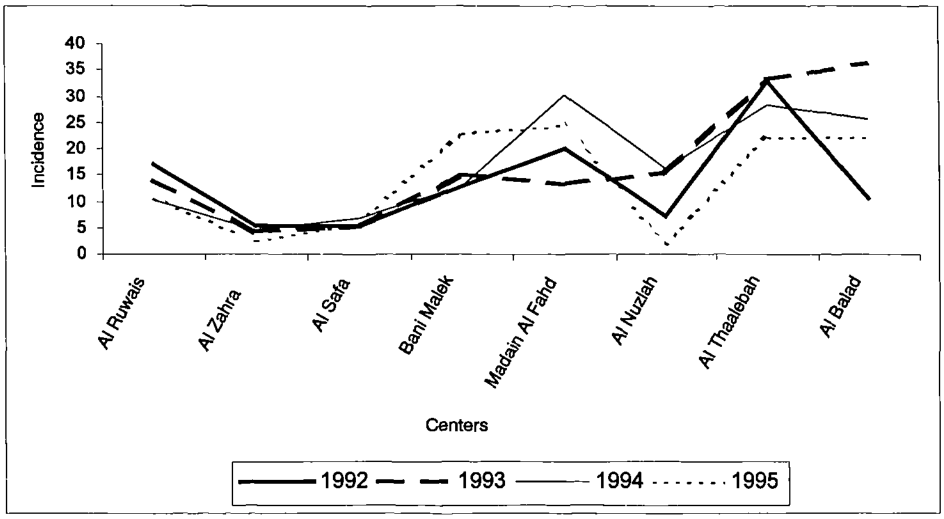



Figure 5.21 Graph for Incidence of Musculoskeletal Diseases.

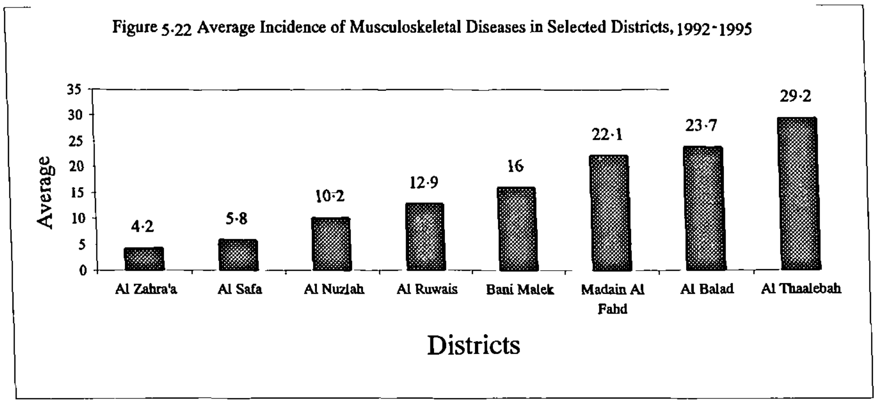



Table 5.30, Figures 5.21, 5.22 shows incidence of musculoskeletal disease among the chosen PHCCs. An ANOVA test revealed that there was a significant difference between these centres as regards the disease, $P<0.05$, while there was no significant difference shown over the time period from 1992-1995. In general, there was a remarkably high incidence of this complaint in southern districts compared to northern districts, once again this can be attributed to the low socio-economic level of the population that inhabits the southern districts which, in turn, is reflected in the relatively poor nutritional status and housing conditions which exacerbate musculoskeletal diseases and especially Osteoporosis and Osteomalacia.

Table 5.31 Incidence of Muscular Diseases among Saudi Inhabitants

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 31.4 | 27.8 | 22.1 | 22.3 | 25.9 |
| Al Nuzlah AlYammanyah | 5.3 | 14.3 | 14.3 | 15.8 | 12.4 |
| Al Ruwais | 14.3 | 10.7 | 8.5 | 9.8 | 10.8 |
| Al Safa | 7.1 | 7.2 | 9.0 | 14.4 | 9.4 |
| Al Thaalebah | 25.6 | 26.8 | 23.7 | 19.8 | 24.0 |
| Al Zahra'a | 4.4 | 3.0 | 3.5 | 2.0 | 3.2 |
| Bani Malek | 17.2 | 20.1 | 16.6 | 22.7 | 19.1 |
| Madain Al Fahd | 25.9 | 24.7 | 16.2 | 22.5 | 22.3 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Table 5.32 Incidence of Muscular Diseases among Non Saudi

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 7.5 | 46.3 | 28.6 | 22.3 | 26.2 |
| Al Nuzlah AlYammanyah | 28.3 | 26.1 | 28.4 | 23.7 | 26.6 |
| Al Ruwais | 24.9 | 24.2 | 15.1 | 12.7 | 19.2 |
| Al Safa | 2.2 | 1.8 | 1.7 | 5.6 | 2.8 |
| Al Thaalebah | 160.0 | 99.0 | 55.6 | 35.7 | 87.6 |
| Al Zahra'a | 6.6 | 8.0 | 7.2 | 4.7 | 6.6 |
| Bani Malek | 7.2 | 8.0 | 8.0 | 23.5 | 11.7 |
| Madain Al Fahd | 11.7 | 44.4 | 38.9 | 45.4 | 35.1 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Tables 5.31 and 5.32 show distribution of Musculoskeletal diseases in the chosen districts subdivided by nationality. An ANOVA test revealed that there was statistically significant difference among chosen districts, ($P<0.05$). However, there was no significant difference in incidence of these diseases over the time from 1992-1995. Generally there was no statistically significant difference between Saudi and Non Saudi as regards incidence of musculoskeletal diseases.

### 5.5.6 Analysis of data for Gastro-intestinal Diseases.

Table 5.33 Incidence of GIT Diseases by District from 1992-1995

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 8.3 | 31.6 | 19 | 15.8 | 18.7 |
| Al Nuzlah | 9.6 | 14.1 | 19.3 | 16.4 | 14.9 |
| Al Ruwais | 23.9 | 19 | 15.8 | 16.2 | 18.7 |
| Al Safa | 8.7 | 6.1 | 9.5 | 7.9 | 8.1 |
| Al Thaalebah | 47.6 | 34.2 | 23.4 | 19 | 31.1 |
| Al Zahra'a | 9.7 | 11.2 | 13.3 | 9.3 | 10.9 |
| Bani Malek | 21.1 | 19.1 | 17.9 | 26.8 | 21.2 |
| Madain Al Fahd | 32.4 | 17.5 | 32.7 | 23 | 26.4 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Table 5.33 shows incidence of gastrointestinal diseases among the chosen PHCCs. An ANOVA test revealed that there was a significant difference between these centres as regards the occurrence of these diseases ($P<0.05$). There was no significant difference over the time period 1992-1995. The highest incidence was recorded in Al Thaalebah and Madain Al Fahd in south of Jeddah region, while the lowest incidence was in Al Safa an Al Zahra in north of Jeddah region, reflecting yet again, the impact of socio-economic level on the occurrence of some diseases e.g. Gastroenteritis.

The graph and average Figures 5.23 and 5.24 for gastrointestinal diseases showed that there were no substantial changes along study time period. The high incidence of these diseases can be attributed in part to the preferred dietary habits of consuming high fat meals.

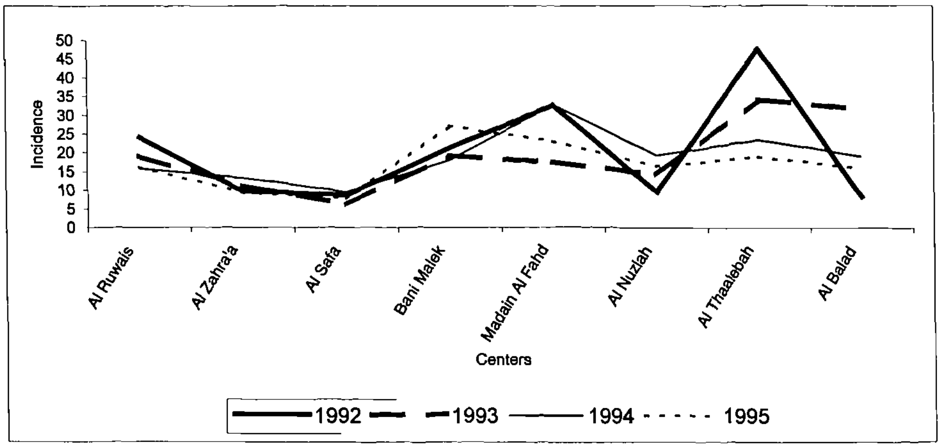



Figure 5.23. Graph for Incidence of Gastro-intestinal Diseases.

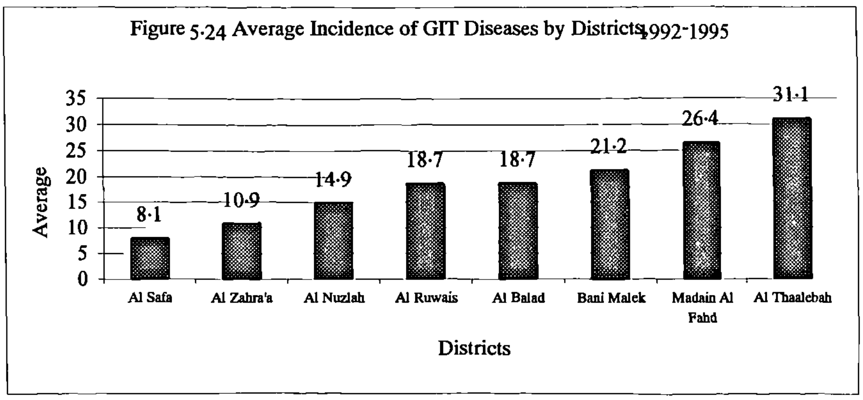


Table 5.34 Incidence of GIT Diseases among Saudi by District from 1992-1995.

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 26.4 | 24.4 | 16.8 | 15.8 | 20.8 |
| Al Nuzlah AlYammanyah | 7.0 | 12.7 | 18.2 | 15.9 | 13.4 |
| Al Ruwais | 19.1 | 15.0 | 12.8 | 14.6 | 15.4 |
| Al Safa | 11.2 | 7.8 | 11.5 | 19.9 | 12.6 |
| Al Thaalebah | 38.9 | 26.5 | 18.9 | 17.2 | 25.4 |
| Al Zahra'a | 9.0 | 8.8 | 10.1 | 7.2 | 8.8 |
| Bani Malek | 27.2 | 25.3 | 22.1 | 27.5 | 25.5 |
| Madain Al Fahd | 42.6 | 32.1 | 17.3 | 21.3 | 28.3 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992- 1995.

Table 5.35 Incidence of GIT Diseases among Non Saudi

| Centre | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 5.8 | 40.4 | 20.6 | 15.8 | 20.6 |
| Al Nuzlah AlYammanyah | 37.0 | 25.0 | 25.7 | 19.2 | 26.7 |
| Al Ruwais | 37.0 | 32.4 | 25.4 | 20.3 | 28.8 |
| Al Safa | 4.1 | 2.6 | 4.9 | 9.8 | 5.3 |
| Al Thaalebah | 203.8 | 113.2 | 48.6 | 28.1 | 98.4 |
| Al Zahra'a | 11.0 | 18.6 | 21.1 | 14.8 | 16.4 |
| Bani Malek | 12.5 | 10.3 | 12.0 | 24.9 | 14.9 |
| Madain Al Fahd | 17.3 | 64.2 | 43.4 | 40.5 | 41.4 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

Tables 5.34 and 5.35 show distribution of GIT diseases in the chosen districts subdivided by nationality. An ANOVA test revealed that there was a statistically significant difference among the data for GIT ($P<0.05$). However, there was no significant difference in incidence of these diseases over the period from 1992-1995. Generally there was no statistically significant difference between Saudi and Non Saudi as regards incidence of GIT diseases.

### 5.5.7 Analysis of data for Diabetes Mellitus.

Table 5.36 Incidence of Diabetes Mellitus by District from 1992-1995

| Centres | 1992 | 1993 | 1994 | 1995 | Average |
|---|---|---|---|---|---|
| Al Balad | 1.3 | 8.3 | 7.9 | 11.6 | 7.3 |
| Al Nuzlah AlYammanyah | 3.5 | 10.7 | 15.2 | 12.5 | 10.5 |
| Al Ruwais | 7.3 | 9.5 | 9.3 | 7.4 | 8.4 |
| Al Safa | 1.7 | 2.6 | 5.6 | 3.9 | 3.5 |
| Al Thaalebah | 10.4 | 15.1 | 13.4 | 7.9 | 11.7 |
| Al Zahra'a | 4.9 | 7.3 | 9.2 | 5.6 | 6.7 |
| Bani Malek | 4.0 | 4.9 | 5.6 | 7.5 | 5.5 |
| Madain Al Fahd | 6.5 | 4.5 | 13.1 | 10.4 | 8.6 |

Source: Health Information Centre, PHC Directorate, Jeddah Governorate 1992-1995.

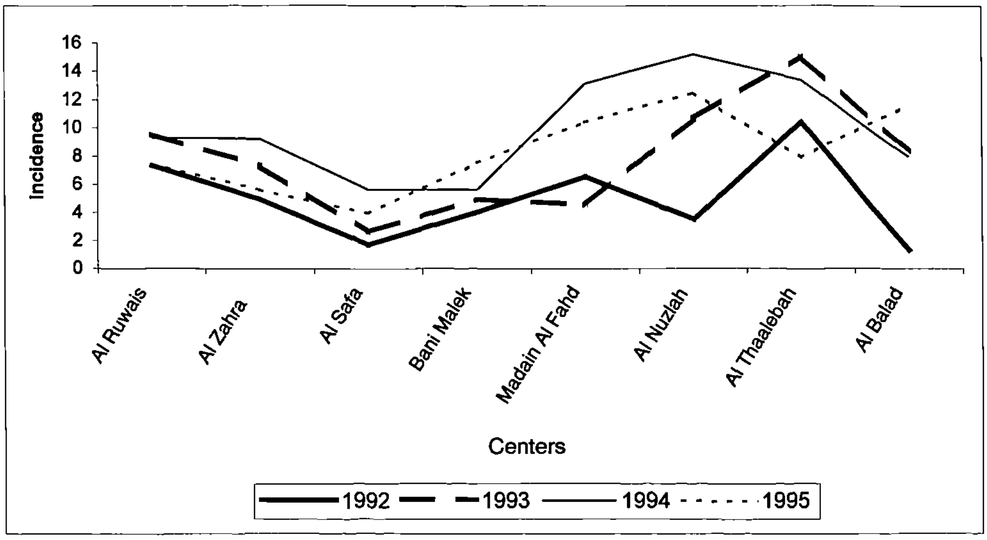



Figure 5.25 Graph for Incidence of Diabetes Mellitus Diseases.

Figure 5.26 Average Incidence of Diabetes Mellitus by District from 1992-1995

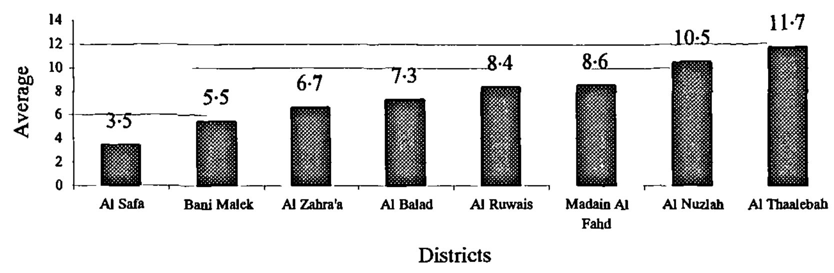



Table 5.36, Figures, 5.25, 5.26 shows the incidence of Diabetes Mellitus and the average at the selected PHCC's. An ANOVA test revealed that there was a significant difference between the centres, ($P<0.05$), while no significant difference was shown over the time period from 1992-1995. Generally, there was a remarkably high incidence for Diabetes Mellitus in the southern districts compared to the northern districts. The low socio-economic level of the southern districts are again suggested to be the reason, poverty combined with poor education and poor housing conditions interact to raise the incidence of this condition.

## 5.6 Summary of the results derived from analysis of data for the most common ailments among patients in the eight-selected PHCC, 1992-1995

For the four years of data, the highest ailment rate was recorded for Respiratory diseases while the lowest was recorded in Anaemia. The high level of Respiratory disease in Jeddah follows the worldwide pattern for distribution this disease. The low proportional rate for Anaemia may be attributed to the nationally preferred food habits in Saudi Arabia which relies greatly on dates as one of the richest foodstuffs in iron, nutrients and trace elements all of which help to protect against Anaemia. In addition, the traditional meal of "Kabsa" is very rich in protein and also assists in protecting against Anaemia. Unfortunately, a diet rich in dates and Kabsa provides a surfeit of fats and carbohydrates leads to obesity, which, in turn, can result in a relatively high proportional rate of Diabetes and Hypertension.

The second position in the disease league table was occupied Dental diseases. This was the situation in six of the eight centres. In Al Zahra'a district Skin diseases occupied second place, but this may reflect the presence of a dermatologist at the centre who was able to diagnose more cases of skin disease than at other centres without a resident dermatologist. Of course, the local doctors may have recognised a specific skin problem and campaigned for a dermatologist to be provided! No data was available to test this theory.

In positions below second place, the sequence of the incidence of diseases differed between the centres, and this difference was statistically significance at $P<0.05$. This may be caused by the effect of the geographical and socio-economic differences that exist between individual districts or in combinations of districts. Attention has been drawn to the repeatedly observed differences between the older, pooper southern districts of Jeddah and the more recently built and affluent northern districts.

# CHAPTER SIX

## Questionnaire Analysis

### 6.1 Introduction

Analysis of the Primary Health Care data had shown that insufficient information existed about the socio-economic conditions of the patients, (see Chapter 4.2.1b). This situation could be overcome by collecting the appropriate data by means of a questionnaire survey based on a sample of the patients who used the Primary Health Care Centres. Gesler (1984) had pointed out that *"in developing countries, information on individuals or groups of people is usually not available in official documents, so surveys are required to obtain this data"* (p.38). A sample questionnaire survey was made in eight of the PHCC's [Al Zahra'a, Al Safa, Al Ruwais, Bani Malek, Madain Al Fahd, Al Thaalebah, Al Nuzlah Al Yamaneyyah, Al Balad] the purpose of which was to provide additional socio-economic data. The aims and objectives of the present study were first, to consider the level of utilization of health care services as influenced by the socio-economic and demographic composition of the districts. Secondly, to examine environmental and social factors as they affect the pattern of diseases with in Jeddah city.

The purpose of the questionnaire survey was to collect information that would help answer these aims. The information would provide a statement on morbidity, the socio-economic level of the population (family income, type of housing, education and the head of household's occupation), and the level of use placed upon PHCC's. The use of information gathered by a questionnaire survey provides an integral part of the research. It is essentially a measurement tool, an instrument for the collection of particular kinds of data (Oppenheim 1992, p.10).

The objective of the patient questionnaire was to collect information on the uptake of PHCC services. Analysis and interpretation of this information would assist the researcher in the task of accepting or rejecting the two hypotheses given above. Considerable effort was given to the design and implementation of the questionnaire not only because of its importance in terms of collecting information but also because of problems that were anticipated in operationalising the questionnaire in a patient population that showed an education level that ranged from illiterate to university degree level. The researcher herself conducted all 1000 interviews with patients. This allowed a standard approach to be adopted in the interviews, with varying degrees of help and assurance being given to the patients where appropriate. The design of the questionnaire, its detailed content, structure, format, and sequence of questions followed the guidelines of Nachmias & Nachmias, (1981), Sharma, Prased & Satyanarayana, (1984) and (Oppenheim, 1992). See Appendix 3 for a sample questionnaire.

The questionnaire was divided into two categories comprising questions that elicited factual information while others extracted patient opinions and attitudes. The factual questions were specifically designed to extract objective information on patient socio-economic background and circumstances relating to their home environment. Other factual information was collected on gender, age, marital status and education. It was considered that answers to these questions might help explain the level of use placed upon the health services, as the personal and socio-economic factors may cause an impact on the occurrence of some of the common disease types and, in turn, influence the utilization level of the health services. Analysis of these data would help interpret Hypothesis One 'to determine the utilisation level of health care facilities'.

Secondly, questions that extracted opinions relating to the provision of health care facilities from patients would help to identify the sum total of a patient's inclinations, prejudices, ideas, convictions and fears about specific illnesses and diseases. This information would help explain why the patients made use of specific services and refrained from using other services. This information would help to explain the level of utilization of the primary health care centres.

A well-designed questionnaire should comprise more than a list of questions or a form to be hurriedly filled in. It is a powerful measurement tool for the collection of particular kinds of data. The aims and specifications of a questionnaire stem directly from the overall research design. Such objectives and specifications are not always obvious from a perusal of the questions (Oppenheim, 1992).

The structured questionnaire comprised 29 questions grouped into three sections. The first part dealt with the level of use of the primary health care centre; the second part considered the ease of access to the PHCC, and the third part requested personal and social data of the interviewees. Every attempt was made to design the questions as 'closed end' questions that were short in length and the answers to which could be ticked or short answers written out by the interviewer during the interview.

The questionnaire was written in Arabic and the local dialect was used when conducting the interviews rather than the classic form of Arabic. By adopting this approach it was intended to make the interviewee at ease and would allow them to clearly understand the questions. Only one open-ended question was contained in the questionnaire, one that asked for information on the reasons for previous visits to the health centre. Contingency and cross check questions were also used in some parts of the questionnaire. Names of the respondents were not taken so helping to ensure confidentiality, and also to improve the likelihood of the respondents fully answering the questions.

Prior to implementing the full questionnaire survey a pilot study had been prepared and tested, see Section 4.9. From an initial analysis of the official Primary Health Care Centre data entitled "Application of Monthly Activities and Services" it had been found that the number of visits made by children to the PHCCs was greater than for women and that the number of female patients exceeded male patients. Based on this information, the ratio of sampling used in both the pilot and full survey comprised three children to two women to one man (3 children: 2 women: 1 man).

One intention of the questionnaire data was to identify any differences that might exist between the PHCC districts for ailments (disease), and the socio-economic conditions. To enable this, analysis of the questionnaire data were subject to statistical analysis by means mainly of the spreadsheet package, Excel, and for some specialist situations by the social statistics package, SPSS. As one of the objectives of the research was to examine the spatial variation in use of PHCC facilities, the data from the questionnaire was also used in the GIS package, Map-Info.

The questionnaire data for each respondent was entered into the database and thereafter, manipulated in a variety of ways, including the calculation of average scores, percentages, cross-table analysis as well as the use of parametric and non-parametric statistical tests of significance such as analysis of variance (F-test) and chi-square. The use of statistical analysis enabled the data to be interpreted and tested against the aims and objectives set for the study.

Having piloted the questionnaire and established the basic patterns of use for the PHCCs, this chapter will now consider the detailed information obtained from the questionnaire survey based upon the eight selected PHCCs. The writer interviewed a sample of patients at the following PHCCs: Al Zahra'a, Al Safa, Bani Malek, Al Ruwais, Al Balad, Al Thaalebah, Al Nuzlah Al Yamaneyyah, Madain Al Fahd.

As previously explained, the collection of data by means of questionnaire survey is very complex and may be prone to error from several sources. One major source of error was the patients themselves in that they may have been in a worried state of mind due to their illness. By interviewing patients *after* they had seen the doctor it was hoped that the anxiety that may have existed over the visit to the PHCC would be eliminated. For the full survey of 1000 patients there was not a single refusal to participate in the study. As far as could be judged, all participants answered the questions with great honesty and sincerity.

## 6.2 The results of the questionnaire analysis

### 6.2.1a Part One: Questions 1 – 12 Use of the Primary Health Care Centre Facilities

All statistical results given in this chapter have a significance value of 95% or above. The list of diseases was based upon the official list of Ministry of Health classification of diseases and which had been used for the collection of official data in Chapter 5. Code numbers were the same as those used in official health statistics.

**Question 1: Types of Ailments:**

Patients were asked what type of illness had required them to visit the clinic. In order to help the respondents categorise their illness a list of 25 diseases was shown to them on a card. The diseases were each allocated a code number for subsequent use in analysis.

Table 6.1 shows the distribution of the types of illnesses reported by the 1000 patient sample survey categorised by the eight PHCCs. This information is also shown in Figures 6.1, 6.2, 6.3 in histogram form. The most common illnesses recorded (in absolute numbers) were: Upper Respiratory Infections (246), followed by Dental and Gingival diseases (98), Diabetes Mellitus (60), Complication of Pregnancy (54), Ophthalmic diseases (53), Stomach, Oesophagus & Small Intestine diseases (49), Skin & Cellular diseases (47). There was similarity between the most common ailment (Upper Respiratory Infections) recorded at all eight PHCCs. This ailment had already been identified in Chapter 5.5.2 as the most common ailment throughout Saudi Arabia and in Tables 5.10 and 5.11. Upper Respiratory Disease was shown to be the most common disease throughout Jeddah Governorate, see Table 5.12. There was also correspondence between the second most common ailments, (Dental and Gingival) for all eight PHCCs surveyed.

There was no correspondence between any of the other diseases at any geographical level.

Table 6.1: All visits to Primary Health Care Centres for consultation: Breakdown by ailment and group.

| Disease | The Disease | Women | | Men | | Children | |
|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % |
| 1 | Parasitic Infectious Diseases | 3 | 0.9 | 5 | 3.0 | 19 | 3.8 |
| 2 | Intestinal Worms | 3 | 0.9 | - | - | 16 | 3.2 |
| 3 | Diabetes Mellitus | 24 | 7.3 | 31 | 18.5 | 5 | 1.0 |
| 4 | Anaemia | 18 | 5.4 | 1 | 0.6 | 24 | 4.8 |
| 5 | Ophthalmic Diseases | 15 | 4.5 | 5 | 3.0 | 33 | 6.6 |
| 6 | Ear and Mastoid Diseases | 8 | 2.4 | 6 | 3.6 | 25 | 5.0 |
| 7 | Hypertension | 26 | 7.9 | 12 | 7.1 | 3 | 0.6 |
| 8 | Anal Diseases | 6 | 1.8 | - | - | 4 | 0.8 |
| 9 | Upper Respiratory Infections | 43 | 13.0 | 29 | 17.3 | 174 | 34.7 |
| 10 | Pneumonia Diseases | 5 | 1.5 | 2 | 1.2 | 12 | 2.4 |
| 11 | Chronic Obstructive Diseases | - | - | - | - | 7 | 1.7 |
| 12 | Foreign Bodies | 2 | 0.6 | 2 | 1.2 | 12 | 2.4 |
| 13 | Dental & Gingival Diseases | 17 | 5.1 | 30 | 12.9 | 51 | 10.2 |
| 14 | Stomach, Oesophagus & Small Intestine Diseases | 14 | 4.2 | 8 | 4.8 | 27 | 5.4 |
| 15 | Urinary Tract Infections | 14 | 4.2 | 4 | 2.4 | 4 | 0.8 |
| 16 | Breast Diseases | 1 | 0.3 | - | - | - | - |
| 17 | Pelvic Infections | 31 | 9.4 | - | - | - | - |
| 18 | Dysmenorrhoea | 24 | 7.3 | - | - | 1 | 0.2 |
| 19 | Skin & Cellular Diseases | 6 | 1.8 | 8 | 4.8 | 33 | 6.6 |
| 20 | Muscular & Bone Diseases | 11 | 3.3 | 3 | 1.8 | 7 | |
| 21 | Dislocation & Fracture of Bones | 1 | 0.3 | 11 | 6.5 | 5 | 1.0 |
| 22 | Burns | - | - | 1 | 0.6 | 8 | 1.6 |
| 23 | Complication of Pregnancy | 54 | 16.3 | 0 | - | 0 | - |
| 24 | Open Wounds | 1 | 0.3 | 10 | 6.0 | 9 | 1.8 |
| 25 | Others | 4 | 1.2 | 0 | - | 22 | 4.4 |
| Total | | 331 | 33.1 | 168 | 16.8 | 501 | 50.1 |

Source: Author's Field Survey, 1996

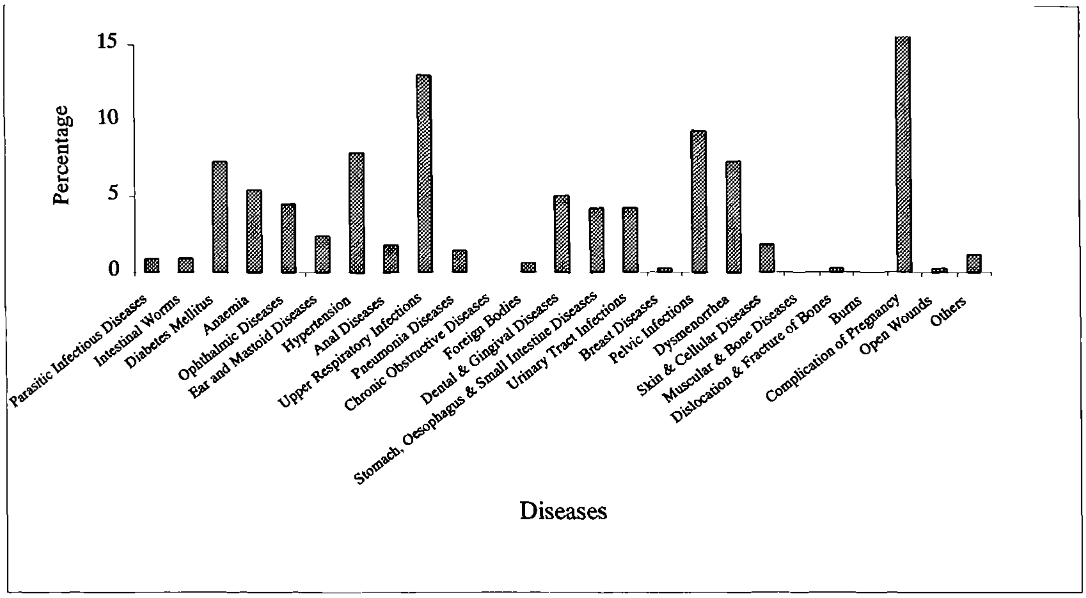



Figure 6.1 Aliments recorded by female patients.

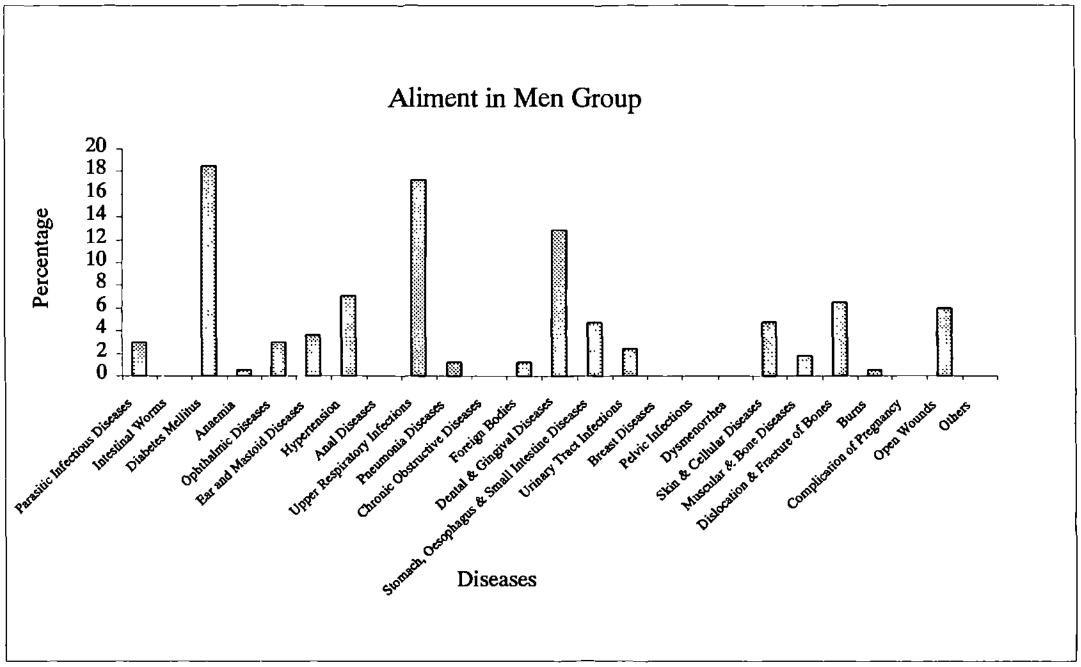



Figure 6.2 Aliments recorded by male patients.

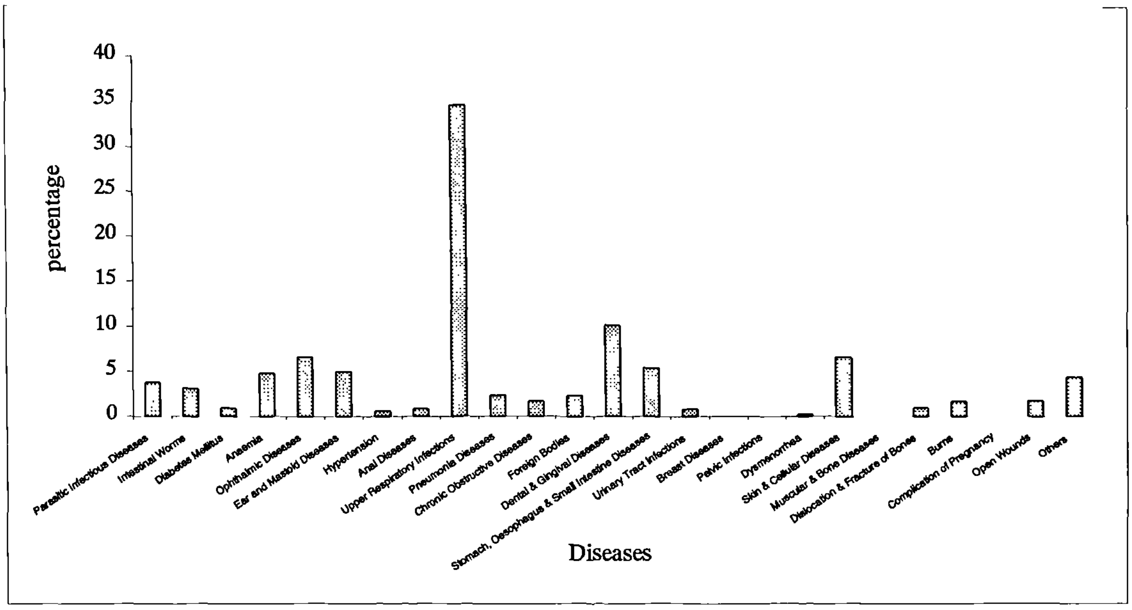



Figure 6.3 Aliments recorded by children.

In Table 6.2 the results of an ANOVA test between 13 behavioural characteristics and 25 diseases are shown

Table 6.2: Result of Kruskal-Wallis (H), 1-Way ANOVA and Whitney (U) between ailments and various behavioural aspects of users of eight Primary Health Care Centres.

| | Various Behavioural aspects | Type of Ailments |
|---|---|---|
| 1. | Gender | ** (.0000) |
| 2. | Number of visits to PHCC by Respondents | Ns (.1730) |
| 3. | Type of the clinics | Ns (.0723) |
| 4. | Registered in any other private clinics | ** (.0156) |
| 5. | Visit a local folk healers | ** (.0017) |
| 6. | Nationality | Ns (.1352) |
| 7. | Age | ** (.0000) |
| 8. | Place of living | ** (.0010) |
| 9. | Number of rooms | Ns (.4638) |
| 10. | Number of toilets | Ns (.5339) |
| 11. | Education | ** (.0010) |
| 12. | Occupation | ** (.0009) |
| 13. | Income | Ns (.7180) |

Ns = Non-Significant
Significance Level = 95 percent (0.05) **

$H_o$ *"Samples have not been taken from a population with identical distributions. Any differences between the samples are due to chance variation inherent in the process of random sampling."*

$H_1$ *The samples have come from populations with different distributions, so that differences between the samples reflect real differences between the population"* (see Ebdon, 1985, p.71).

*"The null hypothesis of the U test is that the two samples are taken from a common population"*

*"The alternative hypothesis of the U test is that the two samples are taken from different population"* (see Ebdon, 1985, p58).

As shown in Table 6.2, a statistically significant relationship was found between age and ailments, $P<0.05$. This relationship can be explained by the occurrence of specific age related ailments, for example, childhood diseases and the need to immunise children against contagious diseases would result in large numbers of young patients. Similarly, child bearing would be related with a specific age range, and the diseases of middle- and old-age would again be linked to specific ailments. There was also a significant result between disease types and the number of people registered with a private clinic. It is more difficult to explain this relationship; it may represent a response to inadequate health care provision at the PHCCs, which may suggest that some patients seek medical care in private clinics for specific diseases. Some patients may consider that by paying for treatment at a private clinic they will receive a better standard of medical care than that provided by a PHCC. However, the choice between the freely available treatment provided by PHCC and the often expensive treatment provided by private clinics will usually be governed by the socio-economic status of patients. Socio-economic status can be considered as one of the hidden factors behind that difference.

There was also a significant relationship between the aliment and use of local traditional healers. Researchers have recently recognised the important role that traditional medicine continues to play in the Third World where, in some cases, it can be viewed as part of the health care delivery system. Good *et al.* (1979) estimated that traditional methods were the dominant system of health care for over three-quarters of the population of the developing world. A number of studies into the continuing role of traditional medicine indicate that the beliefs of people play a significant role in causing illness and also determine the appropriate treatment, Eyles and Woods (1983), Jones and Moon (1987), Meade *et al.* (1988). The present study made further investigation into the role and uptake of traditional medicine and its function alongside the modern primary health care service. The assumption had been made earlier that with the spread of modern medicine throughout Saudi Arabia since the 1980s, traditional healing had assumed a lesser significance. Results from this study suggest traditional medicine is still widely practiced both in rural and urban areas.

One of the basic questions asked by this study was to what extent did the place of domicile within Jeddah Governorate influence the level of disease. The result of the ANOVA test to Question 8 in Table 6.2 showed that there was a statistically significant relationship between where a patient lived and the level of disease. A persuasive explanation for this relationship is to suggest that the considerable socio-economic differences that exist between the districts can explain the differences in the level of different diseases. Introducing the significant relationship between level of education and ailment can assist this argument. The correctness of this assumption is made problematic by the small number (4.2 percent) of the sample categorised as belonging to the high socio-economic group, see Table 6.34. More than two thirds of the total respondents were classified as belonging to the lower education levels, Table 6.29

No statistically significant relationships were found between type of illness and the number of visits made by respondents to the PHCC, nor to the type of clinics or to the nationality of the patient. Neither were there statistically significant relationships between social indicators such as type of illness and number of rooms in the household, number of toilets and income of household. These last three questions had been included as indicators of quality of life of the patients and it had been assumed that high level of income might be associated with lower levels of illness. The result of the ANOVA test disproved this relationship.

### 6.2.1b Logistic Backward: Wald Results

The previous model in Chapter Four (Methodology) was estimated using Backward Wald to investigate what factors were related to occurrence of examined diseases. Eleven independent variables were assumed to be associated with the occurrence of selected diseases; they were entered into the estimation, to be computed against the occurrence of the selected seven diseases. The results showed that there were significant association of certain factors with only three diseases, namely respiratory diseases, diabetes mellitus and ophthalmic diseases, while other diseases showed no significant association with the examined independent factors. Generally, it was found that nationality and age were the two main factors associated with upper respiratory tract infection, while age was the only factor associated with diabetes mellitus. On the other hand, the number of rooms and number of toilets were the main two factors associated with ophthalmic diseases provided that the other factors are kept constant.

**Upper Respiratory Diseases:**

Table 6.3 shows that the most important predictors for occurrence of upper respiratory diseases are nationality and age with P value <0.05. There is a positive relationship between the nationality and the diseases. This can be interpreted that Saudis are more likely affected by the disease than non-Saudi with odds ratio equal to 1.481. Also it was recognized that there was a negative relationship with age groups with odds ratio equal to 0.602, i.e. there is a gradual decrease of the probability of occurrence of upper respiratory tract infection when the patient becomes older.

Table 6.3 Logistic Backward: Wald Results Upper Respiratory Infections Diseases:

| Variables | ß | Wald | Sig. | Exp (B) |
|---|---|---|---|---|
| Nationality | 0.393 | 4.355 | 0.037 | 1.481 |
| Age | -0.508 | 50.702 | 0.000 | 0.602 |
| Constant | -1.226 | 5.830 | 0.016 | 0.294 |

The dependent variable = Upper Respiratory Diseases

**Diabetes Mellitus:**

Table 6.4 Logistic Backward:Wald Results Diabetes Mellitus Diseases:

| Variables | ß | Wald | Sig. | Exp(B) |
|---|---|---|---|---|
| Q29 How old are you? | 1.295 | 44.678 | 0.000 | 3.650 |
| Constant | -7.479 | 76.037 | 0.000 | 0.001 |

The dependent variable = Diabetes Mellitus.

Table 6.4 shows that the most important factor associated with Diabetes Mellitus was age, there was a positive association between age and the occurrence of diabetes mellitus, i.e. there is in increased likelihood of occurrence of diabetes mellitus with older age groups, assuming other factors are kept constant, with odds ratio of 3.650 and $p<0.05$.

**Ophthalmic Diseases:**

Table 6.5 Logistic Backward: Wald Results Ophthalmic Diseases:

| Variables | ß | Wald | Sig. | Exp(B) |
|---|---|---|---|---|
| Number of rooms in the house | 0.289 | 5.050 | 0.025 | 1.335 |
| Number of toilets | -0.704 | 5.318 | 0.021 | 0.494 |
| Constant | -1.091 | 1.576 | 0.209 | 0.336 |

The dependent variable = Ophthalmic Diseases.

Table 6.5 shows that the main two factors associated with occurrence of ophthalmic diseases were number of rooms and number of toilets. While the likelihood of occurrence of ophthalmic diseases was positively associated with the number of rooms with odds ratio of 1.335 and $p<0.05$, it was negatively associated with the number of toilets with odds ratio of 0.494 and $p<0.05$.

**Question 2: Reasons for Choosing the Primary Health Care Centre:**

Respondents were asked to indicate their main reasons for choosing to use the Primary Health Care Centre for treatment. It might be assumed that patients would have little choice in deciding which health centre to visit as they were obliged, in theory, to use the health centre in the same administrative district in which they lived. In practice, the mobility of the population means that they have a choice between using a health centre at which they were previously legitimately registered or the allocated health centre for their current address. This question was included in order to obtain an insight into whether patients considered ease of access to a health centre to be of prime importance, or whether a medical relationship built up at an earlier centre persisted despite a change of address. Table 6.6 groups the results into four miscellaneous categories. Easy access to the Health Centre was clearly the dominant reason, (720 respondents). 204 respondents stated quality of the local doctors as the reason for using a specific health while 161 patients indicated that they used a specific centre because of good medical treatment they had received in the past. There was considerable variation in the patterns of response across the eight PHCC's when free provision of treatment was considered. In the low-income districts, 51.1 % of patient's visitors in Al Thaalebah and 40.4 % of patient's visitors in Bani Malek used the Health Centre because of its free service. In Al Zahra'a and Al Ruwais, one third of the patient indicated that their use of the health centre was due to the quality of the doctors.

Table 6.6: Reasons for choosing the Primary Health Care Centre.
* Patient can select more than one answer.

| The Centres | Because it is near to your residence | | Because it provides a good service | | Because there is a good doctor | | Because it is free of charge | | Other reasons | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | |
| Al Balad | 50 | 54.9 | 24 | 26.4 | 17 | 18.7 | 12 | 13.2 | - | - | 103 |
| Bani Malek | 107 | 78.7 | 10 | 7.4 | 23 | 16.9 | 55 | 40.4 | - | - | 19.5 |
| Madain Al Fahd | 138 | 68.3 | 25 | 12.4 | 38 | 18.8 | 38 | 18.8 | 2 | 1.0 | 241 |
| Al Nuzlah Al Yamaneyyah | 119 | 79.3 | 25 | 16.7 | 22 | 14.7 | 30 | 20 | 2 | 1.3 | 198 |
| Al Ruwais | 76 | 67.9 | 18 | 16.1 | 38 | 33.9 | 26 | 23.2 | 4 | 3.6 | 162 |
| Al Safa | 50 | 71.4 | 18 | 25.7 | 13 | 18.6 | 18 | 25.7 | - | - | 99 |
| Al Thaalebah | 83 | 94.3 | 12 | 13.6 | 2 | 2.3 | 45 | 51.1 | 2 | 2.3 | 144 |
| Al Zahra'a | 97 | 64.2 | 29 | 19.2 | 51 | 33.8 | 35 | 23.2 | 1 | .7 | 212 |
| Total | 720 | 72.0 | 161 | 16.1 | 204 | 20.4 | 259 | 25.9 | 11 | 1.1 | 1354 |

Source: Author's Field Survey, 1996

Tables showing a detailed breakdown of results for each PHCC are included in Appendix 4.

**Question 3 and 4: Combined answers on frequency of visits to the PHCC by respondents.**

Table 6.7: Result of Kruskal-Wallis (H) 1-Way ANOVA and Mann-Whitney (U) between frequencies of visits to the primary health care centre by respondents.

| Various Behavioural aspects | Frequency of visits |
|---|---|
| • Other type of clinics | ** (.0003 |
| • The most important reason for using the PHCC is because it provides a good service | ** (.0390) |
| • Type of transportation | ** (.0180) |
| • Time to reach PHCC | ** (.0001) |

Significance Level = 95 percent (0.05) **

The questionnaires showed that 68.2 percent of patients used the PHCC at least four times a year. Some patients considered that they did not receive sufficient care at a PHCC or they were obliged to use a private clinic because the PHCC was closed after 7:00 P.M. Therefore, the number of recorded visits to a patient's designated PHCC does not necessarily record the total health care demand created by an individual patient as, in addition to using the PHCC, they may go elsewhere for other treatment. A relationship existed between the provision of a good service and frequency of visit were significant $P<0.05$, Table 6.2. There was a significant difference regarding the ability to reach the PHCC and the frequency of visits. Half of the sample size used private transport to reach the health centre (513 patients) and 367 patients (36.7%) reached the relevant PHCC on foot. This difference had been anticipated; ease of transport plays a major role in determining the frequency of visits, especially when the patients make use of optional services such as Antenatal and 'Well Baby' clinic services. 86.7 percent of patients were able to reach their PHCC in less than 16 minutes by any means of transport, indicating that the PHCC's were located in accessible locations for patients.

Table 6.8: Frequency of visits per year to the Primary Health Centre.

| The Centres | One Time | | Two Times | | Three Times | | More than three times | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Al Balad | 11 | 12.08 | 12 | 13.18 | 9 | 9.9 | 59 | 64.8 |
| Bani Malek | 10 | 7.4 | 7 | 5.1 | 13 | 9.6 | 106 | 77.9 |
| Madain Al Fahd | 21 | 10.4 | 24 | 11.9 | 35 | 17.3 | 122 | 60.4 |
| Al Nuzlah Al Yamaneyyah | 16 | 10.6 | 25 | 16.6 | 10 | 6.6 | 99 | 66.0 |
| Al Ruwais | 9 | 8.03 | 12 | 10.7 | 20 | 18.0 | 71 | 63.6 |
| Al Safa | 5 | 7.1 | 7 | 10 | 10 | 14.3 | 48 | 68.6 |
| Al Thaalebah | 3 | 3.4 | 4 | 4.5 | 14 | 15.9 | 67 | 76.1 |
| Al Zahra'a | 8 | 5.3 | 14 | 9.3 | 19 | 12.6 | 110 | 72.8 |
| Total | 83 | 8.3 | 105 | 10.5 | 130 | 13.0 | 682 | 68.2 |

Source: Author's Field Survey, 1996.

Table 6.8 shows the frequency of visits to the eight PHCCs. The detailed breakdown of figures used to compile this table is given in Appendix 5. Most of the patients visited a PHCC more than four times a year and most of these visits involved children. This was partly because of the prevalence of childhood diseases and partly because of the large family size in Arab society. Al-Ribdi (1990) found that in the five communities he studied,

- 9 percent of families comprised one to two persons;
- 17 percent of families comprised two - five persons;
- 44 percent of families comprised six to ten persons, and
- 30 percent eleven or more family members.

Also, from the figures it is evident that married woman were more frequent users of the health service than men and this reflects the normally tendency for women to require access to health care for conditions associated with pregnancy. In this study, it was shown that women were twice as frequent users of the health services than men. It may also indicate that the men prefer to use the private health sector, or that they are less concerned with their health care in general.

**Question 5: Do you have a health record in this PHCC?**

One element of importance to the development of the health services laid out in the first development plan (1970-1975) was to establish a medical registration and record system throughout the Kingdom's hospitals and health centres. A health file is kept for each patient and this is updated every time the patient uses the health care services. Without a health record system it would be possible for a patient to freely visit several doctors in different centres, thereby placing un-necessary pressure on the health care service and possibly receiving conflicting advice or several sets of medicine. With a health record system in operation, a patient can more easily be referred to specialist hospitals for more special advice or treatment. When the record system was not in operation as in the past, a patient was not even asked to give his name and address, and the doctor kept no information to help in the further treatment of the patient. It was not until early 1986 that the M.O.H. began to put a registration and record system into practice.

Table 6.9: Do you have a health record at your PHCC?

| Centres | Women | | | | Men | | | | Children | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | YES | % | NO | % | YES | % | NO | % | YES | % | NO | % |
| Al Balad | 27 | 90 | 3 | 10 | 15 | 100 | - | - | 39 | 84.8 | 7 | 15.2 |
| Bani Malek | 45 | 100 | - | - | 23 | 100 | - | - | 66 | 97 | 2 | 3.0 |
| Madain Al Fahd | 61 | 92.4 | 6 | 3.0 | 33 | 97.1 | 1 | 2.9 | 95 | 94.1 | 6 | 3.9 |
| Al Nuzlah Al Yamaneyyah | 49 | 98 | 1 | 2.0 | 24 | 96 | 1 | 4.0 | 75 | 100 | - | - |
| Al Ruwais | 35 | 94.6 | 2 | 5.4 | 17 | 89.5 | 2 | 10.5 | 54 | 96.4 | 2 | 3.6 |
| Al Safa | 22 | 95.7 | 1 | 4.3 | 12 | 100 | - | - | 35 | 100 | - | - |
| Al Thaalebah | 29 | 100 | - | - | 15 | 100 | - | - | 43 | 97.7 | 1 | 2.3 |
| Al Zahra'a | 49 | 98.0 | 1 | 2.0 | 24 | 96 | 1 | 4.0 | 75 | 98.7 | 1 | 1.3 |

Source: Author's Field Survey, 1996.

Table 6.9 shows that most patients had a health record card in their Health centre. The lowest percentages were found in Al Balad. This is because some patients use the health centres when on visits from another city. Al Balad district contained many small hotels and rented properties that were used by visitors to the city. At the time the questionnaire survey was being made some patients were on their summer holiday to Jeddah and were using the health centre facilities for emergency treatment.

**Question 6: Are you registered in any Private Clinic in Jeddah?**

Table 6.10: Respondents who reported they registered in a private clinic in Jeddah.

| The Centres | Women | | | | Men | | | | Children | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | % | No | % | Yes | % | No | % | Yes | % | No | % | Yes | % | No | % |
| Al Balad | 14 | 15.4 | 16 | 17.6 | 5 | 5.5 | 10 | 11.0 | 26 | 28.6 | 20 | 22.0 | 45 | 49.5 | 46 | 50.5 |
| Bani Malek | 34 | 25.0 | 11 | 8.1 | 11 | 8.1 | 12 | 8.8 | 18 | 13.2 | 50 | 36.8 | 63 | 69.2 | 28 | 30.8 |
| Madain Al Fahd | 39 | 19.3 | 28 | 13.9 | 20 | 9.9 | 14 | 6.9 | 48 | 23.8 | 53 | 26.2 | 107 | 53.0 | 95 | 47.0 |
| Al Nuzlah Al Yamaneyyah | 42 | 28.0 | 8 | 5.3 | 11 | 7.3 | 14 | 9.3 | 67 | 44.7 | 8 | 5.3 | 120 | 80 | 30 | 20 |
| Al Ruwais | 16 | 14.3 | 21 | 18.8 | 15 | 13.4 | 4 | 3.6 | 19 | 17.0 | 37 | 33.0 | 50 | 44.6 | 62 | 55.4 |
| Al Safa | 12 | 17.1 | 11 | 15.7 | 9 | 12.9 | 3 | 4.3 | 21 | 30.0 | 14 | 20.0 | 42 | 36.5 | 73 | 63.5 |
| Al Thaalebah | 18 | 20.5 | 11 | 12.5 | 12 | 13.6 | 3 | 8.4 | 27 | 30.7 | 17 | 19.3 | 57 | 64.8 | 31 | 35.2 |
| Al Zahra'a | 35 | 23.2 | 15 | 9.9 | 10 | 6.6 | 15 | 9.9 | 47 | 31.1 | 29 | 19.2 | 92 | 69.2 | 59 | 49.5 |

Source: Author's Field Survey, 1996.

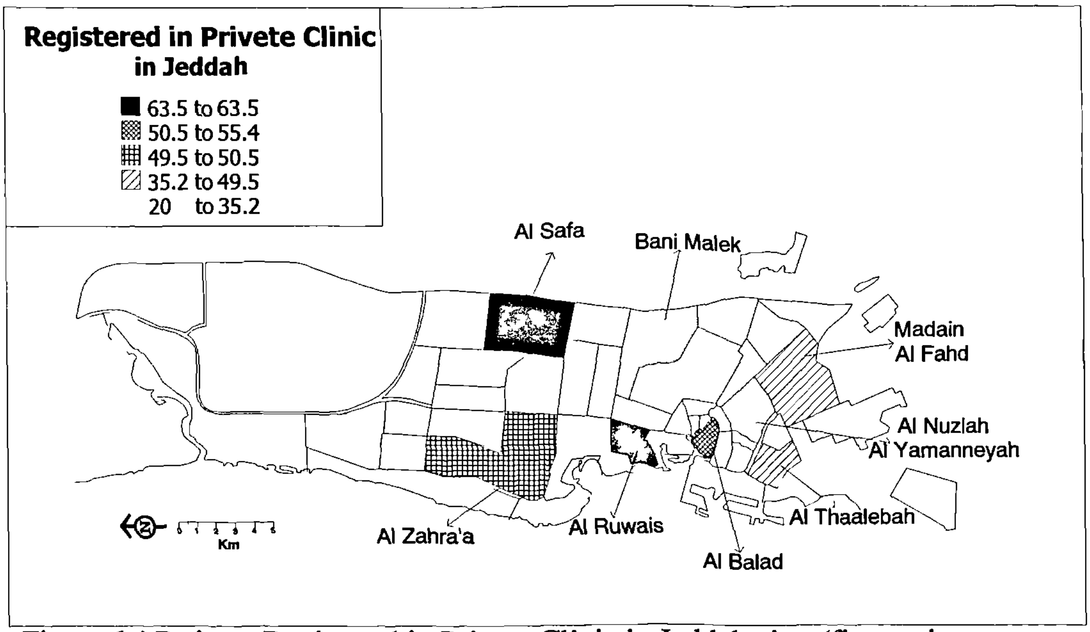



Figure 6.4 Patients Registered in Private Clinic in Jeddah city. (figures in percentage)

Although the questionnaire survey was primary intended to assess the use of the PHCCs, it was considered useful to find out also how many of the patients had made use of private clinics within Jeddah Governorate. A total of more than half of all patients interviewed, 574, were registered at a private health service within the last year, Table 6.10, Figure 6.4. It was more surprising to find that patients living in Al Nuzla Al Yamaneyyah, which were considered as low socio-economic districts, showed the highest response to this question, for instance 44.7 percent children and 28 percent of women in Al Nuzlah Al Yamaneyyah used private facilities for treatment. These patients, as shown in Table 6.11, were mainly using private hospital facilities (14 percent), dispensaries (17.3 percent) and private clinics (3.3 percent).

Women and children showed the highest percentage of private facility users overall, constituting 83.9 percent of all users of private facility compared to 16.1 percent for all men, thus disproving the hypothesis that men prefer to use private health care as suggested on page 187. The variation in the use of PHCC facilities may reflect dissatisfaction with the level of service provided, or a more likely explanation is the use of private facilities for emergency use after 7:00 pm when all PHCCs are closed.

Table 6.11: Other type of private health services used by patients.

| The Centres | Do you use any private services | | Private Hospital | | Dispensary | | Private Clinic | | No answer | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Al Balad | 46 | 50.5 | 13 | 14.3 | 2 | 2.2 | - | - | 30 | 33.0 |
| Bani Malek | 71 | 52.2 | 19 | 14.0 | 5 | 3.7 | 4 | 2.9 | 37 | 27.2 |
| Madain Al Fahd | 95 | 4.7 | 43 | 21.3 | 10 | 5.0 | 6 | 3.0 | 48 | 23.8 |
| Al Nuzlah Al Yamaneyyah | 32 | 21.3 | 21 | 14.0 | 26 | 17.3 | 5 | 3.3 | 66 | 44.0 |
| Al Ruwais | 62 | 55.4 | 15 | 13.4 | 6 | 5.4 | 3 | 2.7 | 26 | 23.2 |
| Al Safa | 28 | 40 | 13 | 18.6 | 4 | 5.7 | 7 | 10.0 | 18 | 25.7 |
| Al Thaalebah | 31 | 35.2 | 11 | 12.5 | 8 | 9.1 | - | - | 38 | 43.2 |
| Al Zahra'a | 59 | 39.1 | 59 | 39.1 | 13 | 8.6 | 3 | 2.0 | 17 | 11.3 |

Source: Author's Field Survey, 1996.

### Question 7: Do you visit this health centre alone or with a family member?

Table 6.12 and Figure 6.5, show that more than three quarters of patients were accompanied by at least one family member and this was especially the case for children and women. The writer noted that many younger visitors to the health centre were not actually patients but were accompanying an elder person. In general, the writer found that male patients usually came alone. A visit to the clinic was seen by many patients as forming a part of their social habit and allowed conversation with friends.

Table 6.12: Visiting health care alone or with family member?

| The Centres | Together | | Alone | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Al Balad | 78 | 85.7 | 13 | 14.3 |
| Bani Malek | 100 | 73.5 | 36 | 26.5 |
| Madain Al Fahd | 144 | 71.3 | 58 | 28.7 |
| Al Nuzlah Al Yamaneyyah | 132 | 88 | 18 | 12 |
| Al Ruwais | 83 | 74.1 | 29 | 25.9 |
| Al Safa | 59 | 84.3 | 11 | 15.7 |
| Al Thaalebah | 60 | 68.2 | 28 | 31.8 |
| Al Zahra'a | 122 | 80.8 | 29 | 19.2 |
| Total | 778 | 77.8 | 222 | 22.2 |

Source: Author's Field Survey, 1996.

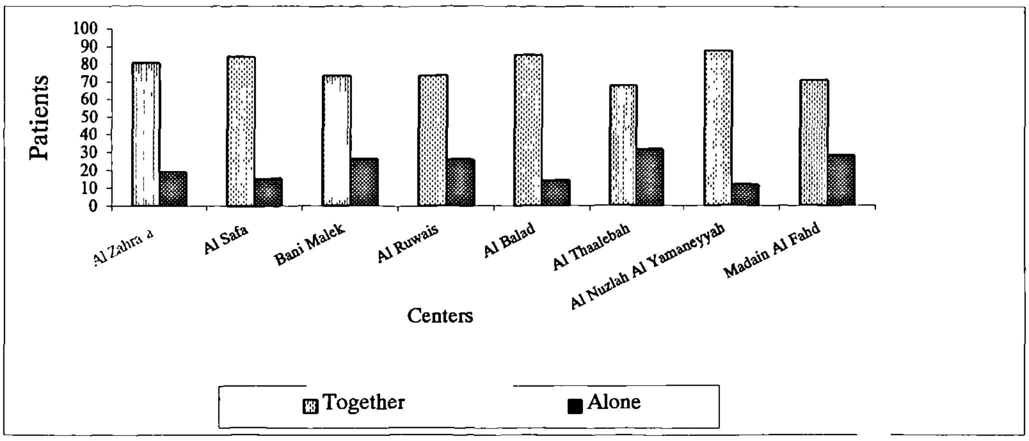



Figure 6.5 Percentage of respondents who visited health care centre alone or with family member.

**Question 8: Is this health centre the one that you usually use?**

Table 6.13; show that 85.1 percent of respondents used a specific health centre. Only 14.9 percent claimed that the centre at which they were interviewed was not their usual centre.

Table 6.13: Is this health centre the one that you usually use?

| The Centres | YES | | NO | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Al Balad | 77 | 89.6 | 14 | 15.4 |
| Bani Malek | 115 | 84.6 | 21 | 15.4 |
| Madain Al Fahd | 159 | 78.7 | 43 | 21.3 |
| Al Nuzlah Al Yamaneyyah | 129 | 86.0 | 21 | 14.0 |
| Al Ruwais | 101 | 90.2 | 11 | 9.8 |
| Al Safa | 59 | 84.3 | 11 | 15.7 |
| Al Thaalebah | 83 | 94.3 | 5 | 5.7 |
| Al Zahra'a | 128 | 84.8 | 23 | 15.2 |
| Total | 851 | 85.1 | 149 | 14.9 |

Source: Author's Field Survey, 1996.

The reasons for not previously using the health centre are given in Table 6.14 It can be seen that the four reasons are roughly equal in proportion.

Table 6.14: Reasons for not using the PHCC.

| The Centres | Because we do not know about the health centre before | Because the medical service is not good | Because it is too far | Because the opening time is not suitable |
|---|---|---|---|---|
| Al Balad | 5 | 4 | 3 | 2 |
| Bani Malek | 6 | 5 | 2 | 8 |
| Madain Al Fahd | 5 | 11 | 17 | 10 |
| Al Nuzlah Al Yamaneyyah | 5 | 10 | 2 | 4 |
| Al Ruwais | 2 | 8 | - | 1 |
| Al Safa | 1 | 7 | 1 | 2 |
| Al Thaalebah | - | - | 4 | 1 |
| Al Zahra'a | 9 | 6 | 3 | 5 |
| Total | 33 (22%) | 51 (34%) | 32 (21%) | 33 (22%) |

Source: Author's Field Survey, 1996

**Question 9: In the last twelve months, have you ever used another clinic in Jeddah?**

Question 8 had shown that the majority of patients used the clinic in their district. However, the writer thought it is useful to examine the option of using health services provided at other clinics within Jeddah and also in other regions of the country. This might also show how respondents ranked their own clinics against other health service providers they had used.

Two questions were asked on this topic and Tables 6.15 and 6.16 provide the results. Table 5.12 shows that there was an almost equal distribution between patients using only one clinic and patients using other clinics. There was little variation in values between the eight districts. The writer tried to pinpoint the most important factor behind utilisation of private clinics, cross matching was done for the monthly income against the utilization of private clinics Table 6.16, it revealed that there was a statistically significant difference between different groups p<0.05. As expected, most of respondents ranked as high socio-economic are utilizing private clinics, the reverse was the case for low socio-economic are utilizing private clinics, the reverse was the case for low socio-economic group, while there were almost equal distribution among medium soci-economic group.

Table 6.15: Number of respondents who reported they had visited another clinic in Jeddah in the last 12 months.

| The Centres | YES | | NO | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Al Balad | 34 | 37.4 | 57 | 62.6 |
| Bani Malek | 71 | 52.3 | 65 | 47.9 |
| Madain Al Fahd | 89 | 44.1 | 113 | 55.9 |
| Al Nuzlah Al Yamaneyyah | 79 | 52.7 | 71 | 47.3 |
| Al Ruwais | 50 | 44.6 | 62 | 55.4 |
| Al Safa | 38 | 54.3 | 32 | 45.9 |
| Al Thaalebah | 49 | 55.7 | 39 | 44.3 |
| Al Zahra'a | 75 | 49.7 | 76 | 49.3 |
| T o t a l | 485 | 48.5 | 515 | 51.5 |

Source: Author's Field Survey, 1996.

Table 6.16: Relation between utilisation of private clinics and the monthly income.

| Level of Income | Yes | | No | | Total | |
|---|---|---|---|---|---|---|
| | No | % | No | % | No | % |
| Low Socio-economic | 51 | 37.5 | 85 | 62.5 | 136 | 13.6 |
| Medium Socio-economic | 361 | 48.3 | 386 | 51.7 | 747 | 74.7 |
| High Socio-economic | 73 | 62.4 | 44 | 37.6 | 117 | 11.7 |
| Total | 485 | 48.5 | 515 | 51.5 | 1000 | 100 |

Chi-sq = 15.63879 DF= 2 p< .00040

Source: Author's Field Survey, 1996.

When the respondents were asked about the place that had made most improvements of their health, 19.3 % said the it was a health centre other than their local PHCC, while 15.89 % replied that could detect no difference and 13.4 % claimed that their own health centre had treated them successfully, see Table 6.17.

Table 6.17: Number of respondents who reported they had visited another clinic in Jeddah in the last 12 months and the influence this had on their health.

| The Centres | This Health Centre | | Other Place | | No Difference | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Al Balad | 16 | 12.6 | 9 | 9.9 | 9 | 9.9 |
| Bani Malek | 23 | 16.9 | 22 | 16.2 | 26 | 19.1 |
| Madain Al Fahd | 18 | 8.9 | 32 | 15.8 | 39 | 19.3 |
| Al Nuzlah Al Yamaneyyah | 31 | 20.7 | 26 | 17.3 | 22 | 14.7 |
| Al Ruwais | 23 | 20.5 | 12 | 10.7 | 15 | 13.4 |
| Al Safa | 4 | 5.7 | 22 | 31.4 | 12 | 17.1 |
| Al Thaalebah | 2 | 2.3 | 39 | 44.3 | 8 | 9.1 |
| Al Zahra'a | 17 | 11.3 | 31 | 20.5 | 27 | 17.9 |
| Total | 134 | 13.4 | 193 | 19.3 | 158 | 15.8 |

Source: Author's Field Survey, 1996.

**Questions 10: Have you visited another clinic or hospital in another regions of the kingdom in the last twelve months?**

and

**Question 11: Do you think you would get better treatment in Riyadh (capital) than treatment in any place in Jeddah City?**

Almost a quarter of respondents had visited a health facility in another part of the kingdom in the past twelve months. The proportion using other locations varied, as shown in Table 6.15. Al Balad and Al Thaalebah districts had the lowest number of patients using other health facilities and it was noteworthy that these two districts had the lowest average incomes recorded in the questionnaire (see Table 6.34). The respondents indicated that they expected that they would find better treatment in other clinics or hospitals, especially those in Riyadh district, because they felt that more specialised services existed there, for example, heart surgery, kidney transplant, cancer treatment (King Faisal Specialist Hospital). However, the majority (76.2 percent) of respondents believed that they would get satisfactory treatment by using local medical facilities. In the case of health care for children, 80 percent of respondents thought that Jeddah district would provide satisfactory treatment. However, as 76.2 percent of the respondents had not experienced treatment outside their area, they would have had no means of comparing the level of health care provision elsewhere.

Table 6.18: Number of respondents who reported they had visited another clinic or hospital in another region (s) in the kingdom in the last 12 months.

| The Centres | YES | | NO | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Al Balad | 7 | 7.7 | 84 | 92.3 |
| Bani Malek | 44 | 32.4 | 92 | 67.6 |
| Madain Al Fahd | 56 | 27.7 | 146 | 72.3 |
| Al Nuzlah Al Yamaneyyah | 53 | 35.3 | 97 | 64.7 |
| Al Ruwais | 23 | 20.5 | 89 | 79.5 |
| Al Safa | 17 | 24.3 | 53 | 75.7 |
| Al Thaalebah | 15 | 17.0 | 73 | 83.0 |
| Al Zahra'a | 23 | 15.2 | 128 | 84.8 |
| Total | 238 | 23.8 | 762 | 76.2 |

Source: Author's Field Survey, 1996.

**Question 12: In the last 12 months, have you visited a local folk traditional healer(s) for treatment or advice?**

Table 6.19: Number of respondents who reported they visited a traditional healer in the last twelve months:

| The Centres | YES | | NO | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Al Balad | 5 | 5.5 | 86 | 94.5 |
| Bani Malek | 34 | 2.5 | 102 | 75.0 |
| Madain Al Fahd | 24 | 11.9 | 178 | 88.1 |
| Al Nuzlah Al Yamaneyyah | 53 | 35.3 | 97 | 64.7 |
| Al Ruwais | 14 | 12.5 | 98 | 87.5 |
| Al Safa | 9 | 12.9 | 61 | 87.1 |
| Al Thaalebah | 19 | 21.6 | 69 | 78.4 |
| Al Zahra'a | 14 | 9.3 | 137 | 90.7 |
| Total | 172 | 17.2 | 828 | 82.8 |

Source: Author's Field Survey, 1996.

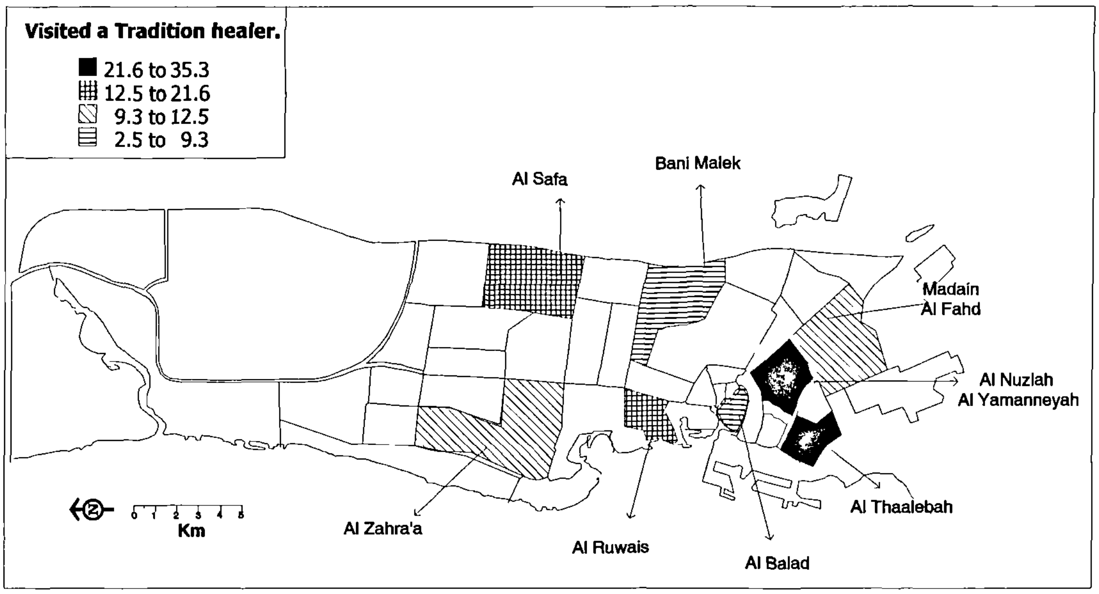



Figure 6.6 Percentage of respondents who reported they visited a traditional healer in the last twelve months.

Table 6.20: Attitudes to use of traditional healing by sex in eight PHCC

| The Centres | Women | | | | Men | | | | Children | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | | No | | Yes | | No | | Yes | | No | | Yes | | No | |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No | % | No | % |
| Al Balad | 4 | 4.4 | 26 | 28.6 | - | - | 15 | 16.5 | 1 | 1.1 | 45 | 49.5 | 5 | 5.5 | 86 | 94.5 |
| Bani Malek | 25 | 18.4 | 20 | 14.7 | 4 | 2.9 | 19 | 14.0 | 5 | 3.7 | 63 | 46.3 | 34 | 25 | 102 | 75 |
| Madain Al Fahd | 12 | 5.9 | 55 | 27.2 | - | - | 34 | 16.8 | 12 | 5.9 | 89 | 44.1 | 24 | 11.9 | 178 | 88.1 |
| Al Nuzlah Al Yamaneyyah | 20 | 13.3 | 30 | 20.0 | 2 | 1.3 | 23 | 15.3 | 31 | 20.9 | 44 | 29.3 | 53 | 35.3 | 96 | 64 |
| Al Ruwais | 7 | 6.3 | 30 | 26.8 | 3 | 2.7 | 16 | 14.3 | 4 | 3.6 | 52 | 46.4 | 14 | 12.5 | 98 | 87.5 |
| Al Safa | 2 | 2.9 | 21 | 30.0 | 2 | 2.9 | 10 | 14.3 | 5 | 7.1 | 30 | 42.9 | 9 | 12.9 | 61 | 87.1 |
| Al Thaalebah | 6 | 6.8 | 23 | 26.1 | 10 | 11.4 | 5 | 5.7 | 3 | 3.4 | 41 | 46.6 | 19 | 21.6 | 69 | 78.4 |
| Al Zahra'a | 4 | 2.6 | 46 | 30.5 | 2 | 1.3 | 23 | 15.2 | 8 | 5.3 | 68 | 45.0 | 14 | 9.3 | 137 | 90.7 |

Source: Author's Field Survey, 1996.

Table 6.19 and Figure 6.6 showed that the highest use of alternative medicine was recorded in Al Nuzlah Al Yamaneyyah, followed by Bani Malek and Madain Al Fahad. Additionally, the study showed that 17.2 percent of the users of the modern public health services had also made at least one visit to a folk healer in the previous 12 months . Most of these were women and children, amounted to 134 collectively.

Table 6.21: Distribution of alternative medicine users by nationality

| | Nationality | | | |
|---|---|---|---|---|
| | Saudi | | Non Saudi | |
| | No. | % | No | % |
| Using alternative medicine | 134 | 18.9% | 38 | 11.4% |
| Not using alternative medicine | 645 | 81.1% | 183 | 88.7% |
| Total | 779 | 100% | 221 | 100% |

Source: Author's Field Survey, 1996.

Table 6.22: Result of Kruskal-Wallis (H), 1-Way ANOVA and Mann--Whitney (U) between using traditional folk healing and some of socio-economic characteristics by eight PHCC.

| Various of Socio-Economic | Type of Traditional Healing |
|---|---|
| - Nationality | (.0086)** |
| - Age | (.0027)** |
| - Education | Ns (.1241) |
| - Category described the respondents | (.0005)** |
| Monthly income | Ns (.1592) |

Source: Authors Field Survey, 1996.

Ns = Non-Significant
Significance Level = 95 percent (0.05) **

representing 86.6 percent of all users, Table 6.20. The results of questions concerning the use of folk healing services indicated that individual patient factors were by far the most important factors regarding the use of traditional (alternative) health care methods.

Table 6.21 showed that Saudi users of folk healers amounted to 134 patients representing 18.9 percent of all Saudi patients population in the study. Non-Saudi users of folk healers amounted to 38 patients, representing 11.4 percent of all non-Saudi patients included in the study. Table 6.22 showed that there was a statistically significant difference regarding use of traditional healers. The relation between nationality and using folk healers had a significant difference of $P<0.05$. There was also a statistically significant difference regarding the use of traditional healers and the age of respondents, with those over fifteen years old and female representing 46.5 percent of users and children under fourteen years old (40.1 percent) from the total answered 'Yes' to the use of traditional healing. No significant difference was found between the use of traditional healers and the education level of the respondents, $P<0.05$. This result suggested that anyone can use traditional folk healing regardless of the level of education. There was a significant difference between the respondent's occupation (category described by themselves). In some instances, for example students and children, the response was high, (58.9 percent). There was a non-significant difference found between monthly income and use of traditional healers.

This result was unusual in that it did not produce a statistically strong significant result.

### 6.2.2 Part Two: Questions 13 – 14 Accessibility and Utilisation of Primary Health Care Service:

**Question 13: What type of transportation use to reach to this health centre?**

and

**Question 14: How long does it take by car to reach this health centre from your home?**

The location of health care facilities is a major aspect of any health care services operation. The primary health care should ideally be centralised to be optimally accessible for the greatest number of the population, so that people can reach it in the minimum time and for the least cost. The location of health services is important to people of different classes, level of income and ages. Hunter (1974), stated that location planning must take into account the scope of services to be provided, the dimension of the catchments area, the geographical distribution of the population and the rate of increase in the number of residents within the planned area and pointed out that " . . . . . *physical proximity is an important factor in accessibility and utilisation of health care resources*". Meade *et al.* (1988) noted that a measure of road distance could be weighted by road quality to assess user accessibility. Meade added, "*In societies where time is often more important than distance, the time it takes to reach a facility may be the best measure. The degree of patient mobility, which involves the type of transportation available, is also implicated in distance measures* . . . . . . .. (pp. 306-308).

For those reasons two measures have been used in this section: travel time and type of transport are considered to be better indicators of the influence of accessibility on use of primary health care services.

Table 6.23 and Figure 6.7 shows that 63.3 percent of the respondents reached the primary health care centres by car (private car, taxi, friend's car, or bus). In general, most of the patients had a car. Table 6.42 shows that even those who lived in the south of Jeddah used private transport. Table 6.24 and Figure 6.8 show that 45.1 percent of the respondents were reached the PHCC less than 5 minutes and 41.6 percent were reached between 6-15 minutes, this showed that the location of the PHCCs were readily accessible. There were significant difference as regards the time taken to reach the PHCC and the type of transportation $P<0.05$. This emphasised that the location for PHCC was in a suitable place and that most of the respondents reached the health centre in less than 15 minutes.

Table 6.23: Method of transport used to get to primary health care centre.

| The Centres | Walking | | Bus | | Private Car | | Taxi | | Friend's Car | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Al Balad | 51 | 56.0 | 2 | 2.2 | 21 | 23.1 | 16 | 17.6 | 1 | 1.1 |
| Bani Malek | 34 | 25.0 | 2 | 1.5 | 87 | 64.0 | 10 | 7.4 | 3 | 2.2 |
| Madain Al Fahd | 62 | 30.7 | 1 | 0.5 | 121 | 59.9 | 17 | 8.4 | 1 | 0.5 |
| Al Nuzlah Al Yamaneyyah | 76 | 50.7 | 2 | 1.3 | 61 | 40.7 | 11 | 7.3 | - | - |
| Al Ruwais | 63 | 56.3 | 2 | 1.8 | 36 | 32.1 | 8 | 7.1 | 3 | 2.7 |
| Al Safa | 10 | 14.3 | 1 | 1.4 | 54 | 77.1 | 4 | 5.7 | 1 | 1.4 |
| Al Thaalebah | 33 | 37.5 | - | - | 29 | 33.0 | 23 | 26.1 | 3 | 3.4 |
| Al Zahra'a | 38 | 25.2 | 2 | 1.3 | 104 | 68.9 | 7 | 4.5 | - | - |
| Total | 367 | 36.7 | 12 | 1.2 | 513 | 51.3 | 96 | 9.6 | 12 | 1.2 |

Source: Author's Field Survey, 1996.

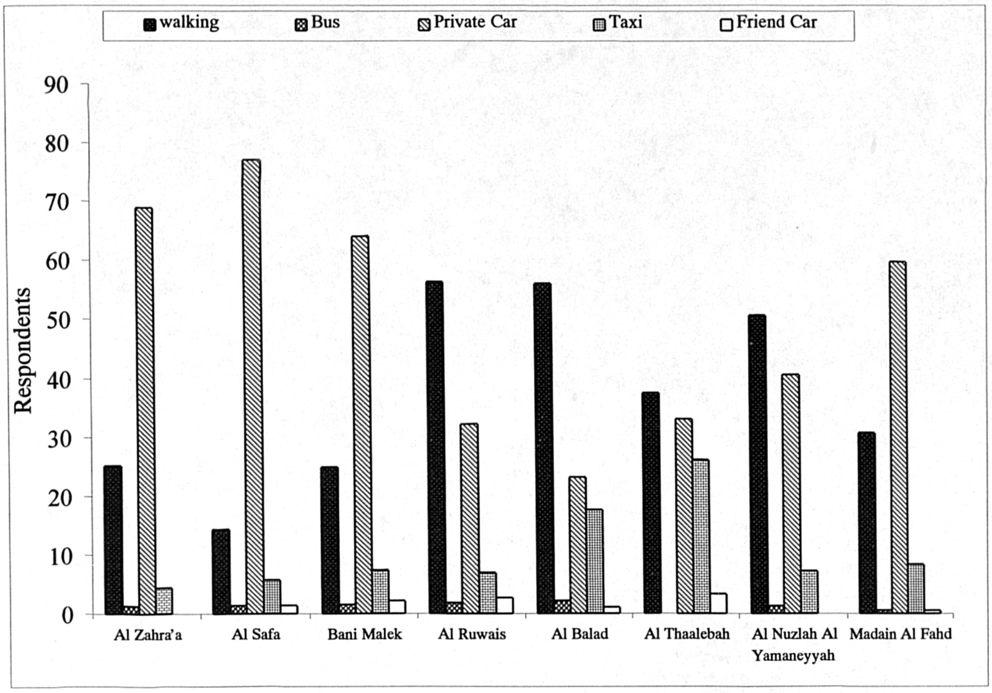



Figure 6.7 Method of transport used to get to primary health care centre.

Table 6.24: Time taken to reach the primary health care centre.

| The Centres | < 5 min | | 6-15 min | | 16 - 30 min | | 31 - 45 min | | 46 - 60 min | | > 60 min | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No | % | No | % | No | % | No | % | No | % |
| Al Balad | 40 | 43.9 | 44 | 48.4 | 4 | 4.4 | 3 | 3.3 | 0 | - | - | - |
| Bani Malek | 60 | 44.1 | 62 | 45.8 | 11 | 8.1 | 2 | 1.4 | 1 | 0.7 | - | |
| Madain Al Fahd | 89 | 44.1 | 88 | 43.6 | 22 | 10.8 | 3 | 1.5 | 0 | - | - | - |
| Al Nuzlah Al Yamaneyyah | 79 | 52.8 | 45 | 30 | 19 | 12.7 | 3 | 2 | 1 | 0.7 | 3 | |
| Al Ruwais | 61 | 54.4 | 31 | 27.7 | 17 | 15.2 | 1 | 0.9 | 1 | 0.9 | 1 | 0.9 |
| Al Safa | 27 | 38.6 | 33 | 47.2 | 8 | 11.4 | 1 | 1.4 | 1 | 1.4 | - | |
| Al Thaalebah | 25 | 28.4 | 47 | 53.4 | 13 | 14.8 | 2 | 2.3 | 1 | 1.1 | - | - |
| Al Zahra'a | 70 | 46.4 | 66 | 43.7 | 13 | 8.6 | 2 | 1.3 | 0 | | - | |
| Total | 451 | 45.1 | 416 | 41.6 | 107 | 10.7 | 17 | 1.7 | 5 | 0.5 | 4 | 0.4 |

Source: Author's Field Survey, 1996.

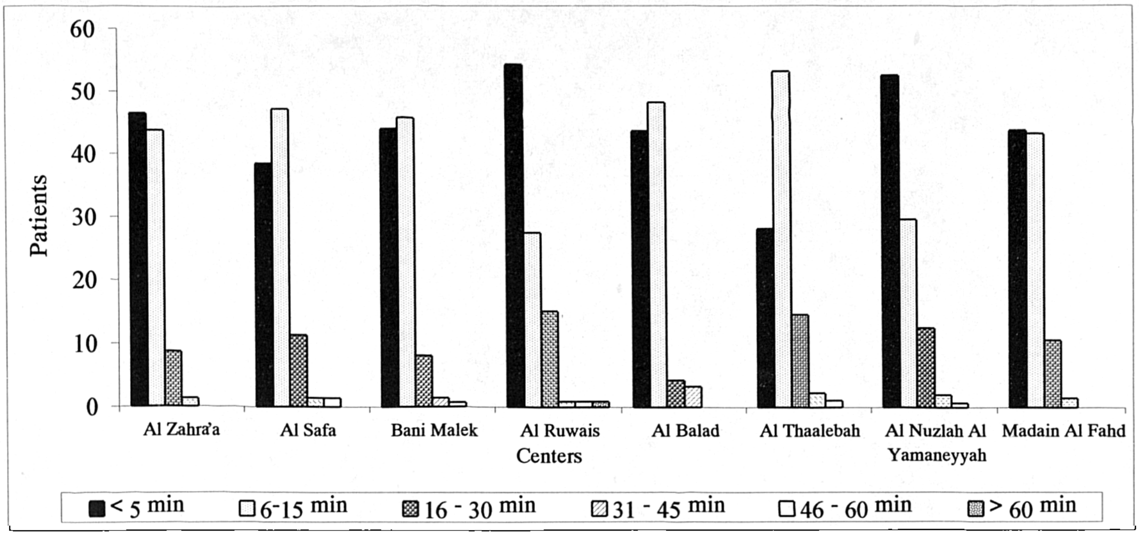



Figure 6.8 Time to reach the primary health care centre.

### 6.2.3 Part Three: Questions 15 – 29 Demographic and Socio-Economic Characteristics:

## Question 15: Age Group:

Age could be expected to be an important influence on a person's use of the primary health care services. Table 6.25 and Figure 6.9 shows the age breakdown of the 1000 respondents. Children under 15 years were most numerous and accounted for exactly 50 percent of the sample. Each successively older cohort produced fewer respondents, so that the age category 15-44 accounted for 42.8 percent of the sample, and the age category 45-65 accounted for 6.6 percent, and the age group 65+ only 1.1 percent. The distribution of age groups derived from the questionnaire was largely in accordance with the official census data and helped verify that the sample was representative of the total population of Saudi Arabia.

Table 6.25: Age distribution of the user's primary health care services in eight PHCC in Jeddah Governorate.

| The Centres | < 1 year | | 1 - 4 Years | | 5-14 years | | 15 - 44 years | | 45 - 64 years | | > 65 years | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Al Zahra'a | 25 | 16.6 | 24 | 15.9 | 27 | 17.9 | 71 | 47.0 | 4 | 2.6 | - | - |
| Al Safa | 2 | 2.9 | 11 | 15.7 | 22 | 31.4 | 32 | 45.7 | 3 | 4.3 | - | - |
| Bani Malek | 11 | 8.1 | 38 | 27.9 | 19 | 14.0 | 57 | 41.9 | 9 | 6.6 | 2 | 1.5 |
| Al Ruwais | 11 | 9.8 | 26 | 23.2 | 18 | 16.1 | 48 | 42.9 | 7 | 6.3 | 2 | 1.8 |
| Al Balad | 6 | 6.6 | 14 | 15.4 | 28 | 30.8 | 31 | 34.1 | 11 | 12.1 | 1 | 1.1 |
| Al Thaalebah | 4 | 4.5 | 13 | 14.8 | 26 | 29.5 | 28 | 31.8 | 14 | 15.9 | 3 | 3.4 |
| Al Nuzlah Al Yamaneyyah | 18 | 12.0 | 12 | 8.0 | 44 | 29.3 | 70 | 46.7 | 5 | 3.3 | 1 | 0.7 |
| Madain Al Fahd | 9 | 4.5 | 18 | 8.9 | 79 | 36.6 | 86 | 42.6 | 13 | 6.4 | 2 | 1.0 |
| Total | 86 | 8.6 | 156 | 15.6 | 258 | 25.8 | 428 | 42.8 | 66 | 6.6 | 11 | 1.1 |

Source: Author's Field Survey, 1996.

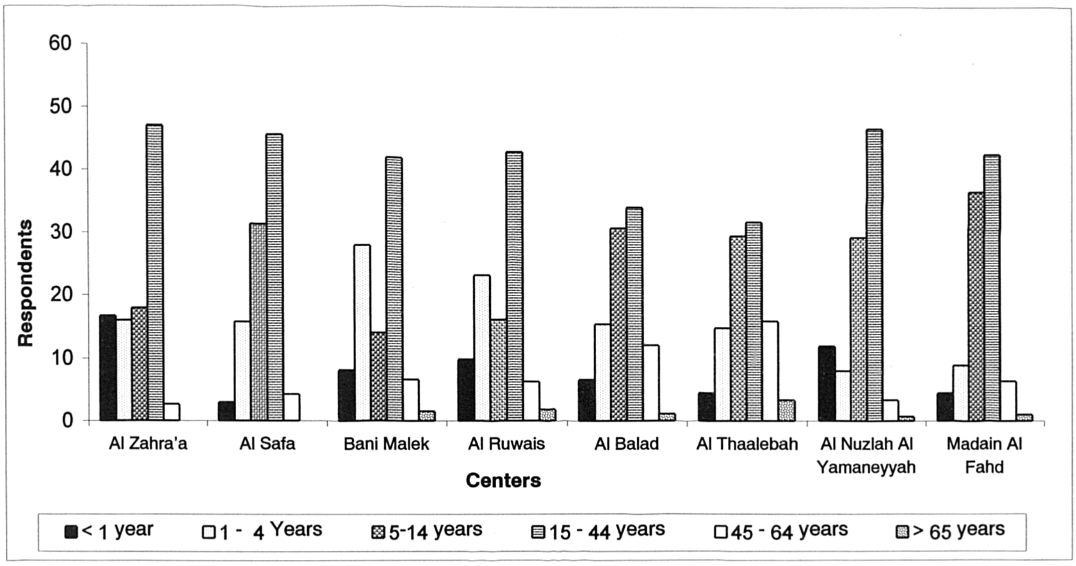



Figure 6.9 Age Groups For Respondents.

The age distribution of sample reflected a feature that is common in most developing countries that the majority of the population falls in the younger age groups. Saudi Arabia is no exception. The crude birth rate for Saudi Arabia is 35.8 compared to the world average of 26.0 (World Bank Report, 1994).

Many studies have considered age in relation to the utilization of the health services. It is presumed that the lower the age then the greater the utilization rate of the health services, since the younger age groups are associated with specific diseases. Other studies have attributed the high percentage of people under 44 years of age using the services to the fact that they are of working age and therefore, have to take care of their health (Al-Kalifah *et.al.* 1993). There was also a strong statistically significant relationship between the age groups and the time frequencies for using the PHCC, $P<0.05$, with marked skewness towards younger age groups. This can be attributed to the fact that children are more prone to acquire particular diseases that are exclusive for this age group, e.g. health problems associated with artificial feeding and weaning, preventable diseases of children as measles, mumps, German measles and chicken pox, in addition to nutritional disorders which are prominent feature in growing age group.

## Question 16: Marital Status

Table 6.26 shows there was no significant difference between occupation and marital status.

Table 6.26: Respondent distribution of study group according to occupation and marital status.

| Occupation | Married | | Single | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Government employee | 96 | 82.8 | 20 | 17.2 |
| Private sector employed | 20 | 71.4 | 8 | 28.6 |
| Housewife | 211 | 91.3 | 20 | 8.7 |
| Self employed | 17 | 89.5 | 2 | 10.5 |
| Unemployed | 10 | 71.4 | 4 | 28.6 |
| Total | 354 | 86.8 | 54 | 13.2 |

Children (below 15 years old) are excluded from the table, as marital status is not applicable to them. Source: Author's Field Survey, 1996.

## Question 17: Residence Place of Respondents:

Appendix 6 shows the districts in which the sample set of patients lived. As already explained in Chapter Two, some PHCCs serve more than one district. Normally, patients are required to use their local Primary Health Care Centres and also to use their own family files for updating medical records. Sometimes, patients use another PHCC on a temporary basis, or because some equipment is not available in their local PHCC. In this case, the patients are officially transferred from their PHCC to anther for treatment.

Table 6.27: Respondents distribution by eight PHCC and place of residence.

| PHCC | The Districts served | Women | | Men | | Children | | Total% |
|---|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % | |
| Al Zahra'a | Al Zahra'a | 43 | 28.5 | 18 | 11.9 | 58 | 38.4 | 78.8 |
| | Al Rawdah | 7 | 4.6 | 5 | 3.3 | 12 | 11.3 | 19.2 |
| | Al Kahledeyyah | | | 2 | 1.3 | 1 | 0.7 | 2.0 |
| Al Safa | Al Safa | 23 | 32.9 | 12 | 17.1 | 35 | 50 | 100 |
| Bani Malek | Bani Malek | 45 | 33.1 | 23 | 16.9 | 68 | 50 | 100 |
| | Al Nassem | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Al Ruwais | Al Ruwais | 37 | 33.0 | 19 | 17.0 | 56 | 50 | 100 |
| Al Balad | Al Balad | 29 | 31.9 | 16 | 17.6 | 46 | 50.5 | 100 |
| Al Thaalebah | Al Thaalebah | 29 | 33 | 15 | 17 | 44 | 50.0 | 100 |
| | Petromin | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Al Nuzlah Al Yammaneyyah | Al Nuzlah Al Yammaneyyah | 50 | 33.3 | 25 | 16.7 | 75 | 50 | 100 |
| | Al Nuzlah Al Sharqeyyah | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Madain Al Fahad | Madain Al Fahad | 67 | 33.2 | 34.0 | 16.8 | 101 | 50 | 100 |
| | Al Wazireyyah | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Source: Author's Field Survey, 1996.

## Question 18: The length of stay for the Respondents in their districts:

Table 6.28 and Figure 6.10 shows the duration patients have lived in their districts. Most of them have been resident for more than five years especially those living in the older southern districts of Jeddah. There were strong statistically significant results between the number of visits to the PHCC and the length of stays P<0.05. This demonstrated that long staying persons made more use of the local district's PHCC.

Table 6.28: Length of stay of respondents by districts.

| | Al Safa | Al Zahra'a | Bani Malek | Al Ruwais | A Balad | Al Thaalebah | Al Nuzlah Alyammaneyah | Madain Al Fahad |
|---|---|---|---|---|---|---|---|---|
| Less than 1 year | 7.3 | 12.9 | 5.9 | 1.8 | 4.4 | 3.4 | 14.7 | 3.5 |
| Less than 2 year | 8.6 | 2.9 | 5.1 | 0.9 | 7.7 | 3.4 | 2.7 | 7.4 |
| Less than 5 year | 24.5 | 30.0 | 18.4 | 13.4 | 28.6 | 15.9 | 12.0 | 19.3 |
| More than 5 years | 59.6 | 54.3 | 70.4 | 83.9 | 59.3 | 77.3 | 70.7 | 69.8 |

Source: Author's Field Survey, 1996.

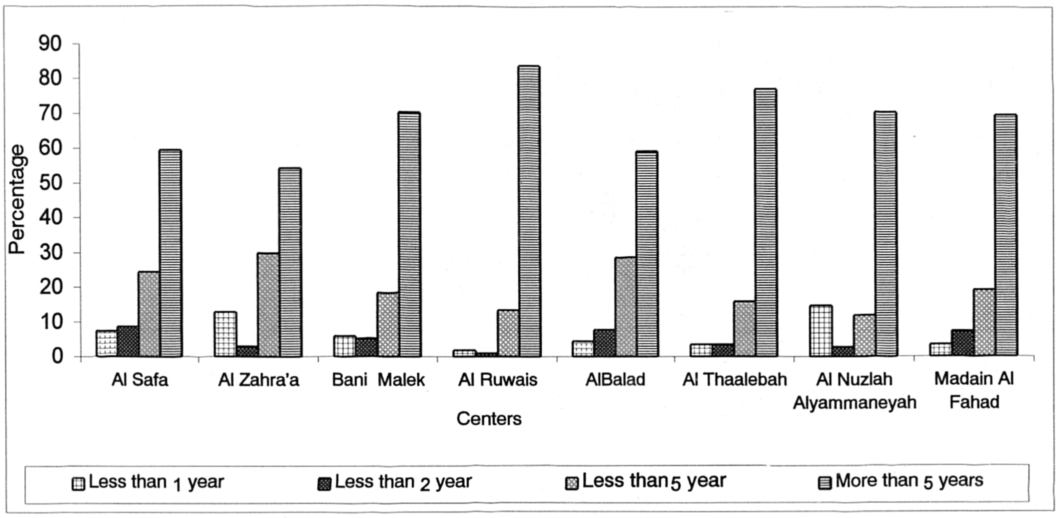



Figure 6.10, Length of stay of respondents by districts.

## Question 19: The Level of Education of the respondents

The analysis of the population sample in relation to their level of education revealed that a high proportion of the respondents had a formal education albeit at a low level. Before interpreting and commenting on the result in Table 6.29, a brief explanation of the Saudi education system is necessary. Formal education in Saudi Arabia starts at age six years. A child at this age is enrolled in a primary school for six years, and then goes to an intermediate school for three years, after that to secondary school for another three years then possibly to university or college. However, some people have not acquired any type of formal education, although they can read and write. Another group have been trained specifically in Islamic studies and acquired their learning from traditional sources such as Qura'nic education centres. This group of people can read and write fluently and may actually be teachers or scholars in their own field. However, because they do not hold any official degree, they classify themselves and are classified officially as "*can read and write*". For purposes of analysis and statistical interpretation, the education status of the respondents was categorised into three categories.

Low education included those without any schooling or who had not completed the full six years of primary education. Medium education included those who had completed elementary or middle level school. High education included those who had attended secondary school and those with a university degree. Table 6.29 and Figure 6.11, shows the distribution of respondents in selected PHCC and level of education. More than 66 percent of the total respondents were classified as having low-level education. These were dominant in three areas located in the old part of Jeddah Governorate. It is clear in the statistical test that there were significant differences between the eight PHCC as regards to distribution of respondents according to their level of education.

Table 5.29 Respondents distribution by eight PHCC and level of education.

| PHCC | Low | Medium | High |
|---|---|---|---|
| Al Zahra'a | 58.9 | 11.3 | 29.8 |
| Al Safa | 55.7 | 18.6 | 25.7 |
| Bani Malek | 73.5 | 7.4 | 19.1 |
| Al Ruwais | 61.7 | 14.3 | 24.0 |
| Al Balad | 72.6 | 11.0 | 16.4 |
| Al Thaalebah | 84.0 | 8.0 | 8.0 |
| Al Nuzlah Al Yamaneyyah | 66.7 | 10.0 | 23.3 |
| Madain Al Fahd | 67.8 | 17.8 | 14.4 |

Source: Author's Field Survey, 1996.

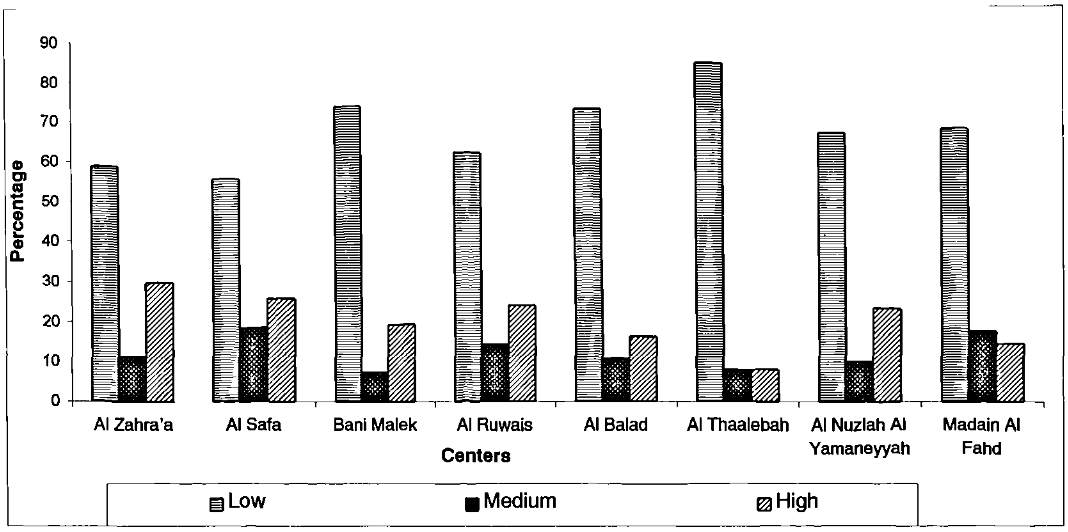



Figure 6.11, Place of domicile and level of education for eight PHCCs.

There was a significance difference in the level of education and the place of living, P<0.05. This result confirmed that the people living in the southern districts of Jeddah differed in respect from those of the northern districts with the southern districts typified by people with lower levels of education.

## Question 20: Nationality of the respondents

In Saudi Arabia, due to the shortage of indigenous manpower, the implementation of the ambitious development plans since the 1970s has necessitated the presence of a high percentage of non-Saudi employees who work in various public and private sectors. These non-Saudis are of varying nationalities, coming from both developed and developing countries.

Table 6.30 and Figure 6.12 shows that 83.2 percent of the total sample of respondents was Saudi and 16.8 percent were non-Saudi. This distribution was anticipated for the reason explained in Section 2.4.4. Only a few groups of non-Saudi used the PHCC health facilities and these were normally restricted to employees working in the government apparatus who are allowed to use the public sector medical services. The Ministry of Labour and Social Affairs has stipulated that every firm, enterprise, or organization employing more than twenty persons should provide them with medical care, either within the company's private clinic or by contracting with the private medical sector. This means that non-Saudi need only have limited access to the public health services.

Table 6.30: Respondent's distribution by PHCC and nationality.

| The Centres | Saudi | | Non-Saudi | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Al Zahra'a | 116 | 76.8 | 35 | 23.2 |
| Al Safa | 59 | 84.3 | 11 | 15.7 |
| Bani Malek | 109 | 80.1 | 27 | 19.9 |
| Al Ruwais | 78 | 69.6 | 34 | 30.4 |
| Al Balad | 48 | 52.7 | 43 | 47.3 |
| Al Thaalebah | 64 | 72.7 | 24 | 27.3 |
| Al Nuzlah Al Yamaneyyah | 137 | 91.3 | 13 | 8.7 |
| Madain Al Fahd | 168 | 83.2 | 34 | 16.8 |

Source: Author's Field Survey, 1996.

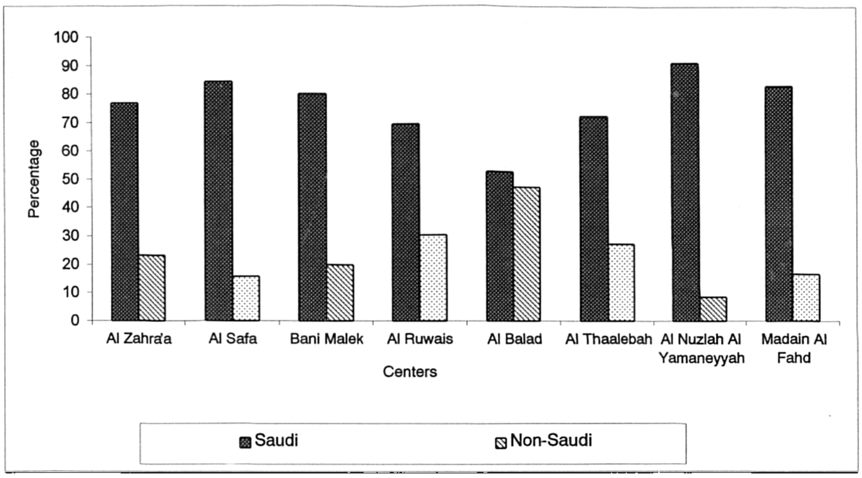



Figure 6.12, Nationality of the respondents.

Al-Baz (1992) reported that the Al-Riyadh Directorate of the PHC was enforcing a rule that only Saudi and government employees should receive treatment in health centres. He asserted that the policy was implemented because the Health Directorate was under pressure from owners of private clinics and hospitals to force non-Saudi worker's to purchase health services from the private sector.

## Question 21: Place of birth

Table 6.31 shows distribution of Saudi respondents according to their place of birth. It is evident that most of them (88.6%) originated from within K.S.A, while others (11.4%) originated from other countries and have gained Saudi citizenship;

the later group originated mainly from Asian countries and from Yemen, Syria, Palestine, Jordan, Kuwait, Lebanon; Afghan, India. Others were from African countries - Egypt, Ethiopia, Somalia, Morocco, Syria and Sudan.

Comparing this data with other studies, Al-Kalifah *et.al.* (1993), found that citizens of North Yemen, Egypt, Syria, Palestine, Pakistan, Jordan, Turkey, Bangladesh, Eritrea and Gulf States made more frequent use of the public sector whereas those from Lebanon, South of Yemen, Philippines, Somalia, Western Countries and certain other Asian Countries were more likely to use the private sector. In fact, the former have the right to utilise public health services, for example the Primary Health Care Centres and Government Hospitals, while people from the latter group of do not and are therefore compelled to use the private sector.

In general, the non-Saudi respondents in the sample were from developing countries or from neighbouring Arab states. Most of them worked as domestic staff, drivers, or were housewives, children or students. The relationship between nationality of the patient and level of education produced a significant inverse result, $P<0.05$. This reflected the situation that non-Saudis did not posses a high level of education. Most of the better-educated non-Saudis attained their health care from private health services

Table 6.31: Respondent's distribution by place of birth.

| Place of Birth | Number | % |
|---|---|---|
| K.S.A | 886 | 88.6 |
| Palestinian | 8 | 0.8 |
| Pakistani | 7 | 0.7 |
| Egyptian | 34 | 3.4 |
| Jordanian | 3 | 0.3 |
| Yemeni | 30 | 3.0 |
| Afghanistan | 1 | 0.1 |
| Ethiopian | 2 | 0.2 |
| Somalia | 6 | 0.6 |
| Moroccan | 1 | 0.1 |
| Syrian | 4 | 0.4 |
| Sudan | 10 | 1.0 |
| Indian | 1 | 0.1 |
| Chadian | 2 | 0.2 |
| Kuwaiti | 1 | 0.1 |
| Lebanese | 4 | 0.4 |
| Total | 1000 | 100 |

Source: Author's Field Survey, 1996.

## Question 22: Respondents Description of Themselves

Table 6.32 gives data showing the occupation of respondents by study area. It can be seen that a high percentage (35.1 percent) of the respondents were students, while children made up the second most common category at 22.8 percent, housewife accounted for 21.8 percent; 12.4 percent were government employees and 3 percent were private sector employees, 'others' constituted 2.5 percent, for example, baker and teachers.

Table 6.32: Respondents description of themselves.

| The Centres | Government Employee % | Private Sector Employee % | Student % | House-wife % | Self Employed % | Farmer % | Unum-ployed % | Child % | Others % |
|---|---|---|---|---|---|---|---|---|---|
| Al Zahra'a | 11.3 | 4.6 | 13.9 | 27.2 | 2 | - | 0.7 | 39.1 | 1.3 |
| Al Safa | 14.3 | 2.9 | 35.7 | 22.9 | 1.4 | - | - | 22.9 | - |
| Bani Malek | 8.1 | 2.9 | 12.5 | 25.7 | 5.1 | 0.7 | 0.7 | 44.1 | - |
| Al Ruwais | 12.5 | 1.8 | 11.6 | 22.3 | 1.8 | - | 0.9 | 49.1 | - |
| Al Balad | 7.7 | 4.4 | 23.1 | 24.2 | 1.1 | - | 2.2 | 37.4 | - |
| Al Thaalebah | 10.2 | 1.1 | 25.6 | 22.7 | 3.4 | - | 5.7 | 31.8 | - |
| Al Nuzlah Al Yamanneyah | 12.0 | 1.3 | 35.3 | 18.7 | - | - | 0.7 | 32.0 | - |
| Madain Al Fahd | 12.4 | 3.0 | 35.1 | 21.8 | 1.0 | - | 1.5 | 22.8 | 2.5 |

Source: Author's Field Survey, 1996.

## Question 23: Income of the Users

Income may form a crucial factor in determining the utilization of health services. Those with higher incomes are expected to be more likely to use private sector health care. However, income is a matter on which people are often reluctant to give exact information because they are afraid to disclose their economic status or of envy from relatives or neighbours. The questionnaire attempted to collect data about the personal income of patient and their families. Surprisingly, no one refused to answer this question.

Table 6.33: Result of Kruskal-Wallis (H), 1-Way ANOVA and Whitney (U) between various characteristics of the patients and their level of income.

| **Characteristic** | **Monthly Income** |
|---|---|
| - Districts | (.0000)** |
| - Nationality | (.0000)** |
| - Frequency of visiting the health care | (.0295)** |
| - Registration in any private clinic | (.00040)** |
| - Visiting another clinic in Jeddah for treatment | (.0000)** |

Significance Level = 95 percent (0.05) **
Source: Author's Field Survey, 1996.

As shown in Table 6.33, a statistically significant relationship was found between the patient address and level of income $P<0.05$. This revealed that patient income varied from district to district. In addition, income varied by nationality and there was a significant difference ($P<0.05$) between the incomes of Saudi and non-Saudi. Moreover, there was a significant difference between the frequency of visiting the health care centre and the monthly income $P<0.05$ with the wealthiest patients making fewer visits to the PHCC. Similarly, there was a significant difference regarding registration in other private clinics and the monthly income $P<0.05$, also visiting another clinic in Jeddah for treatment $P<0.05$. These results showed that there were differences in the monthly income for patients in the eight PHCC districts and most of the patients used other services especially during the time of closure of their local PHCC. The writer has generalized the responses to this question into three broad income categories as shown in Table 6.34 and Figure 6.13.

The income distribution shown here suggests that the users of PHCC services in Saudi Arabia were more likely to be from low income groups. There was a statistical difference between study groups, $p< 0.05$, regarding the monthly income. This finding confirmed the work of Al-Ghamdi (1981), Al-Sunai (1983), El-Zahrany (1989), Al-Osimy (1991), Al-Baz (1992) and Al-Khalifah *et al.* (1993). It was expected that those with higher incomes would be more likely to seek private health care. Patients with a high level of income may be unprepared to endure the long waiting times recorded at the PHCC and use private health care facilities with a punctual appointment system instead. However, results from the survey showed the most affluent sectors of society *do* make limited use of the PHCC services.

Table 6.34: Distribution of the study group by the monthly income in the eight PHCC's districts.

| Districts | Low + | Medium! | High * |
|---|---|---|---|
| Al Zahra'a | 23.1 | 68.3 | 8.6 |
| Al Safa | 25.7 | 62.8 | 11.5 |
| Bani Malek | 40.5 | 57.3 | 2.2 |
| Al Ruwais | 51.8 | 46.4 | 1.8 |
| Al Balad | 56.1 | 41.8 | 2.2 |
| Al Thaalebah | 68.1 | 32.9 | - |
| Al Nuzlah Al Yamaneyyah | 64.0 | 32.6 | 3.4 |
| Madain Al Fahd | 46.5 | 49.0 | 4.5 |

+ Low : less than 3000 SR ! Medium: 3000 - 8999 SR

* High: 9000 > SR

Chi sq= 85.714 DF= 14 P<0.000

Source: Author's Field Survey, 1996.

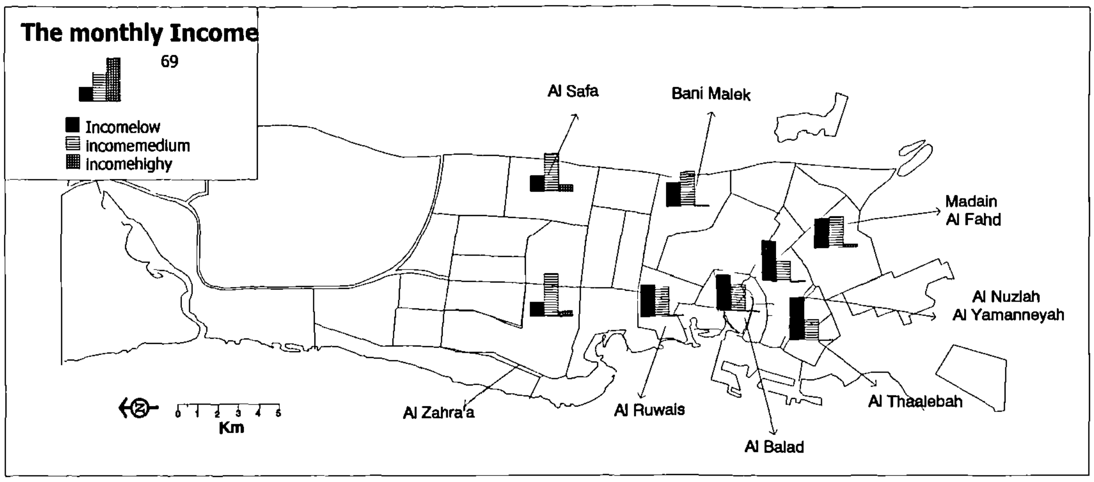



Figure 6.13 The monthly income (in Saudi Riyals) in the eight PHCC's districts.

## Question 24: Family size

It was considered that family size might be an important factor in determining level of utilization and satisfaction of PHCC health care provision. It was assumed that families of small size would make less frequent use of the PHCC services, and it would be easier to satisfy them because their needs were fewer than those families of large families size.

Information about family members by age and gender is shown in Table 6.35. The youthfulness of population is shown by the fact that 30.5 percent of the family members were children of 12 years or less. The adult population showed a slight

Table 6.35: Distribution of Respondents according to Gender and Age Groups in Selected PHCCs

| Family Size by Sex | Al Zahra'a % | Al Safa % | Bani Malek % | Al Ruwais % | Al Balad % | Al Thaalebah % | Al Nuzlah Al Yamaneyyah % | Madain Al Fahd % | Average |
|---|---|---|---|---|---|---|---|---|---|
| Male > 12 Years | 36 | 25.7 | 28.7 | 25 | 23.1 | 20.5 | 25.3 | 25 | 26.2 |
| Female > 12 Years | 29 | 27.1 | 27.2 | 25 | 26.4 | 19.3 | 31.3 | 20.8 | 25.8 |
| Children < 12 years (M & F) | 30 | 35 | 32.4 | 37 | 30 | 25 | 26 | 28.2 | 30.5 |

Source: Author's Field Survey, 1996.

preponderance of males over females. Arab families in general are characterized by large families because this symbolized power as well bringing in more income and providing extra hands to work in rural communities. Thus, the larger the family, the more powerful it became. The preference for large families still exists in contemporary Arab society. Another factor in explaining large family size is that the extended family system still exists in Saudi Arabia.

From Table 6.35 it can be seen that there was no significant variation in the age structure pattern across the eight PHCC areas. The number of children was an important indicator of the types of health services used and the services and facilities that need to be provided by the PHCC. Children have special health needs because their immunity to contagious diseases is lower than that of adults. In addition, children suffer more from accidents when playing and come into contact with contaminated water and animal wastes.

## Question 25 Type of housing

Table 6.36: Type of housing by eight PHCC.

| Type of House | Al Zahra'a | Al Safa | Bani Malek | Al Ruwais | Al Balad | Al Thaalebah | Al Nuzlah Al Yamaneyyah | Madain Al Fahd | Average |
|---|---|---|---|---|---|---|---|---|---|
| Villa | 19.9 | 18.6 | 1.5 | 6.3 | 1.1 | - | 8.7 | 5.4 | 7.7 |
| Traditional House | 3.3 | 4.3 | 40.4 | 24.1 | 47.3 | 63.6 | 44.0 | 31.2 | 32.3 |
| Flat | 76.8 | 77.1 | 58.1 | 69.6 | 51.6 | 35.2 | 47.3 | 62.9 | 60.0 |
| Others | | | | | | 1.1 | | 0.5 | |

Source: Author's Field Survey, 1996.

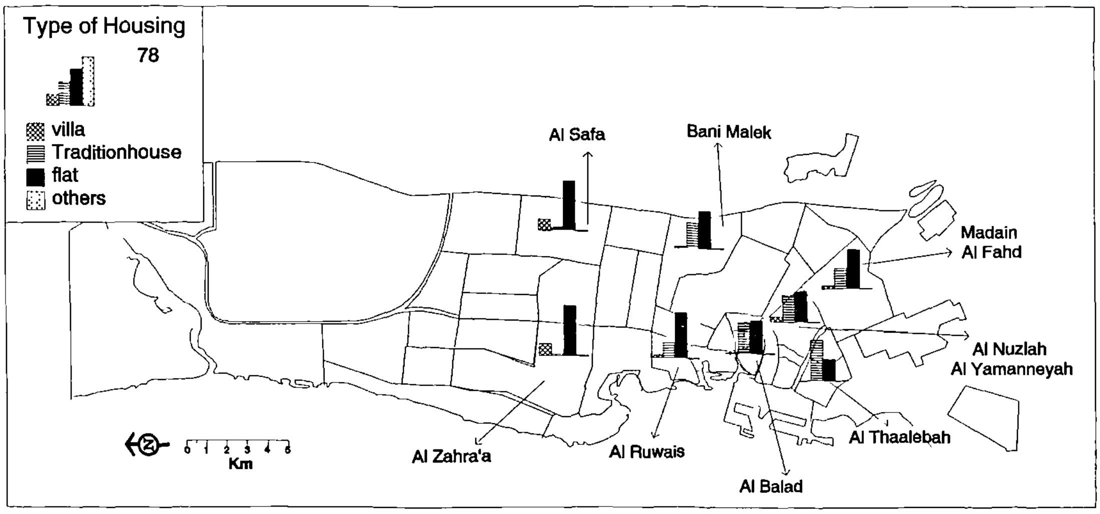



Figure 6.14, Percentage type of housing within the eight PHCC.

Table 6.36 and Figure 6.14 reveals that 7.7 percent of the respondents stated that they lived in a villa, while the majority, 60.0 percent, indicated that they lived in flats and 32.3 percent lived in traditional housing (Arab houses). The three categories need some clarification. Traditional housing, known as "Arab house" is a term which can cause some confusion to researchers because some consider the Arab house to be one built of mud in the traditional way, while others use the term to apply to any house that is neither a flat nor a villa. Such houses are usually made of concrete but in a similar building style to the old mud house. One extended family usually occupies this type of housing. Family villas are mostly built in Jeddah's new districts, while the Arab house is usually located in the old districts of the city, though a few exists in some of the new districts.

Type of housing is one of the socio-economic factors that to some extent indicate the quality of the general physical environment and which, in turn, may have health implications in terms of ventilation, light, sanitation and level of over-crowding. Therefore, families living in villas which are well ventilated, light and spacious have an advantage in health terms over those who live in an old traditional Arab house in a crowded area where light, sun and air penetrate into the house only with difficulty. Table 6.36 shows that the majority (77.1 percent) of families in the Al Safa PHCC district lived in flats and in Al Zahra'a PHCC district a figure of 76.8 percent was recorded These districts are located in the north of Jeddah Governorate which is the location for the 'new' districts. The greater occurrence of traditional housing was found in the older parts of Jeddah such as Al Thaalebah district (63.6 percent). Also, there was significant difference between the eight PHCC districts as regards to the type of houses respondents said they lived in ($P<0.05$). Also, there was a significant difference between the type of the house and the monthly income ($P<0.05$), see Table 6.37, and in relation to occupation ($P<0.05$), which means that the respondents who are categorized to have higher monthly income and better occupations lived in higher ranking socio-economic districts, and mainly in flats and villas, in contrast to those with lower monthly income and modest occupations who lived in districts which were ranked as low and medium socio-economic status and occupied traditional style housing.

The greater tendency of the traditional Arab house dwellers to use the PHCC or public services may be because they would be likely to fall in the lower income categories. Those living in a villa were possibly more able to afford private health care. These findings are similar to those of previous studies, for example, Al-Sunai (1983), reported that the majority of the population in Makkah, (55.1 percent) lived in flats, while 39.5 percent of the sample lived in traditional houses. Al-Ghamdi (1981), in his study in Jeddah found a slightly different picture. Most of the public health centre's patients in Jeddah were residents of traditional house (61.9 percent), flat residents constituted only 30.2 percent and villa dwellers, 3.7 percent. The differences between the findings from data collected for this research and these of Al-Ghamdi may be attributed to the increase in the number of villas in the nineteen years since Al-Ghamdi's research in 1981.

Table 6.37 Relation between the type of the house and the monthly income.

| Income By SR | Villa | | Traditional house | | Flat | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | NO | % | No | % |
| Less than 1000 | 7 | 5.1 | 88 | 64.7 | 41 | 30.1 | 136 | 13.6 |
| 1000 to 2999 | 23 | 7.0 | 131 | 39.7 | 176 | 53.3 | 330 | 33.0 |
| 3000 to 4999 | 13 | 4.7 | 70 | 25.1 | 196 | 70.3 | 279 | 27.9 |
| 5000 to 6999 | 13 | 9.4 | 20 | 14.5 | 105 | 76.1 | 138 | 13.8 |
| 7000 to 8999 | 9 | 12.0 | 6 | 8.0 | 60 | 80.0 | 75 | 7.5 |
| 9000 to 10999 | 7 | 25.9 | 4 | 14.8 | 16 | 59.3 | 27 | 2.7 |
| 11000 to 12999 | 2 | 40.0 | 0 | 0 | 3 | 60.0 | 5 | 0.5 |
| 13000 to 14999 | 2 | 50.0 | 0 | 0 | 2 | 50.0 | 4 | 0.4 |
| More than 15000 | 1 | 16.7 | 1 | 16.7 | 4 | 66.7 | 6 | 0.6 |

Fisher Exact test = DF=16 $P < 0.001$

Source: Author's Field Survey, 1996.

## Question 26: Property ownership

Table 6.38: Distribution of respondents by property ownership.

| Property Ownership | Al Zahra'a | Al Safa | Bani Malek | Al Ruwais | Al Balad | Al Thaalebah | Al Nuzlah Al Yamaneyyah | Madain Al Fahd |
|---|---|---|---|---|---|---|---|---|
| Owned | 45.1 | 74.1 | 54.4 | 55.4 | 34.1 | 55.7 | 41.3 | 41.6 |
| Rented | 48.3 | 52.9 | 44.2 | 37.5 | 60.4 | 40.9 | 56 | 55 |
| Provided | 6.6 | - | .7 | 7.1 | 4.4 | 3.4 | 2.7 | 3.4 |
| Others | - | - | .7 | - | 1.1 | - | - | - |

Source: Author's Field Survey, 1996.

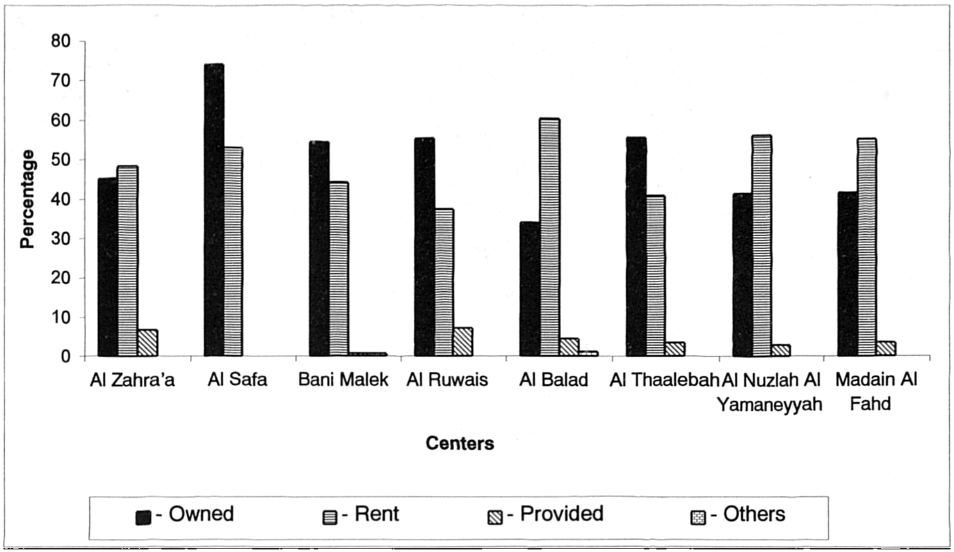



Figure 6.15, Distribution of respondents by property ownership.

A small majority of the respondents lived in rented houses, 49.8 percent, while 46.3 percent indicated they lived in their own houses and a few, 3.7 percent, lived in a house provided by their employers. Earlier studies had shown similar results. Al-Sunai (1983), for example, reported that 40 percent of his sample in Makkah owned their property and 59 percent occupied rented housing. All non-Saudis lived in rented properties because they are not legally entitled to own property.

Table 6.38 and Figure 6.15 shows that the majority of respondents, 74.1 percent, living in Al Safa PHCC district owned their own houses, also more than 50 percent of the respondent in Al Ruwais, Al Thaalebah, Bani Malek, owned their houses. Many people who originated outside Jeddah have retained their permanent residence in their original home cities, towns or villages.

There is a significant difference between the eight PHCC districts in relation to property ownership, P<0.05. The significant differences between the frequency of patients visiting the PHCC and the property ownership (P<0.0225) suggested that the people who lived in owned property will continue to visit the same PHCC and their medical records will be up-dated for as long as they keep visiting the health centre. People who live in rented houses, for example, Al Balad (60.4 percent), Madain Al Fahd (55 percent), Al Safa ((52.9 percent), Al Nuzlah Al Yamaneyyah (56 percent) and Al Zahra'a (48.3 percent), are more likely to move from one district to another and register with the local PHCC centre as a new client. When the computer record is entered into the computer database at PHCC headquarters the previous patient record will be discovered and the record updated with the new information.

**Question 27: Number of rooms and toilets in the house of the respondents.**

Table 6.39 Number of rooms in houses (as percentage), by eight PHCC districts.

| Number of Rooms | Al Zahra'a | Al Safa | Bani Malek | Al Ruwais | Al Balad | Al Thaalebah | Al Nuzlah Al Yamaneyyah | Madain Al Fahd | Ave |
|---|---|---|---|---|---|---|---|---|---|
| 1 – 3 | 19.2 | 11.4 | 33.1 | 41.1 | 57.1 | 67 | 42.7 | 35.6 | 38.4 |
| 4 – 8 | 15.5 | 80 | 64.7 | 55.4 | 42.8 | 31.8 | 52 | 59.9 | 57.8 |
| > 9 | 5.3 | 8.6 | 2.2 | 3.6 | - | 1.2 | 5.3 | 4.5 | 3.8 |

Source: Author's Field Survey, 1996.

Number of rooms and the provision of sanitary facilities can be used as another indicator of housing quality. Tables 6.39 and 6.40 give details for the eight PHCC districts. In Table 6.36 it can be seen that most respondents reported living in medium to large size houses with 57.8 percent having between four and eight rooms. More than one third had between one and three rooms, only 3.8 percent had more than nine rooms or more. There was little variation in this pattern across the two northern PHCC districts (Al Zahra'a and Al Safa). In other PHCC districts there was some similarity, but only one PHCC district showed a different pattern of house type. In Al Thaalebah PHCC district the house size was smaller than in other PHCC districts.

Table 6.40 Over Crowding Index in Chosen Districts by eight PHCC.

| PHCC | Mean value of family size | Mean value number of rooms | Over Crowding Index |
|---|---|---|---|
| Al Zahra'a | 3.10 | 5 | 0.6916 |
| Al Safa | 5.16 | 5 | 1.1255 |
| Bani Malek | 3.62 | 4 | 1.0293 |
| Al Ruwais | 3.49 | 4 | 0.9783 |
| Al Balad | 3.92 | 4 | 1.2665 |
| Al Thaalebah | 5.87 | 3 | 2.1806 |
| Al Nuzlah Al Yamaneyyah | 5.05 | 4 | 1.3294 |
| Madain Al Fahd | 4.95 | 4 | 1.2894 |

The over crowding index can be considered as one of the crucial factors that has an impact on the occurrence and transmission of certain diseases. Table 6.40 and Figure 6.16 shows that the over crowding index was highest in Al Thaalbah, Al Nuzlah Al Yamaneyyah and Madain Al Fahd, all of which are categorized as low socio-economic districts. By contrast, Al Zahra, which is categorized as a high socio-economic district recorded the lowest index value. An ANOVA test revealed that there were highly significant differences between the selected centres as regards the over crowding indices.

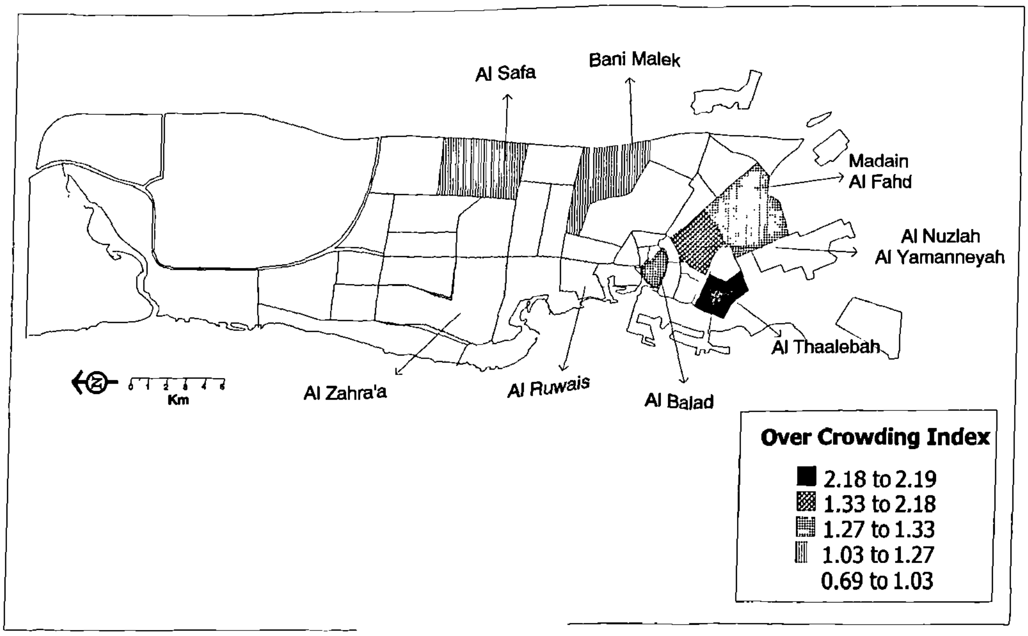



Figure 6.16 Over Crowding Index in the eight PHC Districts.

Table 6.41: Number of toilets in the houses by eight PHCC districts.

| Number of Rooms | Al Zahra'a | Al Safa | Bani Malek | Al Ruwais | Al Balad | Al Thaalebah | Al Nuzlah Al Yamaneyyah | Madain Al Fahd | Average |
|---|---|---|---|---|---|---|---|---|---|
| One | 10.6 | 2.9 | 15.4 | 24.1 | 37.4 | 62.5 | 23.3 | 12.4 | 23.6 |
| 2 – 3 | 80.1 | 85.7 | 83.1 | 71.4 | 51.5 | 36.4 | 70 | 79.2 | 70.9 |
| > 4 | 9.3 | 11.4 | 1.5 | 4.5 | 1.1 | 1.1 | 6.7 | 8.4 | 5.5 |

Source: Author's Field Survey, 1996.

From Table 6.41 it can be seen that most respondents reported having between two and three toilets in their houses (70.9 percent). About one quarter have one toilet; only 5.5 percent had four or more toilets. There was little variation in this pattern across seven of the PHCC districts; only one PHCC district differed. Al Thaalebah PHCC district recorded one toilet for 62.5 percent of the houses in this district. This may be attributed to the larger proportion of smaller houses. Moreover, there were significant differences between the eight PHCC districts in relation to the number of the rooms $P<0.05$, and there was also a difference in relation to number of toilets $P<0.05$. These findings are similar to those of previous studies, Al Ribdi (1990), for example, reported that 54.3 percent of his sample had between four and eight rooms, and quarter had nine rooms and 16 percent had three rooms or fewer.

## Question 28: Car ownership

As mentioned earlier, car ownership may be one of the most important factors influencing the frequency of visiting the PHCC. The car makes places more accessible and car ownership may facilitate visits to the PHCC. The results presented in Table 6.42 and Figure 6.17 shows that the vast majority, 74.6 percent, of the respondents owned a car.

Table 6.42 Vehicle ownership by eight PHCC districts.

| The Centres | Yes % | No % |
|---|---|---|
| Al Sahara | 90.7 | 9.3 |
| Al Safa | 84.3 | 15.7 |
| Bani Malek | 83.1 | 16.9 |
| Al Ruwais | 69.6 | 30.4 |
| Al Balad | 58.2 | 41.8 |
| Al Thaalebah | 59.1 | 40.9 |
| Al Nuzlah Al Yamaneyyah | 70.7 | 29.3 |
| Madain Al Fahd | 81.2 | 18.8 |
| Average | 74.6 | 25.4 |

Source: Authors Field Survey, 1996.

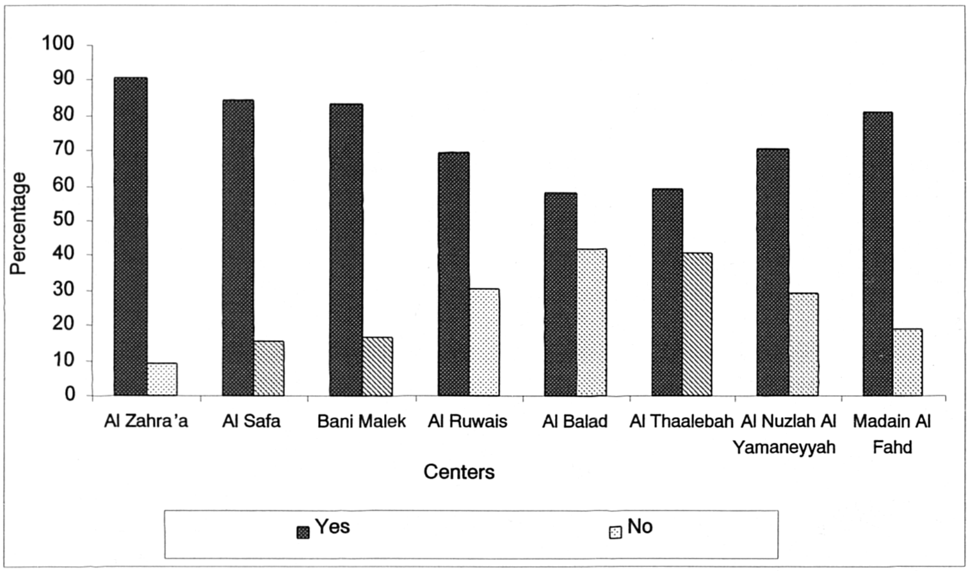



Figure 6.17 Vehicle ownership by eight PHCC districts.

## Question 29: Telephone ownership

Two thirds of the respondents had a telephone in their house, Table 6.43. For families without a telephone there may be real problems in making contact with their doctors for advice or for emergency access to a PHCC or hospital.

Table 6.43 Telephone ownership by eight PHCC districts.

| The Centres | Yes % | No % |
|---|---|---|
| Al Zahraa | 78.8 | 21.2 |
| Al Safa | 74.3 | 25.7 |
| Bani Malek | 72.8 | 27.2 |
| Al Ruwais | 76.8 | 23.2 |
| Al Balad | 64.8 | 35.2 |
| Al Thaalebah | 52.3 | 47.7 |
| Al Nuzlah Al Yamaneyyah | 78.8 | 21.2 |
| Madain Al Fahd | 73.3 | 26.7 |

Source: Authors Field Survey, 1996.

## 6.3 Impact Of Different Socio-economic Criteria On Occurrence Of Most Common Ailments

It was evident that the most common ailments were Upper Respiratory Infection and Dental and Gingival diseases. Diabetes Mellitus has been included in Table 6.44 as it has emerged as an ailment that has increased dramatically in recent years and shows that the heath of a community can change over time, depending on socio-economic conditions. The frequency of occurrence of these ailments correlated most strongly with geographical location, level of education and with occupation.

Table 6.44, shows the incidence of the most common diseases among respondents in the chosen eight PHCC. It is obvious that Upper Respiratory Tract Infections recorded the highest incidence in all centres except Al Nuzla and Al Safa where Dental and Gingival Diseases were the highest. Incidence of Upper Respiratory Tract Infections ranged between eight percent in Al Nuzla and 37.5 percent in Bani Malik, while the incidence of Dental and Gingival diseases ranged between 2.3 percent in Al Thaalebah and 28.6 percent in Al Safa. Incidence of Diabetes Mellitus ranged between four percent in Al Zahra and 9.1 percent in AlThaalebah. There was a significant difference between the chosen districts as regards incidence of most common diseases among respondents ($P<0.05$).

Table 6.44: Incidence Of Most Common Ailments Among Study Group By Location.

| Centres | Diabetes | | URI | | Dental | |
|---|---|---|---|---|---|---|
| | NO | % | NO | % | NO | % |
| Al Balad N=91 | 8 | 8.8 | 14 | 15.4 | 8 | 8.8 |
| Al Nuzlah N=150 | 8 | 5.3 | 12 | 8 | 20 | 13.3 |
| Al Safa N=70 | 4 | 5.7 | 14 | 20 | 20 | 28.6 |
| Al Zahra N=151 | 6 | 4.0 | 46 | 30.5 | 3 | 6.7 |
| Madain N=202 | 13 | 6.4 | 53 | 26.2 | 27 | 13.4 |
| Malek N=136 | 7 | 5.1 | 51 | 37.5 | 5 | 3.7 |
| Al Thaalebah N=88 | 8 | 9.1 | 26 | 29.5 | 2 | 2.3 |
| Ruwais N=112 | 6 | 5.4 | 30 | 26.8 | 13 | 11.6 |

Source: Authors Field Survey, 1996.

Table 6.45 Incidence of Most Common Diseases by level of Education

| Level of education | Diabetes | | URI | | Dental | |
|---|---|---|---|---|---|---|
| | NO | % | NO | % | NO | % |
| Illiterate | 18 | 4.3 | 121 | 29.2 | 29 | 7.0 |
| Can read only | 6 | 20.7 | 2 | 6.9 | 2 | 6.9 |
| Preparatory school. | 9 | 3.9 | 65 | 28.1 | 29 | 12.6 |
| Intermediate school | 8 | 6.5 | 21 | 16.9 | 15 | 12.1 |
| Secondary school | 11 | 7.6 | 25 | 17.2 | 18 | 12.4 |
| University | 8 | 29.6 | 12 | 44.4 | 5 | 18.5 |

Source: Authors Field Survey, 1996.

Table 6.45 shows the incidence of the most common diseases among respondents according to their level of education. It is obvious that Upper Respiratory diseases were the commonest among the entire group except for that group categorised as “can read only”. In this instance, Diabetes was the most common disease. The incidence of URI ranged from a remarkably low 6.9 percent among those who "can read only", to 44.4 percent among those who had reached university level. Incidence of Diabetes ranged from 3.9 percent among preparatory school respondents to 29.6 percent among university level respondents, while incidence of Dental and Gingival diseases ranged between 6.9 percent among respondents who "can read only" to 18.5 percent among university level respondents. There were statistically significant differences between different levels of respondent's education and occurrence of most common ailments P<0.05. Respondents with degrees recorded an illness rate for the three most common diseases that was twice as high as for the next highest group, those respondents with only Preparatory school education. Clearly, possessing a university degree does not lower a person's health but probably does lead to a different working environment.

Table 6.46 Incidence of Most Common Ailments By Occupation

(As described by patients themselves):

| Occupation | Diabetes | | URI | | Dental | |
|---|---|---|---|---|---|---|
| | NO | % | NO | % | NO | % |
| Government employee N=111 | 17 | 15.3 | 15 | 13.5 | 17 | 15.3 |
| Private sector employed N=28 | 5 | 17.8 | 7 | 25.0 | 4 | 14.3 |
| Student N=243 | 7 | 2.9 | 69 | 28.4 | 33 | 13.6 |
| Housewife =231 | 18 | 7.8 | 31 | 13.4 | 8 | 3.5 |
| Self employed N=19 | 7 | 36.8 | 3 | 15.8 | 2 | 10.5 |
| Unemployed N=14 | 3 | 21.4 | 1 | 7.1 | 1 | 7.1 |

Source: Authors Field Survey, 1996.

Table 6.46 shows incidence of the most common diseases among respondents according to their occupation (as described by the patients themselves). There was a statistically significant difference between the respondent's occupation and occurrence of most common ailments P<0.05. Upper Respiratory diseases were most common among students and those employed in private sectors, while Diabetes was the commonest among self employed, unemployed and private sector employed respondents.

# Chapter Seven

## Discussion of Results

### 7.1 Introduction

This chapter will draw information from Chapters Five and Six, concerning the analysis of the official PHCC data set and the 1000 questionnaire data set. The results of the analyses will be interpreted in the light of health care policies and problems within the context of Saudi Arabia and where possible the results will also be related to the wider context of medical geography as discussed in Chapter One. This chapter will also attempt to show where additional medical statistics are needed from within the Saudi medical healthcare system. Finally, an attempt will be made to highlight where further medical geography research is required to take place in Saudi Arabia.

### 7.2 Official census data

There were major problems concerning the latest official census data (1992) for Jeddah because publication of the latest statistics were continually delayed. Eventually, age group figures for the male and female population for Jeddah (Table 2.8) were obtained but it proved impossible to obtain a further breakdown into district statistics. This clearly caused a major problem for the research project but an alternative was found by using the PHCC user population data for the health districts. This data represented the number of patients using a health center during one year and provided an indication of the population size. Section 5.2 has reviewed the problems associated with using PHCC user numbers. The concerns raised by Ramesh (1983) and Joseph and Phillips (1984) and discussed on page 24 of this thesis remain as valid in Saudi Arabia today as they did when written almost twenty years ago. Yet another unique problem for Saudi Arabia is that some data sets exclude data on females. The work by Al Ribdi (1990) provides such an example. Particular problems concerned the lack of socio-economic data relating to the population and reliance had to be placed upon the researchers knowledge of the areas. It is no coincidence that the limited amount of earlier medical geography research for Saudi Arabia discussed in Section 1.3 was also deficient in socio-economic analysis. The infrastructure for collecting socio-economic data is absent from Saudi Arabia. The only unit responsible for collecting data is the administrative unit. There are no electoral wards, no parish equivalents and no post code or zip code areas. The city of Jeddah has been zoned into post code districts and post code numbers appear on all street signs but no use is made of these codes. Neither do digitized map boundaries exist to which data can be geo-referenced. It is difficult therefore to see any immediate opportunity for an improvement in the collection of data linked to geographical regions and the lack of statistical information describing the urban population will remain a problem for future social science research.

## 7.3 Analysis of official health statistics

The availability of health statistics for Jeddah was much more satisfactory than for census data. The General Directorate of Primary Health Care Affairs in Jeddah allowed the researcher access to the monthly returns for eight selected PHCC statistics. This data provided an excellent starting point for the research. However, this data set possessed certain limitations as discussed in sections 4.6 and 4.7. The main limitations were an absence of socio-economic data relating to the patients; patient data was divided into four uneven age groups and, thirdly, the patient data could not be linked in any way to the limited census data. The difficulty concerning the uneven age groups was most apparent in that the main economically active group was placed into one category, 15 – 44 years. Paradoxically, the limited census data did provide an excellent age group breakdown into four yearly categories but was unusable with the PHCC patient data.

## 7.4 Discussion of official PHCC health results

The Multiple Bar Chart shown in Figure 5.12 provides a summary of the 25 most common diseases and ailments reported to the PHCCs. The incidence of reported diseases for the whole of Saudi Arabia were first noted. The data was plotted and the rank order of the most frequently occurring diseases and ailments were as follows:

1. Respiratory tract infections,
2. Gastrointestinal diseases,
3. Muscular and skeletal diseases,
4. Skin diseases,
5. Dental and Gingival diseases,
6. Ophthalmic diseases,
7. COPD - Chronic Obstructive Pulmonary Diseases,
8. Diabetes Mellitus.

The analysis of data from the primary health care directorate in the Jeddah region during the period from 1992 to 1995 revealed that the results closely matched with those for the whole of Saudi Arabia. It was possible to calculate the age, nationality and gender for patients for each of the eight diseases recorded for the Jeddah region. However, the distribution of registered population in each PHCC by age and gender was not available and so information at the all-Saudi and all-Jeddah scales has been based upon counts of the number of patients obtained from official PHCC data rather than the actual occurrence of the age and gender of the population.

The rank order of the eight most frequently recorded diseases and ailments from the population data of all-Jeddah City were:

1 Upper Respiratory Tract Infections mainly among males,
2 Dental and Gingival diseases, mainly among females.
3 Gastrointestinal diseases, mainly among females.
4 Skin and Cellular diseases, mainly among females.
5 Muscular and skeletal diseases, mainly among males.
6 Ophthalmic diseases, mainly among males.
7 Diabetes Mellitus, mainly among males.
8 Urinary Tract Infections, mainly among females.

Finally, the sequence of diseases and ailments for the eight PHCC districts included in this study revealed a strong similarity with the pattern for all-Saudi and all-Jeddah statistics. There were detailed differences, however, in the numbers of patients within specific age groups and nationality distribution and also differences as regards gender.

In summary we can recognize the following patterns between the three data sets:

The greatest number of patients, at all three levels of data collection, were reported for Upper Respiratory Infections (URI). The number of cases reflects the world-wide prevalence of URI, which is considered as the leading cause of morbidity in many countries. The importance of URI as a major complaint had been recognized by WHO (1965), by Cruickshank (1979) and reported at the following World Health Organisation web site in 2001, www.who.int/aboutwho/preventing/acute.htm. These findings show that URI was commonest among young children worldwide with four to eight episodes per year especially in combination with occurrence of low income, low birth weight, poor nutrition, and indoor air pollution.

The Pan American Health Organization reporting on the health profile of Cuba recorded that respiratory infections, especially acute, short-lived infections, were by far, the leading causes of morbidity in Cuba, as shown at the Pan American Health Organisation web site in 2001, www.paho.org/English/SHA/prflcub.htm. About 60% of Cuban statistics were for children under the age of 15, and 41.7% of these were children between 1 and 4 years of age. In 1996, the total number of medical visits for this cause totaled approximately 5 million.

A logistic regression test was applied to the occurrence of upper respiratory diseases and the predictors of nationality and age recorded a positive relationship at a significance p value of $<0.05$, see Table 6.3. This result shows that the Saudi population is more likely to be affected by URI than non-Saudis, with an odds ratio equal to 1.481. Also, it was recognized that there was a negative relationship with age groups with an odds ratio equal to 0.602, i.e. there is gradual decrease of the probability of occurrence of upper respiratory tract infection when the patient becomes older. The prevalence of URI and 'wheezy illness' among the urban population has been noted by Hijazi *et al.* (1998) in Jeddah, the precise explanation of which has been attributed to the urban life style and $PM_{10}$ materials from vehicle exhausts.

The wide spread occurrence of respiratory infection in the Saudi community might also reflect the significant influence of climate and of the differences in socio-economic level of the patient. This information has been shown in Table 5.16 and Figure 5.12. The difference between the incidence of upper respiratory diseases represented by the higher incidence of this disease recorded for all Jeddah districts and the data for the eight PHCCs when compared to all Saudi Arabia can be attributed to the fact that the position of the Jeddah Governorate adjacent to the Red Sea results in the region being one of the most humid regions in the Kingdom. The impact of hot and humid climate on occurrence of upper respiratory diseases has been discussed in many research projects. Laurence *et al.* (1987) stated that humidity has an important impact on mortality since it contributes to the body's ability to cool itself by evaporation of perspiration. It also has an important influence on morbidity; dry air leads to excessive dehydration of nasal passages and the upper respiratory tract and increased chance of microbial and viral infection. See web pages by Kalkstein, L. S. & Valimont, K. M., (2000) *Climate Effects On Human Health* at http://www.ciesin.org/docs/001-338/001-338.html. Projections of more frequent and severe heat waves and humidity could lead to increases in smog and air pollution warnings. Increases in pollen and mold spores would compound the situation and affect those with cardiovascular disease, respiratory disorders such as asthma, emphysema and chronic bronchitis, and allergy problems, see the web pages prepared by Health Canada, Environment Canada and the David Suzuki Foundation, (2000) at www.ccah.cpha.ca/effects.htm.

It is evident from the detailed PHCC data that the highest incidence for URI in general was recorded in Madain Al Fahd, Al Thaalba, Al Nuzla, Bani Malek and Al Balad, while the lowest incidence was recorded in Al Ruwais, Al Zahra and Al Safa. It can be concluded that the highest incidence for URI occurred in those districts located in the southern part of the city of Jeddah and which are characterised by the lowest socio-economic level. This area compares poorly in socio-economic terms to the second group located to the north of the Jeddah region and which is characterised by higher socio-economic level and, as a consequence, a lower incidence of upper respiratory diseases. This emphasizes the impact of the socio-economic status and geographical distribution on the occurrence of disease and specifically, shows broad agreement to all that is known about URI, its mode of transmission favored by low socio-economic status and the poor personal hygiene of the population.

From the graphs showing the incidence of URI (see Figure 5.13), the pattern recorded showed no substantial difference for the number of recorded cases of URI from 1992 to 1995. It is possible that the incidence of this disease can be attributed, at least in part, to the nature of the climate which is characterised by high humidity that exceeds 60 percent for large sections of the year. In addition, the high air temperature (>21$^{O}$C) combined with a lack of natural ventilation in buildings and the increasing reliance on air conditioning both in the place of work, at home and in vehicles, plays an important role in sustaining the high incidence of upper respiratory diseases. The prevailing climate conditions dictate that individuals will spend more time indoors (e.g., individuals may spend more time in air-conditioned environments to avoid extreme heat), resulting in changed exposure to indoor air pollutants and allergens. In some cases, these indoor environments may be more dangerous than the ambient conditions. Recent research in the US by Patz, *et. al.* (2000) has shown the impact of climate on human health and the incidence of specific diseases. This work is reported on at the following web site: http://ehis.niehs.nih.gov/topic/global/patz-full.html.

Generally there is no statistically significant difference between Saudi and Non Saudi elements of the population as regards incidence of upper respiratory diseases. This may be attributed to the fact that both groups live in the same ecological proximity.

Dental and Gum diseases were the second most frequently reported disease category. Compared with URI, there appears to be little research interest in the causes of dental disease in Saudi Arabia. The provision of dental treatment has mainly been provided through private clinics although in recent years, dental facilities at the PHCCs have been improved. In the eight selected PHCC districts studied for this research, six new clinics had been established and the role played by these clinics will undoubtedly increase in the future. For both Jeddah City and the eight PHCCs the incidence of dental and gum disease was substantially greater than the incidence for all-Saudi Arabia. This pattern reflects the high incidence of dental and gum diseases in western society in general with its sugar-rich diet. The diets of the inhabitants of a highly urbanised Jeddah contrasts markedly with the less westernised diet of the population of Saudi Arabia as a whole. Also, the provision of dental treatment in Jeddah Governorate was able to identify and record the incidence of dental and gum diseases, which goes largely unrecorded in rural areas of the country. In Saudi Arabia as a whole dental and gum disease was ranked as the fifth most common disease whereas in Jeddah it was second. This study showed that there was a statistically significant difference between the selected PHCCs as regards incidence of dental and gingival diseases ($P<0.05$), while there was no significant difference in the data collected during the period 1992-1995. The provision of dental treatment throughout the Kingdom probably shows a greater variation than for any other common disease category. Even within Jeddah, provision of dental surgeries had only become available in the late 1990s. As a result of the inequity in the distribution of these facilities, those health centres deficient in dental units referred patients with dental diseases to nearby health centres that were provided with a dental clinic. The transfer of patients was made according to a pre-designed schedule for referral system between the health centres. This transfer of patients contributed to an over-weighed incidence of dental and gingival diseases in some districts which is concomitant with the under weighed incidence of these diseases in other centres. This was evident in Al Zahra where the incidence of dental disease ranged between 0.7 to 1.1. These figures were not a true reflection of the actual incidence of this disease but reflected the absence of a dental unit in Al Zahra PHCC. Patients with dental and gingival problems were referred to the nearest health centre equipped with a dental unit. Patients are recorded and counted in the centre providing treatment and not in the referring centre.

Diseases of the Stomach, Oesophagus and Small Intestine (Gastro-Intestinal Disease – G.I.D.) were more common-place in Saudi Arabia as a whole than in all-Jeddah. The study showed that the level of G.I.D. in the eight PHCCs were slightly higher than for the all-Jeddah figure. There was a significant difference between the selected PHCCs regarding the occurrence of G.I.D. ($P<0.05$), although there was no significant difference discernible over the time period from 1992-1995. The highest incidence was recorded in Al Thaalebah and Madain Al Fahd in the southern section of the Jeddah region, while the lowest was in Al Safa an Al Zahra in north of the Jeddah region. This distribution once again reflects the impact of socio-economic level and also the relevant educational level upon feeding habits. This may reflect the greater difficulty in achieving a high standard of food preparation and of personal hygiene and education level in poor socio-economic areas and also in rural areas compared with the highly urbanised Jeddah population. The effect of bad hygiene can be seen in the occurrence of some specific diseases e.g. gastro-enteritis. Infants and children are especially susceptible to the effects of poor hygiene and inadequate food preparation. The World Health Organisation (1965), Cruickshank (1979) and Milaat and Elassouli (1995) have discussed the seriousness of gastro-enteritis and the consequent effects of diarrhoea and dehydration. These ailments cause up to 50 per cent of children deaths below the age of 5 years in developing countries, Thompson (1994), Benenson, (1995). The graphs shown in Figure 5.23 showed that there were no changes in the number of reported incidents over study time period. The high incidence of gastro-enteritis diseases can also be attributed in part to the customary food habits which favour the consumption of highly fatty meals. Kellow *et al.* (1988) stated that fat acts as major dietary stimulant for the colon. The Surgeon General's Report on Nutrition & Health, (1988) reported that dietary fat was a significant factor associated with gastro-intestinal diseases and evidence related to the role of dietary factors in gastro-intestinal diseases suggested that the public would benefit from additional products that are low in fat and calories and high in fiber. The following site gave details on gastro-intestinal complaints: http://www.geocities.com/nutriflip/11gastro.htm. There was no statistically significant difference among the *selected* districts as regards incidence of GID diseases between Saudi and Non Saudi.

Skin and cellular diseases were fourth most common disease. The list of different skin diseases is very great, see Table 7.1, and their occurrence shows considerable variation over time. The frequency of this category may once again reflect the climate of Saudi Arabia, especially during the summer season, when the very hot weather makes the achievement of personal cleanliness more difficult. The widespread use of air-conditioned environments may also exacerbate this group of complaints. There was a statistically significant difference between the selected centres as regards incidence of skin diseases ($P<0.05$). It is evident that the highest incidences were recorded in Madain Al Fahd, Al Balad and Al Thaalebah, while the lowest incidences were recorded in Al Safa, Al Zahra and Al Ruwais. The first group represents the southern districts of the Jeddah region, which are characterised by low socio-economic levels in contrast to the second group which represents the northern districts, which is characterised by medium and high socio-economic levels. This distribution again

Table 7.1 List of Common Skin Diseases

| | |
|---|---|
| Skin Diseases and Disorders | Erythema |
| Connective Tissue Disease | Exanthema Subitum |
| Cellulitis | Furunculosis |
| Cutis Laxa | Hidradenitis Supportiva |
| Ehlers-Danlos Syndrome | Hyperhidrosis |
| Lupus Erythematosus, Systemic | Hypohidrosis |
| Marfan Syndrome | Ichthyosis |
| Mixed Connective Tissue Disease | Incontinentia Pigmenti |
| Noonan Syndrome | Infectious, Skin Diseases |
| Stickler/Marshall Syndrome | Keratosis Follicularis |
| Systemic, Scleroderma | Larva Migrans |
| Hair Diseases | Leg Ulcer |
| Alopecia | Lichen Sclerosus et Atrophicus |
| Hirsutism | Mastocytosis |
| Pruritus | Parapsoriasis |
| Nail Diseases | Pemphigus |
| Erysipelas | Pemphigoid, Bullous |
| Paronychia | Pigmentation Disorders |
| Skin Cancer | Pityriasis |
| Skin Diseases | Pseudoxanthoma Elasticum |
| Acne Rosacea | Psoriasis |
| Acne Vulgaris | Pyoderma Gangrenosum |
| Actinic Keratosis | Skin Ulcer |
| Adiposis Dolorosa | Stevens-Johnson Syndrome |
| Albinism | Sweet's Syndrome |
| Dermatitis | Tinea Versicolor |
| Dermatomycoses | Urticaria |
| Dermatomyositis | Vesiculobullous Blister |
| Eczema | Vitiligo |
| Epidermolysis Bullosa | Xeroderma Pigmentosum |

Source:

http://www.insight-media.co.uk/users/stevew/Pages/Page%20Skin%20Diseases%20and%20Disorders.html

emphasizes the direct impact of low socio-economic status with its concomitant low level of personal hygiene on the incidence of skin diseases and which emphasizes the findings of previous studies (Abolfotouh *et al.*, 1996) about the relationship of socioeconomic status and occurrence of skin diseases. Anchala Parthasaradhi (1997) stated that the high incidence of pyogenic and fungal infections recorded at Calcutta and in Kenya could be due to the poor socioeconomic status (and overcrowding) prevailing in these areas. Teressa *et al.* (1993) stated that communities with low socioeconomic status suffer most from skin conditions. This is probably because they do not have good hygiene practices nor do they treat the symptoms, thus encouraging the spread of the disease. Most houses in these communities are overcrowded and this aggravates the condition. Some skin diseases are intimately related to poor personal hygiene e.g. scabies and pyoderma. Research by Masawe *et a.l* (1975) conducted in Tanzania in preschool children highlighted that both conditions were more common in rural than in urban environments, but scabies was most common in populations with poor socioeconomic and hygienic conditions. The predisposing factors included trauma, insect bites, hot and damp coastal weather, and poor socioeconomic and hygienic conditions. Figure 5.17 shows the variation in skin diseases between 1992-1995 and reveals no substantial differences during this period. Nevertheless, it appears that there was a high incidence of skin disease in general which can be attributed to the nature of the climate, which is characterised by high humidity and high temperature. Both these factors are considered important for the occurrence of some skin diseases especially fungal diseases. The statistical analysis for impact of nationality on occurrence of skin diseases showed no statistically significant difference between Saudi and Non Saudi.

Muscular and Bone diseases were fifth most common. As for previous ailments, a possible explanation for the prevalence of the muscular and bone diseases may be due to the widespread use of air-conditioning to cool buildings in summer. Chilling of muscles can occur from over cooling. Also, a lack of physical exercise due to the enervating climate, such as the inability to undertake a brisk walk, may lead to a general weakening of the muscles and bones. The crucial role of exercise in lowering the incidence of musculoskeletal disease has been emphasized by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (2001), see http://www.nih.gov/niams/healthinfo/arthexfs.htm. There is some evidence that exercise during childhood provides particular resistance to higher peak bone mass as does high-impact exercise (such as weight training), in later life. While there are health benefits to low-impact exercise, such as walking, it has minimal benefit for bone mineral density. Researchers conducted randomized clinical studies of exercise during adulthood and later in life that showed that the conditioning, balance-enhancing, and muscle-building effects of exercise reduce musculoskeletal diseases by approximately 25 percent, see http://www.nih.gov/niams/healthinfo/opbkgr.htm. Researchers now understand the benefits of exercise, especially for older people, as a key to preventing or delaying the onset of disease and disability. There was a significant difference between the selected centres as regards the occurrence of these diseases ($P<0.05$), while there was no significant difference along the time period from 1992-1995. Generally, the was a remarkably high incidence of muscular and bone diseases in southern districts compared to northern districts. This can be attributed to the low socio-economic level found in the southern districts, and this is reflected in the relatively poor nutritional status and housing which complements the other socio-economic factors in the occurrence of diseases such as Osteoporosis and Osteomalacia as represented by bone complaints recorded in PHC clinics. Generally there was no statistically significant difference between Saudi and Non Saudi as regards incidence of musculo-skeletal diseases. The work of Ali, *et al.* (1996) and Al Dalaan (1998) concerning the occurrence of osteoporosis and rheumatoid arthritis has been referred to in Chapter One, and shows that these diseases are commonplace among specific sectors of Saudi population.

Ophthalmic diseases showed a statistically significant difference ($P<0.05$), between centres. Generally, there were no significant differences over the time period 1992 –1995 for the individual centres. In general the highest incidence for ophthalmic diseases were recorded in southern districts represented by Al Thaalebah and Madain Al Fahd. It is again possible to point to the socio-economic conditions in these areas as explaining the higher rates of eye disease. For example, conjunctivitis is often related to poor personal hygiene and is more easily spread in conditions of high population density. Malaty *et al.* (1995) showed that climatic factors played a pathogenic role due to the dry, sunny and dusty conditions which often prevail in the Middle East. Jacob (1999) stated that the incidence of cataracts correlates with poverty, poor diet and poor hygiene and the vast majority of cataract is found in developing countries. Moreover, the research conducted to study eye diseases among Palestinians showed that poor hygiene and sometimes-dubious medical practice are responsible for serious anterior segment and external ophthalmic disease (O'Shea, 2000). The WHO Global Alliance for the Elimination of Trachoma by the Year 2020 (GET, 2020) has adopted the "SAFE" strategy, consisting of four components: ***S***urgery, ***A***ntibiotic treatment, promotion of ***F***acial cleanliness and initiation of ***E***nvironmental changes. This review of selected studies from different parts of the world shows that there is clear evidence to support the recommendation of facial cleanliness and environmental improvements to prevent trachoma. Person-to-person contact and flies appear to constitute the major transmission pathways. Improvement of personal and community hygiene has great potential for a sustainable reduction in *trachoma* transmission (Pruss & Mariotti, 2000).

Figure 5.19 provides a graph for the occurrence of Ophthalmic diseases and shows that there were no significant differences in the period from 1992 to 1995; It has already been explained that the high incidence of these diseases in general may be due to the nature of the climate, characterised by the high dusty winds (Khamaseen wind) and high temperature and high humidity which predispose to the occurrence of some eye diseases. In 1994 Sundharam *et al.* stressed the impact of high humidity on occurrence of ophthalmic diseases in a study conducted in the area of Asir, located in the western region of Saudi Arabia and sharing with Jeddah region in its tendency for high air humidity. Sundharam *et al.* stated that the relatively damp climate of Asir, favoured the ecology of *C. anthropophaga* , which is one of the ophthalmic diseases which is prevalent in humid climate areas .

In Iraq, where the climate is generally hot and dry throughout the summer, findings have shown that dust storms and sandstorms may promote or aggravate respiratory and ophthalmic ailments, (as discussed at the following address: www.fas.org/irp/gulf/intel/950925/01810545_691.txt ).

## 7.5 General observations

Most of the patients recorded in this survey were Saudi nationals. This was to be expected, as non-Saudis would normally be provided for by private health care provision. The numbers of Saudi patients using the services provided by the PHCCs proved that the policy of the government to make available an extensive primary health care facility was being extensively used.

For the data relating to all-Saudi Arabia the majority of patients were males whereas the data collected specifically for Jeddah City included both males and females. As far as can be determined, the absence of female statistics from the all-Saudi data was not deliberate whereas the inclusion of female statistics in the Jeddah survey was a deliberate decision made by the author. Within the Jeddah Governorate, attempts by the health service to provide a service for both males and females has been successful. Analysis of official data derived from PHCC monthly activity forms revealed that the most commonly affected age group for all diseases was generally the

15-44 years age group. There are three reasons to explain the prevalence of this age group. First, it contains the economically active groups and as such they want to remain healthy so that they can work and earn money. Secondly, this age group spans more than 30 years whereas all other age groups for which data is collected spans a much smaller time span. As such, more visits to the PHCCs can be expected and third, this is the age group when the effects of aging become reflected in a higher incidence of all seven diseases included in this study.

The health service needs of children require different levels of provision and from Table 5.14 it can be seen that the three age groups from birth to 14 years generate just under 50 percent of all visits to PHCCs.

As indicated on page 26 in the Introduction to this thesis, diabetes mellitus has become the most common metabolic disorder among both adult men and women in the Region, see www.who.sci.eg/rd/Annualreports/1999/chapter5.htm. This site provided data from community based surveys in the countries of the Middle East that show exceptionally high rates of diabetes with prevalence rates among adults aged 40 years and older as high as 20% (e.g. Bahrain, Kuwait, Saudi Arabia). Mohsen (1995) has shown that in adults in Saudi Arabia over 30 years of age, 16 per cent of males were found to suffer from diabetes mellitus, compared to about 12 per cent of females in the same age group. in addition. Allballa, *et al.,* (1993) reported that diabetes is one of the most important diseases responsible for causing chronic degenerative disorder among people older than 60 years. From the PHCC data it was possible to calculate a logistic regression test for diabetes mellitus and the predictor of age. This test recorded a positive relationship at a significance of <0.05, see Table 6.4.

## 7.6 The least reported disease

While attention has been almost wholly focused on the main diseases and ailments it is relevant to look briefly at the disease with the lowest recorded incidence. Anaemia occupies this position. This may be due to the prevalence in the Saudi diet of dates which are very rich in iron in addition to nutrients and elements which help together to protect against Anaemia. The Pediatric Advisors group listed dates as one of the food stuffs which is very rich in iron, they estimated that each half cup of dates contains 2 mg of iron, see http://www.choc.com/pediatric/adv/hhg/iron.htm. Red blood cells need iron so they can carry oxygen to all the cells of the body. Low blood iron is a developed condition. It can be prevented by including food rich in iron daily with meals, as shown at the following site: http://www.noblood.com/anaemia.htm

The traditional Saudi meal of "Kabsa" is very rich in protein and helps to protect against Anaemia. However, both dates and Kabsa contributes to the prevalence of obesity with its high fats and carbohydrates content. The relatively high proportion of Diabetes and Hypertension may also be explained by the diet.

## 7.7 Analysis of the questionnaire

This research project had as its main aims the following:

- to test the level of satisfaction of patients towards primary health care services, and its impact on the level of utilizing these services,
- to know what are the most common diseases prevalent in the community, and
- the relation of the diseases with socio-economic and geographic factors found within the population of the eight selected PHCCs.
- to consider the level of utilization of health care services as influenced by the socio-economic and demographic composition of the districts.

The objectives were tested by means of a questionnaire the design and operation of which has been explained in Chapter 6.1. The first, and most important question asked the patient from what ailment they were suffering. The result of this question provided the rank order of ailments as set out on page 171 of Chapter Six. By recording the gender of the patients it became possible to show that children and females made more use of PHCC facilities than men and that these differences were statistically significant. Analysis of frequency of visits to the PHCC was examined in relation to preference of use in relation to other types of clinics (i.e. private clinics). The most important impetus for using the PHCC was the provision of good service, the availability of personal transportation and shortness of time taken to reach the local PHCC. All these variables were statistically significant at the 5% level. The average number of visits per patient to the health centre was in excess of four times per year. However, Table 6.8 shows that 8.3 per cent of patients made only one visit per year while 68.2 per cent made four or more visits per year. Time taken to reach the PHCC from the patient's home address was generally less than 15 minutes, reflecting well upon the location of the PHCC within its district. More than half of the respondents stated that they had used a car to reach it the health centre.

Next, the questionnaire provided information to test whether patients were attending their local health center at which attendance was, in theory, mandatory. The reasons stated by most of the surveyed patients for choosing the primary health care service for their personal health care treatment was (i) ease of access to the local PHCC and (ii) that treatment was free of charge. Surprisingly, there was considerable variation in the patient attendance patterns between the eight PHCC districts. Responses from the low income districts (Al Thaalebah, Bani Malek and Al Ruwais) suggested that availability of free health care was especially important whereas elsewhere, health centres were chosen primarily on the quality of the local doctors.

Ninety six per cent of the patients interviewed for the purpose of this research had health records in their designated PHCC. However, many respondents indicated that they also used other clinics, mainly for confirmation of the diagnosis that had been made at the PHCC. There was a strong positive correlation between income and use of other medical services. However, one district stood out from the general trend. Residents of Al Nuzlah Al Yamaneyyah who are ranked as being of low socio-economic status were the most likely to use other, private, health facilities. No explanation can be given for this behaviour, necessitating further research.

About half of the patients (48.5 percent) had used more than one private clinic for health care during the twelve months preceding the survey. However, the study showed during the survey that 85.1 percent of respondents had used the health centre at which they were registered. Only 14.9 percent claimed that the centre at which they were interviewed was not their usual centre; the reasons for attending another PHCC rather than the designated health centre in can be summarised as following:

- 34 percent of patients attributed their attendance to another PHCC to the experience of receiving bad medical services in their own PHCC.
- 22 percent claimed that they didn't know about the presence of their local health centre.
- 22 percent claimed that the working hours of the centre were not suitable for them.
- 21 percent claimed that the health centre was located too far from their home.

## 7.8 Use of traditional (alternative) folk healers for treatment

On page one of the Introduction, comment was made about the social, economic and political aspects of the provision of medical facilities. A proportion of the population that use the PHCC facilities are poorly educated and from a rural background. Their understanding of western medicine and the way in which pharmaceutical products can operate in effecting a cure is poorly understood. Instead, many people rely on traditional medicine as a means of ensuring their good health. Very little is known about the part played by traditional medicine in Jeddah. It undoubtedly takes places as a 'grey activity' but to what extent it competes with, or compliments, modern medicine is unknown.

Hyma and Ramesh (1994) have claimed that the interaction between modern and traditional medical systems has been poorly researched and this thesis cannot claim to have contributed to this area. However, it was considered necessary to obtain a general indication of the reliance on traditional medicine and one question asked if the patients had visited a traditional folk healer in the previous twelve months. Replies to this question showed that 17.2 percent of the users of the modern public health services had also made at least one visit to a folk healer in the previous 12 months. Most of these were women and children. The results of questions concerning the use of folk healing services indicated that individual patient factors were by far the most important factors regarding the use of traditional (alternative) health care methods. The highest percentage use of alternative medicine was recorded in Al Nuzlah Al Yamaneyyah, followed by Bani Malek and Madain Al Fahd. The differences observed between the surveyed groups regarding the use of alternative medicine reflected a wide variety of socio-economic characteristics such as, nationality, age, education, occupation and income. This study showed that Saudi national users of folk healers amounted to 134 patients, representing 18.9 percent of the all-Saudi patient population in the study. Non-Saudi users of folk healers amounted to 38 patients, representing 11.4 percent of all non-Saudi patients included in the study. There was a statistically significant difference ($p<0.05$) between Saudi and non-Saudi patients although the number of non-Saudi's was small. No significant difference was found in the use of traditional medicine by occupation, nor was there any evidence to suggests that the use of folk healers was linked to a particular education level or to income. In general, results from the questionnaire suggest that those with a lower income group and those living in the south of Jeddah, especially in the old part of the city, were most likely to obtain their health care from both the modern medical facilities and from alternative sources.

The variation in use of alternative medicine can be explained by the differences in ethnicity beliefs and traditions especially for non-Saudi. This cohort of patients originated from many different countries and differ considerably in their beliefs, tradition and attitudes towards folk healing. A statistically significant difference was also found between use of alternative medicine and age with 46.5 percent of users being above fifteen years old. These findings were in broad accord with the results of a study conducted in Tanzania, (Satimia *et al.*, 1998) where it was found that modern and traditional health facilities were equally used, but especially by persons older than 55 years and who were poorly educated. In Jeddah the age structure of the population differs from that in Tanzania. Only 7.7 per cent of the surveyed population was older than 45 years Table 6.25 indicating that the bulk of the population was more youthful and thus more prepared to accept modern medicine.

It is now considered by many workers that traditional medicine can be usefully used to compliment modern medicine (Meade and Earickson, 2000, p. 394) although at present there is little cooperation between the two forms of health care delivery. In Jeddah, this is undoubtedly the situation.

## 7.8 Accessibility and utilisation of PHCCs

Ease of access between patient and the health care system has long been known to be an important factor that influences uptake of service. Gesler (1984) and more recently, Meade and Earickson (2000) have stated that ease of interaction between consumer and provider is THE most important link in provision of a successful health care system. Access involves not only ease of physical access but, as discussed in Section 3.3, a wide range of social geography factors influence the use of medical services.

Three questions were included to test the means and ease of physical contact with the PHCC clinic. Results showed that the vast majority (81.2 percent) of users of primary health care services in all eight PHCC districts had their own transport. This high level of car ownership meant that most respondents had easy access to health centres and only 36.7 percent of respondents reached the clinics by walking. There was no difference in ownership of cars between those patients living in low income districts, for example, Al Thaalebah and Al Nuzlah Al Yamaneyyah or in high income districts e.g. Al Safa and Al Zahra'a PHCC districts. There were significant results between travel time and health care utilisation rates. A mean access time of less than 5 minutes was recorded by 45.1 percent and 15 minutes by a further 41.6 percent of the respondents. From these results it can be concluded that the locations of PHCC are generally suitable for the majority of patients and supports the reasons for the choice of the locations of the clinics. The Ministry of Health accepts that accessibility to health care must form one of the cardinal features of the PHCC and it is essential to ensure a high degree of geographical proximity and of social and functional access. Ideally, proximity of the PHCC services should be as near to the people as possible. Ministry of Health policy denotes that organised professional health care services administered through health centres should be available to every citizen within one hour of travel based upon the most common mode of transport available in that area. In Jeddah, 86.7 percent of the patients surveyed had access within 15 minutes. Only 4 patients took more than 60 minutes to reach their PHCC accounting for 0.4 percent of all respondents, clearly indicating that the MOH access benchmark was attained.

The frequency of visits to primary health care centres was examined for both demographic and socio-economic characteristics of patients. This study revealed that there was a statistically significant difference between different age groups as regards the frequency of visits to PHCC. Children under fifteen years of age were most numerous. This reflects a prominent feature in the Saudi Arabian population pyramid in which children under 15 years constitute a large proportion accounting for about 50 percent of the total population (Al Mazrou, 1991). In addition, children are categorised as one of the high risk groups, with specific risks associated with growth, development and survival. Child care is, therefore, delivered as an integral component of MOH services in the PHCC. Its activities are continuously and vigorously promoted and their use monitored by the regional and central health authorities.

## 7.9 Other social variables

Marital status was one of the variables matched against frequency of visits to the PHCC. Analysis of the questionnaires revealed that excluding children below the age of 15 years a substantial difference existed between the proportion of married and unmarried patients with a preponderance of married (86.8 percent) over unmarried (13.2 percent) patients. The high proportion of married persons in the survey was typical for most Middle East, Muslim countries in which the importance of marriage and family life are in contrast to the growing tendency towards single families in North America and Europe.

As regards education, more than 66 percent of the total number of respondents were classified as possessing a low level of education. Three PHCC districts located in the older part of Jeddah City along with southern areas dominated the poorer education category. Three districts recorded particularly high levels of poor education: Al Thaalebah (84.1 percent), Bani Malek (73.5 percent), and Al Balad (72.6 percent). Higher levels of education were more dominant in the northern part of Jeddah with the following districts recording the highest levels: Al Zahra'a (29. percent), and Al Safa (25.7 percent). Generally, there were significant differences between the eight PHCC districts and the distribution of respondents according to their level of education. This broadly reflected the intimate relationship between socio-economic status and education level and confirmed the general findings that the lowest socio-economic category of population was concentrated in the southern sectors of Jeddah and, in contrast, the highest socio-economic standards were located in the northern sector.

As regards nationality, most of the users of PHCC facilities were Saudi (83.2 percent) compared to non-Saudi (16.9 percent). The predominance of Saudi patients was an expected feature as it is normally only Saudi citizens who have eligibility for the utilisation of governmental health and medical facilities in Saudi Arabia. A few categories of non-Saudi population, namely those working in the government sector are eligible for PHCC-based treatment. Most of the non-Saudi patients originated from developing countries or from neighbouring Arab States. Analysis of the data showed there was a significant difference between Saudi and Non Saudi as regards their level of education. This relationship was due to the type of employment occupied by most of the non-Saudi population, namely, domestic staff, drivers, housewives and children.

Analysis of the data according to occupations for the interviewed attendants revealed that 12.4 percent were governmental employees compared to only 3 percent who were employed in the private sector. The remainders were mainly school children (35.1 percent) and housewives (21.8 percent). The difference shown between the numbers of respondents working in governmental sector compared to those working in the private sector can be attributed to the rules relating to the utilization of health care facilities. The Labor Office rules cite that private companies with 50 or more employees should provide curative health services for their employees though private health institutes (Labor Office Role (LO), 1968).

## 7.10 Impact of income on utilization of health services

This study showed the distribution of the population according to their different income level. The lowest income groups were found in the south of Jeddah City and confined mainly to the older sections, for example, Al Thaalebah (67.1 percent), Al Nuzlah Al Yamaneyyah (65 percent), Al Balad (56.1 percent), and Al Ruwais (51.8 percent). The middle and high-income groups were represented in the north of Jeddah, Al Zahra'a and Al Safa. Again, this re-confirms the distribution of population between north and south of Jeddah according to their socio-economic status.

A crucial factor in determining the utilization of PHCC services was the level of income on the users of the health centers. The relationship between income and level of utilization of health services was elaborated in various researches. Donner, (2000) found in her research in Canada that there was a positive relationship between income and health services utilization for non-sex-specific conditions. The health effects of income inequalities increase the burden of illness in all body systems, and data from the Manitoba Health show that for Manitoba women there is a connection between income and health services utilization Level of income was matched with other variables to determine if any correlation existed. The inter-relationship between income and location of habitation, nationality, frequency of visiting PHCC and membership of private clinics were assessed. A statistically significant relationship was found between the place of living for patients and the income ($P < 0.05$), This shows that the samples taken from districts with different socio-economic status was determined by the income of the respondents. Also, with nationality and income there was a significant difference ($P < 0.05$) between Saudi and non-Saudi, as the high-income group comprised mainly of Saudi Arabians. Moreover, there was a significant difference between the frequency of visiting the health care and the monthly income ($P < 0.05$). There was a preponderance of low income groups over high income groups regarding the frequency of visiting the PHCC. Also, there was a significant difference regarding registration in private clinics and the monthly income (P <0.05), the study showed that 76.2 percent of those who were categorized as high income group were also registered in private clinics, compared to 54.5 percent and 58.9 percent for low and medium income group respectively.

## 7.11 Type and size of housing

The type and condition of housing occupied by patients visiting the PHCCs was tested against family size to see if it influenced the utilisation level of PHCCs. It was found that there was no significant difference at P<0.05. The anticipation that a relationship might exist between these variables was probably invalidated due to the general trend amongst Arab families in general of having large families irrespective of income or house type.

Most of the persons sampled lived in flats (60.3 percent), while 31.8 percent lived in traditional houses. Type of housing is one of the main socio-economic factors that can be used as a surrogate to indicate the general physical environment. The highest figures for flatted accommodation were Al Safa (77.1 percent) and Al Zahra' a (76.8 percent). Most of respondents living in villas were located in the same PHCC districts (Al Safa and Al Zahra). These districts were located in the newer northern sections of Jeddah. The main location of traditional houses were found in southern and older parts of Jeddah, for example, in Al Thaalebah, Al Balad, Al Nuzlah Al Yamaneyyah, Bani Malek, and Madain Al Fahd. This distribution was confirmed by statistical analysis. There were significant differences between the type of housing in relation to monthly income and also with occupation. Most of the respondents lived in a rented houses (49.8 percent), while 46.3 percent lived in their owned houses. There was also a significant difference between the eight PHCC districts in relation to the property ownership for the respondents.

The frequency of visiting the PHCC was correlated with the type of property ownership, the assumption being that people who lived in their own properties were probably resident and stable in their place of domicile. As such, they would be more likely to make use of the nearest PHCC, that is, the health centre in their district. Such a practice would provide continuity in use of the same PHCC over time and would result in their medical records being regularly up-dated provided they continued to visit their health centre. People who lived in rented houses, for example, Al Balad (64.4 percent), Madain Al Fahd (55.0 percent), Al Safa (52.9 percent), Al Nuzlah Al Yamaneyyah (56.0 percent), and Al Zahra'a (48.3 percent), are more likely to move from one district to another. Under these circumstances, they may be registered in more than one health centre as their original record may be lost or the transfer between districts delayed. Multiple registration will become less likely when the patient records are finally transferred to a computerised record keeping system.

This study showed that the majority of respondents (57.8 percent) lived in medium to large size houses having between four and eight rooms, about one third of respondents lived in houses with one to three rooms. Only 3.8 percent of residents lived in large houses with nine rooms or more. It was shown that there was similarity in housing condition between Al Zahra'a and Al Safa which are located in the north of Jeddah. In these districts 77.1 percent and 76.8 respectively of respondents were living in flats. In contrast, it was shown that 63.6 percent of respondents in Al Thaalebah were living in traditional houses. As an over crowding index can be considered as one of the crucial factors which has impact on the occurrence and transmission of some diseases, the over crowding index was computed for the selected districts to help in explanation of the pattern of distribution of diseases. The index was higher in Al Thaalbah, Al Nuzlah Al Yamaneyyah and Madain Al Fahd, which are categorized as low socio-economic districts, if compared to Al Zahra, which is categorized as a high socio-economic district. The crowding index for all the selected centres ranged between one and nine persons per room with a mean value 1.2. An ANOVA test revealed that there were highly significant differences between the selected centres as regards the crowd index in the selected districts. Moreover, there was little variation in the number of toilets across the seven PHCC districts, in which the majority of houses have 2 or more toilets. Only one PHCC district was different, that of Al Thaalebah PHCC district, in which the majority of the houses of respondents (62.5 percent) had only one toilet. This may reflect the size of the houses in these districts. There was a significant difference between the eight PHCC districts according to number of the rooms and toilets in houses of the respondents.

## 7.12 Impact of Different Socio-Economic Criteria on Occurrence of Most Common Ailments

This study showed that Upper Respiratory Tract Infections were the highest in incidence in all centres except AL Nuzla and Al Safa where Dental and Gingival Diseases were the highest. Incidence of Upper Respiratory Tract Infections ranged between eight percent in Al Nuzla and 37.5 percent in Bani Malik, while the incidence of Dental and Gingival diseases ranged between 2.3 percent in Al Thaalebah and 28.6 percent in Al Safa. On the other hand, incidence of Diabetes Mellitus ranged between four percent in Al Zahra and 9.1 percent in AlThaalebah. There were significant differences between chosen districts as regards incidence of most common diseases among respondents (P<0.05).

Study of the incidence of the most common diseases among respondents according to their level of education revealed that Upper Respiratory diseases were the commonest among all studied groups except for those categorised as "can read only" where Diabetes became the commonest disease. Incidence of Upper Respiratory diseases ranged between 6.9 percent among those who "can read only" to 44.4 percent among those who were at the university level. Incidence of Diabetes ranged between 3.9 percent among preparatory school respondents to 29.6 percent among university level respondents, while incidence of Dental and Gingival diseases ranged between 6.9 percent among respondents who can read only to 18.5 percent among university level respondents. There were statistically significant differences between different levels of a respondent's education and occurrence of most common ailments (P<0.05).

An examination of the incidence of the most common diseases among respondents according to their occupation, (as patients described their own occupation status), revealed that Upper Respiratory disease was most common among school children, and those employed in private sectors. Diabetes was the commonest among governmental employees, self employed and unemployed respondents. Incidence of Upper Respiratory diseases ranged between 7.1 percent among unemployed to 28.4 percent among school children. Incidence of Diabetes ranged between 2.9 percent among school children to 36.8 percent among self employed respondents, while incidence of Dental and Gingival diseases ranged between 3.5 percent among housewives to 15.3 percent governmental employees. There was a statistically significant difference between respondent's occupation and occurrence of most common ailments (P<0.05).

# Chapter 8

## Conclusion

The purpose of the thesis was to addresses two main research questions:

1. To consider the level of utilization of health care services as influenced by the socio-economic and demographic composition of the districts and the associated level of satisfaction recorded by the patients using the health facilities;
2. To examine environmental and social factors as they affected the pattern of the most common diseases prevalent within Jeddah city.

### 8.1 Summary of Results

The research findings within the eight PHCCs revealed a pattern of disease that was broadly similar throughout. No one district appeared to have a statistically significant poorer pattern of disease than any other centres. Two districts, Al Zahraa and Al Safa, showed a statistically lower incidence of disease than all other districts. These two areas were located in the newest northern districts of Jeddah. The results based on the questionnaire survey were also broadly in agreement with the official PHCC data for all-Jeddah and for the 1995 data derived from MOH data for all-Saudi.

Throughout the four years covered by the data for the eight districts in Jeddah the most common disease was consistently that of upper respiratory disease. This result was confirmed by the findings from the questionnaire survey of 1000 patients. The highest incidence of URI was generally recorded in those districts with the lowest socio-economic indicators located in the south of Jeddah. There was a statistically significant difference in the level of URI recorded between the eight districts ($P<0.05$) but no difference was recorded between the eight districts over the time period 199295. A logistic regression test was applied to the occurrence of upper respiratory diseases and the predictors of nationality and age recorded a positive relationship at a significance p value of $<0.05$.

The fastest growing health problem identified by the research was that of the rapid increase in the number of reported cases of diabetes mellitus. This disease affects both adult men and women in the age groups above 30 years with as many as 16 per cent of males suffering from symptoms associated with diabetes mellitus and about 12 per cent of females in the same age group. The medium term significance of diabetes on an aging population will place additional strain upon the health service. A logistic regression test for diabetes mellitus showed age to provide a positive relationship at a significance of $<0.05$.

The main findings of the research can be summarised as follows:

1. The eight most common diseases had their greatest extent in districts in the south of Jeddah where the lowest social economic level could be found;
2. Almost all of the patients surveyed for the questionnaire had a medical record based upon their designated PHCC centre. In this respect the provision of primary health care delivered through the public clinics had a achieved a very high attainment level.
3. A little more than 50 per cent of the population used other medical facilities in addition to the PHCCs. The most unusual feature was that the district with the lowest socio-economic condition (Al Nuzlah Al Yammanyah) recorded the *highest* use of private facilities.
4. Almost one fifth of the population surveyed claimed they used traditional medicine and of this group, women and children were the main users. The main users were found in the lowest socio-economic groups but the use of this facility was not exclusive to any one particular education level.
5. Most of the patients gained access to their PHCC in less than 15 minutes, reflecting that the location of the PHCCs were generally well located for the majority of users.
6. Patients using PHCC facilities were drawn mainly from the lowest socio economic and education groups. Income levels of the users were confined to the lowest income categories, less than 3000 Saudi Riyals per annum (£500).

Most of the patients were used PHCC facilities lived in traditional houses and were located in the southern and older parts of Jeddah. This housing type had the poorest standards of construction and facilities (water supply and sanitation) and made the attainment of personal hygiene difficult especially considering the very high temperatures and humidity. Finally, building density was highest in this area resulting in overcrowding.

## 8.2 Limitations of the Study

The research conducted for this study encountered many problems, not least being the lack of a social science research base and the lack of social data, which in many countries would be available as a matter of course. This was especially the case for population census data and statistical information surrounding socioeconomic data.

The data that was available was usually seriously out of date and often showed great variance with other earlier data sets making the authenticity ofthe data values somewhat dubious. Data was sometimes collected in a manner that made its subsequent use of limited application. For example, at the PHCCs no differentiation was made between new patients and those reattending for repeat medication or longer term problems. The age groups of patients for which data was recorded comprised a small number of very uneven age groups, and in particular, only one age group spanned the economically active range of 15– 44 years. This age span of 30 years was far toogreat and did not allow the identification of changes that occurred within the age group.

Finally, when field work for this study was started, all official data was kept in paper format. Only recently have statistics been recorded in digital format, making their transfer and level of utility more widely available. Similarly, no digital maps were available for the study area.

## 8.3 Recommendations

Despite the limitations listed in the previous section it is believed that the research conducted for this thesis has made a positive contribution to the understanding of the distribution of the main diseases and ailments that occur in Jeddah Governorate.

The study has contributed to the knowledge of both the distribution and the pattern of utilisation of health services in a non-western country, about which little was previously known and at a time when the provision of health care facilities has been changing very rapidly. The study has also provided a great deal of empirical data on the immediate subject area and it is hoped that it will provide a foundation for future research in Saudi Arabia on the field of health in general and on the geography of health care in particular.

Although one of the ultimate goals of this study was to provide some ideas for planning an appropriate health care delivery system, planning objectives were not the primary focus for the study. Instead, the information revealed in this study can be used to modify and 'fine tune' the existing health care system.

The following summary points can be made:

- By using a computer-based geographic information approach for the collection, storage, integration, analysis and display of spatially referenced data, it has been possible to obtain a more thorough understanding of the data representing or associated with health and disease in Jeddah Governorate. Work conducted by many other workers in other countries has revealed complex geographical variations in the distribution of health and the associated need for health care.
- The health care needs have been influenced by a variety of social, environmental and health care factors.
- Geographical analysis of the variation in the pattern of human health can make an important contribution to the provision of public health. Mapping of disease status, while one of the simplest functions provided by Geographic Information Systems, provides an important aid to the understanding of local patterns of disease. Interpretation of the results of analysis can remain problematic.
- Issues of data quality are particularly important, especially at the small area level.
- The usefulness of GIS in health service planning has been recognised and its application is expanding. Patterns of health care use can be examined and location analysis applied to decision-making concerning the optimal configuration of services while at the same time, taking account of population distribution, location of current health care facilities, transport links and other factors. It may also be helpful in

analysing access to health services and equity in their provision.

There remains a major need for further research on the patterns of disease in Saudi Arabia in general and Jeddah in particular. By focusing on the utilisation of the primary health care centres in chosen districts, attention was paid in this study to the more common ailments and illnesses that brought patients to the PHCC. This study has shown that much more research is needed on the patterns of health and health trends at the local and regional levels. This work is necessary to enable a fuller assessment of future health care needs in Jeddah. In particular, the issue of morbidity and mortality in Jeddah should be fully explored by future research. Such research should study the epidemiology of the most common diseases in the Governorate. This study should take into consideration the issues of variation in the socio-economic level in the Governorate, ethnicity and the local culture within any districts. Also causes of mortality in different sectors of the Governorate must be examined. Such a study might enable an answer to be found to the commonly held assumption that the population of the southern sectors of the city of Jeddah have different causes of death and at different ages from the population of the more affluent, modern sectors of the city. A classification of the patterns of morbidity and mortality in the Governorate would allow an insight into the prevailing inequality in distribution of health facilities within Jeddah.

Only when considerable further basic research and collection of health statistics has been completed will it become possible for new research to address issues such as the possible variation in the need for health care from one district to another. These different issues should be included on the agenda for future research by Saudi geographers. The continuity of research in diseases, health and medicine is one of the basic guarantors of improving the quality of life for the population.

This study was limited to the use of the public health centres in Jeddah. A quite separate layer of health care provision is provided for by private clinics. There is a major shortage of information on the utilisation of private health facilities as well as alternative (traditional) medicine. It would be highly appropriate if more research were conducted to discover the level of utilisation of the private health care sector and to compare the utilisation levels of private and public health services.

Improvements in the availability, accuracy and speed of delivery of information concerning the demographic data for Jeddah is necessary before a more accurate assessment of the distribution of disease is possible. The maintenance of personal health records must be improved as these records provide the basis of all health statistics Medical practitioners must be made aware of the need to maintain medical records as without this data the medical profession itself will be unable to provide the best level of health care to the public.

The improved availability of data will allow the preparation of demographic maps showing the regional population distribution and the location of existing health services. This information can be combined with the pattern of ailments and the availability of specialist facilities, such as X-ray services, laboratories, and dental clinics, at selected PHCC sites. The use of GIS analysis will allow the identification of the nearest referral hospitals to the PHCCs and will also identify any gaps in provision.

Strict regulation for maintaining patient records and reports should be introduced so that a better understanding of the utilisation of facilities at PHCCs can be made. One outcome of the research has been to show that the demand for PHCC services is greater in the socially poorer districts in the older, southern parts of Jeddah whereas most physicians live in the north of Jeddah and wish to work in the vicinity of their homes. Redistribution of physicians working in primary health care centres based on a simple statistical analysis showing the mean number of patients attending the health centres divided by the total number of physicians was shown to be necessary. Transferring doctors away from their desired place of work to those areas in which they are most needed may require a modification of working hoursto encourage physicians to work some distance from their homes.

Analysis of the questionnaire suggested patients would welcome extended opening hours of PHCCs, especially later opening. Night time opening would permit greater access to the public health care service and would help reduce the problem of over crowding in emergency rooms during the day. However, more medical staff would be required to provide services across a longer time span and this would result in increased operating costs.

An improved referral system for patients should be developed to strengthen communication and co-operation between primary care centres and hospitals. Such a system would facilitate and co-ordinate a wide range of existing range of patient services which are, at present, only loosely connected. Provision of a telephone help line between primary health physicians and specialists would permit easier referrals and would also assist in preventing misunderstandings between different health service providers. A system in which medical specialists could visit health centres would enable those patients unable to obtain easy access to hospitals to gain expert diagnosis. In addition, follow-up visits for specialists to PHC clinics could provide access to patients in need of specialist care. Closer working practices between PHCC medical staff and specialists could promote better understanding between primary health physicians and specialists in hospitals. Use of electronic mail (e-mail) between primary health centres and hospitals would improve the quality of referral and speed up the referral process.

From extensive visits to PHCCs throughout Jeddah it was discovered that most primary health physicians are non-Saudi. A programme of educating new immigrant staff on the special socio-economic conditions that prevail in the districts would be of major benefit both to staff and patients. Social workers may be the best people to enlighten the foreign physicians about cultural differences in Saudi society.

The questionnaire revealed that integration of traditional medicine with modern medicine could offer the potential to correct the deficiencies of each and to enable the development of medical science that would provide a better overall level of treatment. The role of herbal medications needs to be investigated. Herbal treatments administered on a self-help basis are still extensively used but the scientific explanation for the success of herbal treatment is still poorly known. Medicinal plants used for treatment are generally locally available and are relatively cheap.

A programme of community health participation is required, whereby the value creating a healthy personal life style is imparted on the community. This would olve a media campaign using radio, TV and local newspapersand supported by the iistry of Health. A major health education programme should be introduced for the population in general and in particular for the population of the poorer districts in the southern sectors of Jeddah. The aim of these programmes shoild be to modify the attitudes and behaviour of the population toward the creation of a healthier life style.

Changes in the policy and practice of PHCC services will require more financial resources. Many of these measures proposed above will require additional funding. This has implications for the allocation of expenditures within the health sector budget. From both a practical and economic perspective it should be possible to achieve improvements to the current level of health care services making it one of the best in the world. It was shown in Table 5.2 that in 1998 Saudi Arabia spent 5.1 per cent GDP on health care provision, one of the lowest figures in the table. By gradually increasing this amount the level of service provided by the PHCCs would be able to include the improvements in the service discussed above.

Controversially, it is proposed that a nominal charge for utilising government health care services should be introduced. This could take the form of a charge for registration at a health centre or a small contribution to the cost of prescriptions. The introduction of charges, while inevitably unpopular with the public, would limit the current misuse of health care facilities, for example clinic waiting rooms often become used as social meeting areas especially by females.

Finally, more detailed studies are needed to clarify the reasons for the wide variations in utilisation of health centres in Jeddah Governorate.

# Appendix 1

## The Family Health Profile

Kingdom of Saudi Arabia
MINISTRY OF HEALTH
General Directorate Of Health

HEALTH CENTRE ________

المملكة العربية السعودية
وزارة الصحة
المديرية العامة للشئون الصحية

المركز الصحي ________

FAMILY HEALTH PROFILE

السجل الصحي العائلي

| Registration No. | | | | | | | | | رقم السجل |
|---|---|---|---|---|---|---|---|---|---|

Name of Head of Family ________________________ اسم رب العائلة

| Family Name | Middle Name | First Name |
|---|---|---|
| اسم العائلة | اسم الأب | الاسم الأول |

Residential Address ________________________ عنوان السكن

________________________

Place of Work & Address ________________________ مكان العمل والعنوان

________________________

I.D. Number ________________________ رقم الهوية

Telephone Number ________________________ رقم التليفون

Date of Registration ________________________ تاريخ التسجيل

| | | | | | | |
|---|---|---|---|---|---|---|
| TYPE OF FAMILY: | Single ☐ صغيرة | Extended ☐ كبيرة | | | | نوع العائلة : |
| APPROX. FAMILY INCOME PER YEAR: S.R. | ☐ | | | | | دخل العائلة السنوي التقريبي - ريال - |
| TYPE OF HOUSE: | Nomadic ☐ بدو | | | | | نوع السكن (البناء) |
| Wood & Tin ☐ خشب وصفيح | Mud Mortar ☐ طين | Thatched Hut ☐ كوخ | | | | |
| Cement & Brick ☐ مسلح | Flat ☐ شقة | Villa ☐ فيلا | | | | |
| NUMBER OF LIVING ROOMS: | | | | | | عدد غرف البيت : |
| LIGHTING: | | | | | | الاضاءة : |
| Natural ☐ طبيعي | Artificial ☐ صناعي | | | | | |
| Adequate ☐ كافية | Inadequate ☐ غير كافية | | | | | |
| VENTILATION: | | | | | | التهوية |
| Natural ☐ طبيعي | Artificial ☐ صناعي | | | | | |
| Adequate ☐ كافي | Inadequate ☐ غير كافي | | | | | |
| SOURCE OF WATER SUPPLY : | | | | | | مصدر المياه . |
| Ponds ☐ تجمع مائي | Well ☐ بئر | Stream ☐ مجرى ماء (نبع) | | | | |
| Tanker ☐ وايت | Municipal ☐ شبكة (عام) | Other ☐ أخرى | | | | |
| DISPOSAL OF GARBAGE: | | | | | | التخلص من النفايات (القمامة) : |
| Sanitary ☐ صحي | Insanitary ☐ غير صحي | | | | | |
| DISPOSAL OF HUMAN EXCRETA: | | | | | | التخلص من فضلات الانسان : |
| Open Field ☐ في العراء | Sanitary Latrine ☐ مرحاض صحي | | | | | |
| REFREGERATOR: | Present ☐ موجودة | Absent ☐ غير موجودة | | | | الثلاجة : |
| ANIMAL PETS: | Present ☐ موجودة | Absent ☐ غير موجودة | | | | حيوانات أليفة : |
| | Specify ☐ حدد | | | | | |
| INSECTS & RODENTS: | Present ☐ موجودة | Absent ☐ غير موجود | | | | حشرات وقوارض: |
| | Specify ☐ حدد | | | | | |

USUAL TYPE OF HEALTH SERVICE AVAILED: نوع الخدمات الصحية المستعملة :

Government ☐ حكومي Private ☐ خاص Pharmacy ☐ صيدلية

Traditional Healer ☐ علاج شعبي Other Specify ☐ آخر (حدد)

BREAST FEEDING: Encourraged ☐ مشجعة Discouraged ☐ الرضاعة الطبيعية : لا أهمية لها

USUAL TYPE OF INTRANATAL SERVICES AVAILED: نوع الخدمات الصحية المستعملة أثناء الولادة :

Elder Ladies of House ☐ النساء الكبيرات في السن في المنزل Untrained Village Women ☐ نساء المنطقة غير المدربات

Midwife ☐ القابلة Doctor ☐ الطبيب

Domiciliary ☐ في البيت Institutional ☐ في مؤسسة صحية

COMMON AGE AT A CHILD IS INTRODUCED TO SOLID FOOD: معدل العمر للأطفال عند ادخال أغذية جافة مع الحليب

NUMBER OF DEATHS OF CHILDREN BELOW عدد وفيات الأطفال في عمر أقل من سنة

ONE YEAR IN LAST TWELVE MONTHS: خلال الاثني عشر شهرا الماضية :

Males ☐ ذكور Females ☐ أناث

Probable Cause: الاسباب المحتملة

NUMBER OF MATERNAL DEATHS IN LAST ONE YEAR: عدد وفيات الامومة خلال الاثني عشر شهرا الماضية :

FAMILY STRUCTURE: تكوين العائلة

| S. No. رقم | Name الاسم | Relationship With H.O.F. صلة قرابة برب الأسرة | Age العمر | Sex الجنس | Educational Status مستوى التعليمي | Occupation المهنة | Marital Status الحالة الزوجية | Immunization Status حالة التحصين |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

## The Application of the Monthly Activities and Services in the Health Centres. Sample pages extracted from Arabic original.

المملكة العربيه السعوديه
وزارة الصحـــة
ادارة الاحصـــــــــــاء
مديرية الشئون الصحيه بمنطقة :
القطاع
أسم المركز الصحي : ----------

## انشطة وخدمات المركز الصحي

خلال شهر ١٤١ هـ

ملحوظة :

- تتم مراجعة التقرير من ادارة الرعاية الصحية الأولية بالمديرية
- يتم تفريغه فى نموذج خاص من قبل ادارة الاحصاء بالمديرية
- ترسل نسخة من التفريغ الى الادارة العامة للمراكز الصحية بالوزارة
- يرسل اصل التفريغ الى ادارة الاحصاء بالوزارة

## ٦ ) مراجعى العيادات

الامراض الشائعة فى الرعاية الصحية الاولية

| المرض | الرقم الكودى للمرضى | العدد الاجمالى | الجنسية | | الجنس | | العمر بالسنين | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | سعودى | غير سعودى | ذكر | انثى | اقل من ١ | ١-٤ | ٥-١٤ | ١٥-٤٤ | ٤٥-٦٤ | ٦٥< |
| الامراض الطفيلية و المعدية | ٠١١ | | | | | | | | | | | |
| الديدان المعوية | ٠١٢ | | | | | | | | | | | |
| مرض السكرى | ٠١٣ | | | | | | | | | | | |
| فقر الدم | ٠١٤ | | | | | | | | | | | |
| امراض العيون | ٠١٥ | | | | | | | | | | | |
| امراض الاذن و الماستويد | ٠١٦ | | | | | | | | | | | |
| ارتفاع ضغط الدم | ٠١٧ | | | | | | | | | | | |
| امراض الشرج و ما حوله | ٠١٨ | | | | | | | | | | | |
| التهابات الجهاز التنفسى العلوى | ٠١٩ | | | | | | | | | | | |
| الالتهابات الرئوية | ٠٢٠ | | | | | | | | | | | |
| الامراض الانسدادية الرئوية المزمنة | ٠٢١ | | | | | | | | | | | |
| الاجسام الغريبة فى العين و الاذن و الانف | ٠٢٢ | | | | | | | | | | | |
| امراض اللثة و الاسنان | ٠٢٣ | | | | | | | | | | | |
| امراض المعدة و المرىء و الامعاء الدقيقة | ٠٢٤ | | | | | | | | | | | |
| التهابات مجرى البول | ٠٢٥ | | | | | | | | | | | |
| التهابات الثدى لدى النساء | ٠٢٦ | | | | | | | | | | | |
| التهابات اعضاء الحوض لدى النساء | ٠٢٧ | | | | | | | | | | | |
| الام الطمث و النزف الرحمى | ٠٢٨ | | | | | | | | | | | |
| امراض الجلد و النسيج الخلوى | ٠٢٩ | | | | | | | | | | | |
| امراض الجهاز العظمى و العضلى | ٠٣٠ | | | | | | | | | | | |
| الالتواءات و الكسور والخلع بالعظام والمفاصل | ٠٣١ | | | | | | | | | | | |
| الحريق | ٠٣٢ | | | | | | | | | | | |
| الحمل * | ٠٣٣ | | | | | | | | | | | |
| الجروح المفتوحة | ٠٣٤ | | | | | | | | | | | |
| اخرى تذكر | ٠٣٥ | | | | | | | | | | | |
| | | | | | | | | | | | | |
| المجموع | | | | | | | | | | | | |

* يقصد بها مضاعفات الحمل

# Appendix 3

## Patient Questionnaire
## a. English translation

User of Primary Health Centre Questionnaire:

| | | | |
|---|---|---|---|
| Form | | No | ( ) |
| District | No | ( ) | |
| Centre | Name | ______________ | |
| Man | | No | ( ) |
| Woman | | No | ( ) |
| Child | | No | ( ) |

Part One: Use of Health Centre:

(1) Why have you visited the health centre today? Because you have a health problem related to:

| Disease Code | The Disease | |
|---|---|---|
| 11 | Parasitic & Epidemic Diseases | ( ) |
| 12 | Intestinal Worms | ( ) |
| 13 | Diabetes Mellitus | ( ) |
| 14 | Anaemia | ( ) |
| 15 | Ophthalmic Diseases | ( ) |
| 16 | Ear and Mastoid Diseases | ( ) |
| 17 | Hypertension | ( ) |
| 18 | Anal Diseases | ( ) |
| 19 | Upper Respiratory Infections | ( ) |
| 20 | Pneumonia Diseases | ( ) |
| 21 | Chronic Obstructive Pneumonia Diseases | ( ) |
| 22 | Foreign Bodies in Ear, Nose & Eye | ( ) |
| 23 | Dental & Gingival Diseases | ( ) |
| 24 | Stomach, Oesophagus & Small Intestine Diseases | ( ) |
| 25 | Urinary Tract Infections | ( ) |
| 26 | Breast Diseases | ( ) |
| 27 | Pelvic Infections | ( ) |
| 28 | Dysmenorrhoea & Uterus Bleeding | ( ) |
| 29 | Skin & Cellular Diseases | ( ) |
| 30 | Muscular & Bone Diseases | ( ) |
| 31 | Dislocation & Fraction of Bones and Joints | ( ) |
| 32 | Burns | ( ) |
| 33 | Complication of Pregnancy | ( ) |
| 34 | Open Wounds | ( ) |
| 35 | Others | ( ) |

(2) Which of the following are the most important reasons for you choose this health centre for treatment?

1- Because it is closed to your residence?
2- Because it provides a good service?

3- Because it has a good doctor(s)?
4- Because it is free of charge?
5- other reasons (please specify) ________________

(3) Have you been to this health centre before?

1 - Yes    2 - No

(4) How many times have you visited this health centre in the last 12 months for treatment or advice?

1 - One time    2 - Two times
3 - Three times    4 - More than four times

(5) Do you have a health record in this health centre?

1 - Yes    2 - No

(6) Are you registered in a private clinic in Jeddah?

1 - Yes    2 - No

If yes, which other type of the following clinics do you usually use?

1- Private hospital    2- Public hospital
3- Dispensary    4- School clinic
5- Private clinic    6- Others

(7) Today, have you visited the health centre alone or with another individual from you family who comes with you for treatment or advice?

1 - Yes    2 - No

(8) Is this health centre the one that you and your family usually use?

1 - Yes    2 - No

If no

1- Because we did not know about the health centre before.
2- Because the medical service is not good.
3- Because it is too far from home.
4- Because the opening time is not suitable.

(9) In the last 12 months, have you ever visited another clinic in Jeddah for treatment?

1 - Yes    2 - No

If yes, which centre do you think most improved your

Health?

1- this health centre
2- some other health centre
3- there is no difference between them.

(10) In the last 12 months, have you ever visited another clinic or Hospital in another region(s) in the kingdom?

1 - Yes 2 - No

If yes, specify name of the clinic ______________________.

(11) Do you think if you go to Riyadh (the capital) for treatment it Would provide better treatment than in this health centre or in any Other place for treatment in Jeddah City?

1 - Yes, certainly 2 - No, certainly 3 - Unsure

(12) In the last 12 months, have you visited a local folk healer(s) for treatment or advice?

1 - Yes 2 – No

Part Two: Type of Transportation used to travel to the health centre

(13) What type of transportation did you use to reach to this health centre today?

1 - Walking 2 - Bus
3 - Private car 4 - Taxi
5 - Friend's car 6 - Other (specify) __________

( 14 ) How long does it take by car to reach this health centre from your home?

1 - Less than 5 minutes 2 - 6 to 15 minutes
3 - 16 to 30 minutes 4 - 31 to 45 minutes
5 - 46 to 60 minutes 6 - More than one hour

Part Three: Personal Information and Household and Family Details:

(15) Age group: Which age group do you belong to?

1 - Less than 1 year 2 - 1 to 4 years
3 - 5 to 14 years 4 - 15 to 44 years
5 - 45 to 64 years 6 - More than 65 years

(16) Marital status

1 - Married 2 - Single

(17) Where do you live?

1 - Name of district ____________________

(18) How long have you been living at your current address?

1 - Less than 1 year 2 - Less than 2 years
3 - Less than 5 years 4 - More than 5 years

(19) What is your level of education?

1 - Illiterate 2 - Can read only
3 - Preparatory school 4 - Intermediate school
5 - Secondary school 6 - University degree
7 - Other (specify) ____________________

(20) Nationality

1 - Saudi 2 - Non-Saudi

(21) Place of birth ____________________

(22) What of these categories describes you best?

1 - Government employee
2 - Private sector employed
3 - Student
4 - Housewife
5 - Self employed , (Trader or Businessman)
6 - Herdsman
7 - Farmer
8 - Unemployed
9 - Child
10 - Other (please specify) ____________________

(23) Would you mind telling me what is your household monthly Income in Saudi Riyals?

1 - Less than 1000 2 - 1000 to 2999
3 - 3000 to 4999 4 - 5000 to 6999
5 - 7000 to 8999 6 - 9000 to 10999
7 - 11000 to 12999 8 - 13000 to 14999
9 - More than 15000

(24) How many individuals of the following categories live in your house?

| 1 - Children under 12 years of age | 2 - Males above 12 years of age | 3 - Females above 12 years of age |
|---|---|---|
| | | |

(25) What type of house do you live in?

1 - Villa 2 - Traditional house
3 - Flat 4-Other ______________

(26) Is the house you live in

1 - Owned by you or your family?
2 - Rented?
3 - Provided by the employer?
4 - Other (please specify) ____________________

(27) How many rooms and toilets are there in your house?

1 - Number of rooms ______________
2 - Number of toilets ______________

(28) Do you or anyone in your household own a car?

1 - Yes 2 – No

(29) Does your household have a telephone?

1 - Yes 2 - No

## b. Arabic original

جامعة الملك عبد العزيز

نموذج رقم

..................

كلية الآداب والعلوم الإنسانية

إســـم الحي

.....................

قسم الجغرافيـــا

إسم المركز

.....................

إستبانة لدراسة في الجغرافيا الطبية
( لدرجة الدكتوراة )

عنوان الرسالة
التحليل المكاني لبعض الأمراض في مدينة جدة
- من خلال مراكز الرعاية الصحية الأولية -

هذه دراسة ميدانية لدراسة علمية جغرافية
لدرجـة الدكتوراه . هـذه المعلومات لن
تستخدم إلا للبحث العلمي وأن تعاونكـــم
وتجاوبكـــم ســـوف يكون دعامة لتأصيل
البحث العلمي الموضـوعي دراســـة
مجتمعنا الســـعودي .
.. ونحن نشكرك مسبقا على تعاونك ..

1417هـ - 1996م

الرجاء وضع دائرة حول العبارة المختارة :

الجزء الأول : استخدام المركز الصحي :-

1- ما هو سبب وجودك في المركز الصحي ؟ هل هو بسبب إحدى المشاكل التالية :

11- الأمراض الطفيلية والمعدية 12- الديدان المعدية
13- مرض السكر 14- فقر الدم
15- أمراض العيون 16- أمراض الأذن
17- ارتفاع ضغط الدم 18- أمراض الشرج
19- التهابات الجهاز التنفسي العلوي 20- الالتهابات الرئوية
21- الأمراض الإنسدادية الرئوية المزمنة 22- الأجسام الغريبة في العين والأذن والأنف
23- أمراض اللثة والأسنان 24- أمراض المعدة والمريء والأمعاء الدقيقة
25- إلتهابات مجرى البول 26- التهابات الثدي لدى النساء
27- إلتهابات أعضاء الحوض لدى النساء 28- آلام الطمث والنزف الرحمي
29- أمراض الجلد والنسيج الخلوي 30- أمراض الجهاز العظمي والعضلي
31- الإلتواءات والكسور والخلع بالعظام والمفاصل 32- الحروق
33- مضاعفات الحمل 34- الجروح المفتوحة
35- أخرى تذكر
..............................................................................
..............................................................................

2- ما هو سبب استخدامك لهذا المركز الصحي دون غيره من المراكز الصحية ( اختار إجابة واحدة فقط ) .

1- بسبب قربه من المنزل 2- بسبب الخدمه الجيدة
3- بسبب وجود أطباء ممتازين 4- بسبب مجانية العلاج
5- أخرى أذكرها
......................................................
......................................................

3- هل سبق لك زيارة هذا المركز الصحي ؟

1- نعم 2- لا

4-كم عدد المرات التى زرت بها المركز الصحي خلال أل 12 شهر الماضية من أجل العلاج؟
1- مرة واحدة 2- مرتان
3- ثلاث مرات 4- أربع مرات فاكثر

5- هل لديك سجل صحي في هذا المركز ؟
1- نعم 2- لا

6- هل لديك ملف صحي في أي مكان آخر غير هذا المركز ؟
1- نعم 2- لا
إذا كانت الإجابة بنعم أي من هذه الأماكن تزور للعلاج؟
1-مستشفى خاص 2- مستشفى حكومي
3- مستوصف 4- عيادات مدرسية
5- عيادة خاصة 5- أخرى تذكر ..................

7- هل كان حضورك اليوم إلى هذا المركز الصحي بمفردك أو بصحبة أحد أفراد أسرتك المحتاجين إلى علاج ؟
1- نعم 2- لا

8- هل تعالج دائما في هذا المركز أنت وجميع أفراد أسرتك ؟

1- نعم 2- لا
إذا كانت الإجابة بلا فان السبب الرئيسي هو :
1- لعدم المعرفة المسبقة بالمركز 2- لعدم توفر الخدمة الطبية الجيدة
3- لبعد المسافة 4- لعدم مناسبة مواعيد فتح المركز

9-هل سبق لك زيارة مكان آخر في مدينة جدة غير هذا المركز طلبا للعلاج خلال 12 شهر الماضية ؟

1-نعم 2- لا

إذا كانت الإجابة بنعم :- فأيهما أفضل 1- هذا المركز 2- مكان آخر 3- لا يوجد فرق

10- هل زرت مكان آخر للعلاج في أية محافظة من محافظات المملكة خلال أل 12 شهر الماضية؟

1-نعم 2- لا

إذا كانت الإجابة بنعم :

اذكر اسم المركز أو المستشفى: ..............................

11 - هل تعتقد بأنك لو زرت أية مكان للعلاج في مدينه الرياض سيكون أفضل بكثير من العلاج في هذا المركز الصحي و في أية عيادة في مدينة جدة ؟

- بالتاكيد نعم - بالتاكيد لا - لا أعرف

12-في خلال 12 شهر الماضية هل زرت أحد الأطبــاء الشعبيين من أجل العلاج أو النصيحة ؟

1-نعم 2- لا

الجزء الثاني : وسيلة المواصلات :

13- ما هي الوسيلة التي تستخدمها للوصول إلى المركز ؟

1- المشي 2- الأتوبيس

3-سيارة خاصة 4- سيارة أجره

5- سيارة صديق 5- أخرى ........................

14-كم المدة التي تستغرقها للوصول إلى المركز بالسيارة ؟

1- خمس دقائق فاقل 2- من 6-15 دقيقة

3- من 16-30 دقيقة 4- من 31- 45 دقيقة

5-من 46-60 دقيقة 6-أكثر من ساعة واحدة

رابعا : المعلومات الشخصية :

15- كم عمرك ؟

1- أقل من سنه 2- من 1 - 4 سنوات 3- من 5 - 14 سنه

4- من 15 - 44 سنه 5- من 45 - 64 سنه 6- أكثر من 65 سنه

16- الحالة الاجتماعية : 1- متزوج 2- اعزب

17- أين تسكن ؟

1- أسم الحي:..............

18- منذ متى تسكن في هذا الحي ؟-

1- أقل من سنة 2- أقل من سنة
3-أقل من خمس سنوات 4- خمسة فأكثر

19- ما هو مستواك التعليمي ؟
1- أمي 2- قراءة فقط 3- ابتدائي
4- إعدادي 5- ثانوي 6- جامعي
7- أخري تذكر ............

20- الجنسية : 1- سعودي 2- غير سعودي

21- مكان الولادة : .......................

22- ماهي مهنتك ؟
1- موظف حكومي 2- موظف قطاع خاص 3- طالب 4- ربة منزل
5- أعمال خاصة مثل تاجر او رجل أعمال 6- راعي 7- مزارع
8- عاطل عن العمل 9- طفل 10- أخرى ...........

23- ما هو دخلك الشهري ؟
1- أقل من 1000 ريال 2- من 1000-2999 3-من3000 - 4999
4- من5000 - 6999 5- من 7000- 8999 6- من 9000- 10999
7- من11000 - 12999 8- من13000- 14999 9- أكثر من 15 الف

24- ما هي الفئات التي تعيش معك في المنزل ؟

| 1-أطفال اقل من 12 سنه | 2- ذكور أكثر من 12 سنه | 3- إناث أكثر من 12 سنه |
|---|---|---|
| | | |

25 -ما نوع المسكن ؟
1-فيلا 2- بيت شعبي
3- شقه 4- أخرى .........

26- هل المنزل الذي تسكنه:
1- ملك لعائلتك 2- مستأجر
3- ملك لصاحب العمل 4- أخرى تذكر.........

27- كم عدد الغرف والحمامات في منزلك ؟
1- عدد الغرف........ 2- عدد الحمامات ........

28- هل تملك سيارة خاصة ؟ 1- نعم 2- لا

29- هل لديك تليفونا في منزلك ؟
1- نعم 2- لا

# Appendix 4

## Detailed Breakdown of Reasons for Choosing the Primary Health Care Centre

Al Zahra'a (PHCC)

| The Choice | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| - Because it is near to your residence. | 29 | 29.9 | 13 | 13.4 | 55 | 56.7 |
| - Because it provides a good service. | 6 | 20.7 | 2 | 6.9 | 21 | 72.4 |
| - Because there is a good doctor. | 29 | 56.9 | 4 | 7.8 | 18 | 35.3 |
| - Because it is free of charge. | 10 | 28.6 | 7 | 20.0 | 18 | 51.4 |
| - Other reasons. | - | | - | | 1 | 100 |

Source: Author's Field Survey, 1996.

Al Safa (PHCC)

| The Choice | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| - Because it is near to your residence. | 15 | 30 | 10 | 20 | 25 | 50 |
| - Because it provides a good service. | 7 | 38.9 | 2 | 11.1 | 9 | 50 |
| - Because there is a good doctor. | 4 | 30.8 | 2 | 15.4 | 7 | 53.8 |
| - Because it is free of charge. | 3 | 16.7 | 2 | 11.1 | 13 | 72.2 |
| - Other reasons. | - | | - | - | - | - |

Source: Author's Field Survey, 1996.

Bani Malek (PHCC)

| The Choice | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| - Because it is near to your residence. | 43 | 40.2 | 15 | 14 | 49 | 45.8 |
| - Because it provides a good service. | 1 | 10.0 | 3 | 30 | 6 | 60 |
| - Because there is a good doctor. | 1 | 4.3 | 4 | 17.4 | 18 | 78.3 |
| - Because it is free of charge. | 32 | 58.2 | 4 | 7.3 | 19 | 34.5 |
| - Other reasons. | - | | - | - | - | - |

Source: Author's Field Survey, 1996.

Al Ruwais (PHCC)

| The Choice | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| - Because it is near to your residence. | 24 | 31.6 | 9 | 11.8 | 43 | 56.6 |
| - Because it provides a good service. | 6 | 33.3 | 4 | 22.2 | 8 | 44.4 |
| - Because there is a good doctor. | 8 | 21.1 | 7 | 18.4 | 23 | 60.5 |
| - Because it is free of charge. | 11 | 42.3 | 4 | 15.4 | 11 | 42.3 |
| - Other reasons. | 1 | 25.0 | - | - | 3 | 75.0 |

Source: Author's Field Survey, 1996.

Al Balad (PHCC)

| The Choice | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| - Because it is near to your residence. | 14 | 28.0 | 7 | 1.4 | 29 | 58.0 |
| - Because it provides a good service. | 12 | 50.0 | 2 | 8.3 | 10 | 41.7 |
| - Because there is a good doctor. | 6 | 35.3 | 3 | 17.6 | 8 | 47.1 |
| - Because it is free of charge. | 4 | 33.3 | 3 | 25.0 | 5 | 41.7 |
| - Other reasons. | - | - | - | - | - | - |

Source: Author's Field Survey, 1996.

Al Thaalebah (PHCC)

| The Choice | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| - Because it is near to your residence. | 27 | 32.5 | 15 | 18.1 | 41 | 49.4 |
| - Because it provides a good service. | 7 | 58.3 | 1 | 8.3 | 4 | 33.3 |
| - Because there is a good doctor. | - | - | - | - | 2 | 100 |
| - Because it is free of charge. | 14 | 31.1 | 13 | 28.9 | 18 | 40.0 |
| - Other reasons. | - | - | 1 | 50.0 | 1 | 50.0 |

Source: Author's Field Survey, 1996.

Al Nuzlah Al Yamaneyyah (PHCC)

| The Choice | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| - Because it is near to your residence. | 44 | 37.0 | 19 | 16.0 | 56 | 47.1 |
| - Because it provides a good service. | 7 | 28.0 | 4 | 16.0 | 14 | 56.0 |
| - Because there is a good doctor. | 5 | 22.7 | 2 | 9.1 | 15 | 68.2 |
| - Because it is free of charge. | 17 | 56.7 | 2 | 6.7 | 11 | 36.7 |
| - Other reasons. | 1 | 50.0 | - | - | 1 | 50.0 |

Source: Author's Field Survey, 1996.

Madain Al Fahd (PHCC)

| The Choice | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| - Because it is near to your residence. | 50 | 36.2 | 22 | 15.4 | 66 | 47.8 |
| - Because it provides a good service. | 6 | 24.0 | 11 | 44.0 | 8 | 32.0 |
| - Because there is a good doctor. | 15 | 39.5 | 9 | 23.7 | 14 | 36.8 |
| - Because it is free of charge. | 10 | 26.3 | 8 | 21.1 | 20 | 52.6 |
| - Other reasons. | 1 | 50.0 | - | - | 1 | 50.0 |

Source: Author's Field Survey, 1996.

# Appendix 5

## Frequency of Visits to the Primary Health Care Centres

Al Zahra'a (PHCC)

| Number of Visits | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| One time | 3 | 2.0 | 3 | 2.0 | 2 | 1.3 |
| Two times | 4 | 2.6 | 3 | 2.0 | 7 | 4.6 |
| Three times | 8 | 5.3 | 3 | 2.0 | 8 | 5.8 |
| More than four times | 35 | 23.2 | 16 | 10.5 | 59 | 39.1 |

Source: Author's Field Survey, 1996.

Al Safa (PHCC)

| Number of Visits | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| One time | 2 | 2.9 | 2 | 2.9 | 1 | 1.4 |
| Two times | - | - | 3 | 4.3 | 4 | 5.7 |
| Three times | 3 | 4.3 | 2 | 2.9 | 5 | 7.1 |
| More than four times | 18 | 25.7 | 5 | 7.1 | 25 | 35.7 |

Source: Author's Field Survey, 1996.

Bani Malek (PHCC)

| Number of Visits | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| One time | 3 | 2.2 | 2 | 1.5 | 5 | 3.7 |
| Two times | 1 | 0.7 | 1 | 0.7 | 5 | 3.7 |
| Three times | 3 | 2.2 | 3 | 2.2 | 7 | 5.1 |
| More than four times | 38 | 27.9 | 17 | 12.5 | 51 | 37.5 |

Source: Author's Field Survey, 1996.

Al Ruwais (PHCC)

| Number of Visits | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| One time | 6 | 5.4 | 1 | 0.9 | 2 | 1.8 |
| Two times | 4 | 3.6 | 5 | 4.5 | 3 | 2.7 |
| Three times | 7 | 6.3 | 2 | 1.8 | 11 | 9.8 |
| More than four times | 20 | 17.9 | 11 | 9.8 | 40 | 35.7 |

Source: Author's Field Survey, 1996.

Al Balad (PHCC)

| Number of Visits | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| One time | 4 | 4.4 | 2 | 2.2 | 5 | 5.5 |
| Two times | 3 | 3.3 | 2 | 2.2 | 7 | 7.7 |
| Three times | 1 | 1.1 | 1 | 1.1 | 7 | 7.7 |
| More than four times | 22 | 24.2 | 10 | 11.0 | 77 | 29.7 |

Source: Author's Field Survey, 1996.

Al Thaalebah (PHCC)

| Number of Visits | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| One time | - | - | 1 | 1.1 | 2 | 2.3 |
| Two times | 2 | 2.3 | - | - | 2 | 2.3 |
| Three times | 4 | 4.5 | - | - | 10 | 11.4 |
| More than four times | 23 | 26.1 | 14 | 15.9 | 30 | 34.1 |

Source: Author's Field Survey, 1996.

Al Nuzlah Al Yamaneyyah (PHCC)

| Number of Visits | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| One time | 5 | 3.3 | 3 | 2.0 | 8 | 5.3 |
| Two times | 1 | 0.7 | 6 | 4.0 | 18 | 12.0 |
| Three times | 3 | 2.0 | 1 | 0.7 | 6 | 4.0 |
| More than four times | 41 | 27.3 | 15 | 10.1 | 43 | 28.7 |

Source: Author's Field Survey, 1996.

Madain Al Fahd (PHCC)

| Number of Visits | Woman | | Man | | Child | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| One time | 12 | 5.9 | 3 | 1.5 | 6 | 3.0 |
| Two times | 4 | 2.0 | 2 | 1.0 | 18 | 8.4 |
| Three times | 9 | 4.5 | 7 | 3.5 | 19 | 9.4 |
| More than four times | 42 | 20.8 | 22 | 10.9 | 58 | 28.7 |

Source: Author's Field Survey, 1996.

# Appendix 6

## Respondent's distribution by eight PHCCs and place of residence

Al Zahra'a (PHCC)

| The Districts | Women | | Men | | Children | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Al Zahra'a | 43 | 28.5 | 18 | 11.9 | 58 | 38.4 | 119 | 78.8 |
| Al Rawdah | 7 | 4.6 | 5 | 3.3 | 12 | 11.3 | 29 | 19.2 |
| Al Khaledeyyah | - | - | 2 | 1.3 | 1 | 0.7 | 3 | 2.0 |

Source: Author's Field Survey, 1996.

Al Safa (PHCC)

| The Districts | Women | | Men | | Children | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Al Safa | 19 | 27.1 | 12 | 17.1 | 35 | 50.0 | 66 | 94.3 |
| Mushrefa | 4 | 5.7 | - | - | - | - | 4 | 5.3 |

Source: Author's Field Survey, 1996.

Bani Malek (PHCC)

| The Districts | Women | | Men | | Children | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Bani Malek | 45 | 33.1 | 23 | 16.9 | 68 | 50.0 | 136 | 100 |

Source: Author's Field Survey, 1996.

Al Ruwais (PHCC)

| The Districts | Women | | Men | | Children | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Al Ruwais | 37 | 33.0 | 19 | 17.0 | 55 | 49.1 | 111 | 99.1 |
| Al Andalus | - | - | - | - | 1 | 0.9 | 1 | 0.9 |

Source: Author's Field Survey, 1996.

Al Balad (PHCC)

| The Districts | Women | | Men | | Children | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Al Balad | 28 | - | 12 | - | 46 | - | 86 | 94.5 |
| Al Rawdah | - | - | 1 | - | - | - | 1 | 1.1 |
| Mushrefa | - | - | 1 | - | - | - | 1 | 1.1 |
| Al Khaledeyyah | 1 | - | 2 | - | - | - | 3 | 3.3 |

Source: Author's Field Survey, 1996.

Al Thaalebah (PHCC)

| The Districts | Women | | Men | | Children | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Petromin | 29 | 33.0 | 15 | 17.0 | 44 | 50.0 | 88 | 100 |

Source: Author's Field Survey, 1996.

Al Nuzlah Al Yamaneyyah (PHCC)

| The Districts | Women | | Men | | Children | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Al Nuzlah Al Yamaneyyah | 49 | 32.7 | 25 | 16.7 | 75 | 50.0 | 149 | 99.3 |
| Al Qerat | 1 | - | - | - | - | - | 1 | 0.7 |

Source: Author's Field Survey, 1996.

Madain Al Fahd (PHCC)

| The Districts | Women | | Men | | Children | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Madain Al Fahd | 67 | 33.2 | 29 | 14.4 | 98 | 48.5 | 194 | 96.0 |
| Al Qerat | - | - | 5 | 2.5 | 3 | 1.5 | 8 | 4.0 |

Source: Author's Field Survey, 1996.

Appendix 5.4 Length of stay in the district:
Al Safa (PHCC)

| Length of stay | Frequency | Percentage |
|---|---|---|
| - Less than 1 year | 1 | 7.3 |
| - Less than 2 years | 13 | 8.6 |
| - Less than 5 years | 37 | 24.5 |
| - More than 5 years | 90 | 59.6 |
| Total | 151 | 100 |

Source: Author's Field Survey, 1996.

Al Safa (PHCC)

| Length of stay | Frequency | Percentage |
|---|---|---|
| - Less than 1 year | 9 | 12.9 |
| - Less than 2 years | 2 | 2.9 |
| - Less than 5 years | 21 | 30.0 |
| - More than 5 years | 38 | 54.3 |
| Total | 70 | 100 |

Source: Author's Field Survey, 1996.

Bani Malek (PHCC)

| Length of stay | Frequency | Percentage |
|---|---|---|
| - Less than 1 year | 8 | 5.9 |
| - Less than 2 years | 7 | 5.1 |
| - Less than 5 years | 25 | 18.4 |
| - More than 5 years | 96 | 70.4 |
| Total | 136 | 100 |

Source: Author's Field Survey, 1996.

Al Ruwais (PHCC)

| Length of stay | Frequency | Percentage |
|---|---|---|
| - Less than 1 year | 2 | 1.8 |
| - Less than 2 years | 1 | 0.9 |
| - Less than 5 years | 15 | 13.4 |
| - More than 5 years | 94 | 83.9 |
| Total | 112 | 100 |

Source: Author's Field Survey, 1996.

Al Balad (PHCC)

| Length of stay | Frequency | Percentage |
|---|---|---|
| - Less than 1 year | 4 | 4.4 |
| - Less than 2 years | 7 | 7.7 |
| - Less than 5 years | 26 | 28.6 |
| - More than 5 years | 54 | 59.3 |
| Total | 91 | 100 |

Source: Author's Field Survey, 1996.

Al Thaalebah (PHCC)

| Length of stay | Frequency | Percentage |
|---|---|---|
| - Less than 1 year | 3 | 3.4 |
| - Less than 2 years | 3 | 3.4 |
| - Less than 5 years | 14 | 15.9 |
| - More than 5 years | 68 | 77.3 |
| Total | 88 | 100 |

Source: Author's Field Survey, 1996.

Al Nuzlah Al Yamanneyah (PHCC)

| Length of stay | Frequency | Percentage |
|---|---|---|
| - Less than 1 year | 22 | 14.7 |
| - Less than 2 years | 4 | 2.7 |
| - Less than 5 years | 18 | 12.0 |
| - More than 5 years | 106 | 70.7 |
| Total | 150 | 100 |

Source: Author's Field Survey, 1996.

Madain Al Fahd (PHCC)

| Length of stay | Frequency | Percentage |
|---|---|---|
| - Less than 1 year | 7 | 3.5 |
| - Less than 2 years | 15 | 7.4 |
| - Less than 5 years | 39 | 19.3 |
| - More than 5 years | 141 | 69.8 |
| Total | 202 | 100 |

Source: Author's Field Survey, 1996.

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