THE IMPACT OF HEALTH INSURANCE ON ACCESS TO HEALTH CARE IN SUDAN

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ABSTRACT

Health insurance (HI) is a form of health financing that is acknowledged, theoretically and empirically, to be an optimum health finance alternative with the potential of promoting access to healthcare and offering financial protection to its subscribers. In line with this, Sudan established a National Health Insurance Fund (NHIF) in 1994 to mitigate the low utilisation of care. The implementation of NHIF raised a number of public concerns pertain to the impact of HI on access, the exclusion of the poor, and whether HI escalates total healthcare. To contribute local evidence regarding each of these vital questions was the main motive that drove this study. The main objective here was to assess the impact of HI on access to healthcare services in Sudan. In addition, it assessed other determinants of access to healthcare.

This study employed data from the Sudan Health Utilisation and Expenditure Household Survey, 2009 (SHUEHS 2009), to answer its objectives. The national survey had been performed between January and December 2009 and covered approximately 75,500. Descriptive analyses, followed by binary or multinomial logistic regression analyses, were applied to identify factors that determined access to different types of healthcare services.

The study revealed that among all 72,526 respondents, 9832 (13.5%) had reported having acute illnesses and 6,124 (62.3%) sought healthcare. 4,608 (6.4%) of all the respondents reported having chronic illness in the last four weeks prior to the survey. Among those participants, 2351 (51%) had sought healthcare while the rest did not. Affordability was cited as the main reason for not seeking care. 1776 (2.4%) of all respondents were hospitalised over the previous one year prior to the survey. The

insured status was found to increase the chance of access to healthcare for all types of diseases compared to those without insurance. For acute diseases, the insured had a 31.6%, higher chance of obtaining care than the non-insured; OR 1.316 (95% CI; 1.198-1.446). For chronic diseases, the insured had a 38% higher chance of seeking care compared to the non-insured; OR of 1.38 (95% CI; 1.19-1.6). Even for inpatient care, the insured were 20% more likely to use inpatient services than the non-insured; OR 1.2 (95% CI; 1.07-1.35). With regards to the role of HI on utilisation of private care, this study found that insurance status was not a significant predictor of utilisation of private care for the outpatient service. However, HI increased the likelihood of using private hospitals by 40%; OR 1.4 (95% CI 1.12-1.99).

Based on the SHUEHS 2009 data, it is evident that possessing HI was associated with enhanced access to healthcare for both inpatient and outpatient services. This study showed that insurance enrolment was higher among wealthy and the affluent regions and societal groups. The findings of this work support the expansion of the NHIF as a powerful tool for improving utilisation of healthcare services. Strategies should be developed to ensure enrolment of the poor when planning the expansion of HI in Sudan.

ABSTRAK

Insuran kesihatan adalah satu bentuk pembiayaan kesihatan yang diakui secara teori dan empirikal, adalah merupakan pembiayaan kesihatan alternatif optimum yang mempunyai potensi untuk menggalakkan akses kepada penjagaan kesihatan serta menawarkan perlindungan kewangan kepada ahli-ahlinya. Sehubungan itu, negara Sudan telah menubuhkan Kumpulan Wang Insurans Kesihatan Kebangsaan (NHIF) pada tahun 1994 untuk meningkatkan penggunaan perkhidmatan kesihatan, yang agak rendah disebabkan enakmen caj pengguna dua tahun sebelumnya. Pelaksanaan NHIF di negara ini adalah berikutan tiga faktor yang telah mencetuskan kebimbangan awam; terdapatnya bukti-bukti muktamad mengenai kesan insuran kesihatan (HI) ke atas akses di negara-negara miskin, peranan HI dalam pengecualian golongan miskin dan kumpulan yang sukar untuk dicapai dengan kemungkinan untuk memburukkan lagi ketidaksamaan yang sedia ada dalam penggunaan penjagaan kesihatan, dan sama ada HI boleh meningkatkan jumlah kos penjagaan kesihatan, melalui pembelian perkhidmatan daripada pembekal penjagaan kesihatan swasta yang mahal. Beberapa persoalan berkenaan situasi ini telah menjurus kepada motif utama kajian ini perlu dijalankan. Objektif utama kajian ini adalah untuk menilai implikasi perlaksanaan HI ke atas akses perkhidmatan penjagaan kesihatan di Sudan. Selain itu, kajian ini juga telah menilai factor-faktor lain yang mempengaruhi akses penjagaan kesihatan dan factor-faktor yang menentukan peranan HI di dalam penggunaan perkhidmatan penjagaan kesihatan swasta.

Untuk menjawab objektif kajian, data telah diambil dari survey Penggunaan Kesihatan dan Perbelanjaan Isi Rumah, 2009 (SHUEHS 2009) yang telah dijalankan sebagai sebahagian daripada tinjauan Akaun Kesihatan Kebangsaan, NHA. Survei kebangsaan

tersebut telah dijalankan dari Januari hingga Disember 2009. Survei ini meliputi kira-kira 75,000 responden, daripada kira-kira 12600 isi rumah. Analisis deskriptif telah dijalankan, diikuti oleh analisa binari atau multinomial regresi logistik untuk mengenal pasti faktor-faktor yang menentukan akses kepada penjagaan kesihatan bagi penyakit akut, kronik dan rawatan semasa kemasukan wad (pesakit dalaman).

Kajian ini membuktikan bahawa di antara semua 72,526 responden, 9,832 (13.5 %) telah melaporkan penyakit akut; 6124 (62.3 %) daripada mereka mendapatkan perkhidmatan kesihatan, sementara yang lain tidak. 4608 (6.4 %) daripada semua responden melaporkan mempunyai penyakit kronik dalam tempoh empat minggu terakhir sebelum penyiasatan. Antaranya 2,351 (51 %) telah mendapatkan penjagaan kesihatan, sementara yang lain tidak. Ketidakmampuan telah dinyatakan sebagai sebab utama untuk tidak mendapatkan rawatan. 1776 (2.4 %) daripada semua responden telah dimasukkan ke hospital dalam tempoh satu tahun sebelum penyiasatan. Responden yang mempunyai HI mempunyai peluang yang lebih tinggi untuk mendapat akses penjagaan kesihatan bagi semua jenis penyakit berbanding dengan mereka yang tidak mempunyai insuran. Bagi penyakit akut, pemlik HI mempunyai 31.6%, peluang yang lebih tinggi untuk mendapatkan rawatan daripada yang tidak mempunyai HI OR 1.316 (CI 95 %; 1.198- 1.446). Untuk penyakit kronik, pemilik HI mempunyai peluang 38% lebih tinggi untuk mendapatkan rawatan berbanding dengan yang tidak memiliki insuran; OR 1.38 (95 % CI; 1.19-1.6). Malah bagi penjagaan pesakit dalaman, pemilik HI adalah 20% lebih cenderung untuk menggunakan perkhidmatan pesakit dalaman daripada (CI 95 %; 1.07-1.35) yang tidak diinsuranskan, Merujuk kepada peranan insurans ke atas penggunaan penjagaan peribadi, kajian ini mendapati bahawa status HI itu bukan peramal yang signifikan bagi penggunaan penjagaan peribadi untuk penyakit akut dan kronik. Walau bagaimanapun, HI telah meningkatkan kemungkinan menggunakan

perkihidmatan hospital swasta sebanyak 40%, OR 1.4 (95 % CI 1.12-1.99)

Berdasarkan data 2009 SHUEHS, terbukti bahawa keahlian atau pemilikan HI boleh dikaitkan dengan akses kepada perkhidmatan penjagaan kesihatan untuk pesakit dalam dan pesakit luar. Kajian ini juga telah menekankan bahawa pendaftaran insurans adalah lebih tinggi di wilayah dan kumpulan masyarakat yang kaya dan mewah. Hasil kerja ini dapat menyokong pengembangan NHIF sebagai alat yang berupaya untuk meningkatkan penggunaan perkhidmatan penjagaan kesihatan, namun perancangan untuk pengembangan HI perlu mengambilkira strategi untuk memastikan liputan golongan miskin, golongan terpinggir dan penduduk di kawasan yang ketinggalan.

DEDICATIONS

This work is dedicated to my parents, whose unlimited ambition taught me to believe "The sky's the limit!"

To my wife who left her life in a first world country to join me in the jungles of Africa.

To my children who had paid a great cost with an often very busy father.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION

Abbreviation	Meaning
BA	Bronchial asthma
CBHI	Community based health Insurance
CBoS	Central Bureau of Statistics
DM	Diabetes Mellitus
FMOH	Federal Ministry of Health
GDP	gross domestic product
HBM	Health Belief Model
HIV/AIDS	Human immunodeficiency virus/Acquired Immunity deficiency syndrome
IMF	International Monetary Fund
LMICs	Low middle income countries
MMR	Maternal mortality rate
MTCP	Malaysian Technical Cooperation Programme
NMOF	National ministry of Finance
NHI	National Health Insurance
NHIF	National Health Insurance Fund
NGO	Non-governmental organisation
PHI	Private Health Insurance
SHHS	Sudan Household Survey
SHI	Social Health Insurance
SHUEHS	Sudan Health Utilisation and Expenditure Household Survey
UHC	Universal Health coverage
U5MR	Under 5 mortality rate
WB	World Bank
WHO	World Health Organisation

CHAPTER 1: INTRODUCTION

1.1 Introduction

1.1.1 Background to the study

According to Sudan's National Health Policy (2007), the government is mandated to guarantee access to healthcare for all its citizens (FMOH 2007). People in Sudan, as in many other poor countries, are affected by financial constrains in gaining access to the required healthcare (WHO 2005; WHO 2010; World Health Organization 2010) Many other developing countries face similar challenges in ensuring equitable access to healthcare for their people.

Within this context, many international authorities have promoted health insurance (HI) as a viable health finance mechanism that can improve access to healthcare and offers reasonable financial protections (Simon, Rosen et al. 2001; Wagstaff 2010; WHO 2010; World Health Organization 2010)). These two valuable outcomes from HI constitute the basic pillars of universal health coverage (UHC), endorsed by the World Health Organisation (WHO) as the uttermost benefit any government should offer its people(WHO 2010)

Congruent with the preference of HI as a viable finance alternative for developing countries, there is a plethora of empirical evidence demonstrating that subscription to health insurance is a positive determinant of access to healthcare (Saksena, Antunes et al. 2011; Sekyi and Domanban 2012; Spaan, Mathijssen et al. 2012). Nonetheless, these studies have also illustrated that HI is not the only factor explaining access to healthcare and that there are many other socioeconomic factors that exhibit the same or more explanatory power on people's access to healthcare.

Healthcare access is complex (Gulliford, Figueroa-Munoz et al. 2002). It is a multi-stage process in which people perceive that they are first ill, and only then do they decide whether to seek healthcare or otherwise (Rosenstock 1974; Levesque, Harris et al. 2013). Access, therefore, requires a series of actions and pathways to follow, such as recognition of illness, decision to seek care, weighing of resources, and choosing between healthcare providers (Bedri 2002; Levesque, Harris et al. 2013).

In health economics terms, demand for healthcare is another conceptual alternative to access to healthcare, and is a function of the many important supply and demand facets of the health systems (Mooney 1983; Ensor and Cooper 2004; O'Donnell 2007). Availability of healthcare services, quality, and price are various examples of the supply side, and all the attributes of customers or users of that system, such as their age, gender, income, insurance status, and their morbidity profiles, are examples of demand aspects (Ensor and Cooper 2004; Folland, Goodman et al. 2007)

Technically, HI is a form of payment mechanism for healthcare. The basic principle of HI organisations is similar and could be simplified as follows: HI institution collects money (premium) from all its members, pools it together, and uses these pooled resources to pay, fully or partially, the costs of medical services on behalf of its members or beneficiaries (Wang, Switlick et al. 2012). Through doing so, HI removes a portion of the financial barriers between users and healthcare services. As a result, HI, in theory promotes access to healthcare and has the potential of protecting its member from catastrophic health expenditures (Wagstaff 2010; Wang, Switlick et al. 2012). The basic mechanism behind HI qualifies it to play two socially vital functions - risk sharing and cross subsidy (WHO 2005). Risk sharing is the condition when money or premiums are collected from a healthy member and are used to pay for, or to subsidise, the sick (Folland and Goodman 2004). Cross subsidy is defined as the practice of charging

higher premiums to one group in order to subsidise other groups of members that pay less to ensure cross subsidy between members (Wang, Switlick et al. 2012).

Historically, the first known HI was established in Germany in 1883 as a national (compulsory or statutory) scheme (Wagstaff 2010). Thereafter, HI was implemented in many other developed countries, including France, Canada, and Sweden (Wagstaff 2010). In developing countries, HI is relatively new. It has been observed that over the last thirty years, HI has spread in many African and Asian countries; examples include Vietnam in 1993, Nigeria in 1997, Tanzania in 2001, and Ghana in 2005(Wagstaff 2010). However, these countries implement one or more of four broad categories of HI - national health insurance (NHI), social health insurance (SHI), community-based health insurance (CBHI), and private health insurance (PHI) (Wang, Switlick et al. 2012).

Studies from developing countries have illustrated that, generally, the insured population has better access to healthcare services (Sekyi and Domanban 2012; Spaan, Mathijssen et al. 2012). In a study of Jordan, Ekman (2007) found that, overall, availability of insurance increases the intensity of utilisation of healthcare and reduces out-of-pocket spending(Ekman 2007). A study in Mexico reported same findings(Knaul, Arreola-Ornelas et al. 2007). Similarly, a study in Ghana demonstrated that NHI improved access to healthcare services (Sekyi and Domanban 2012). Spaan, in a review of the impact of NHI on utilisation of healthcare and financial protection in African and Asian countries, reported that insurance did improve access to health services (Spaan, Mathijssen et al. 2012) and had provided safeguarding from financial risk to its members.

However, HI also has negative features, as it excludes the poor and has difficulty reaching specific societal groups. Therefore, it can actually widen the inequity between

the insured and non-insured in term of access to healthcare, which in turn may produce health inequities. HI could also shift the use of healthcare from cheaper public facilities to higher-priced private facilities with the possibility of increasing the overall cost of healthcare systems (WHO 2000; Wagstaff 2010)

Both the advantages and disadvantages of HI are vital health policy questions of which researchers continue to address. However, the current research trends demonstrate that most of the available literature focuses exclusively on the role of health insurance on access (Shaikh and Hatcher 2005; Vingilis, Wade et al. 2007; Simkhada, Teijlingen et al. 2008; Skordis-Worrall, Hanson et al. 2011; Spaan, Mathijssen et al. 2012). Just a few studies have sought to assess financial protection from HI (Xu, Evans et al. 2003; Ekman 2007). In addition, the role of HI on promotion of private service remains poorly investigated.

In Sudan, studies pertaining to the health system are scarce. As stated earlier, the country only established a health insurance scheme in 1993 as National Health Insurance Fund (NHIF). However, despite the relatively still-lengthy history of its implementation, the impact of NHIF on healthcare systems has not been reviewed. Most literature from Sudan has concentrated on the determinants of access to healthcare, and few investigations have looked into the role of insurance as a factor in healthcare utilisation. In fact, other functions of NHIF, especially in promoting the use of private healthcare services, have remained unaddressed.

Among the scarce-yet-available studies on health systems, Khalfallah had evaluated the determinants of utilisation of medicine in Khartoum State. His study was actually on the impact of the implementation of the Revolving Drug Fund (RDF) on utilisation of healthcare services (Ali 2009). Therein, he found that 36% of people who had reported

illness did not seek healthcare and that the availability of medicines at public healthcare facilities could motivate the utility of healthcare services. However, his study had only covered Khartoum, focusing strictly on drugs but not health service utilisation in relation to disease conditions.

In another study by Ibnouf et al. (Ibnouf, Van den Borne et al. 2007) on the utilisation of family planning services by Sudanese women during their reproductive years, it was reported that socioeconomic status, education, and knowledge of family planning were all significantly associated with utilisation of modern family planning (Ibnouf, Van den Borne et al. 2007). In another study, Ibnouf had determined the factors associated with the use of immunisation services in Khartoum State. The rate of vaccination was passively correlated with the age of children and education level of the mother and that the mothers' knowledge and her positive attitudes towards vaccination were strongly linked with the vaccination status of their children. In addition, the economic level of the households also played a significant role in determining the coverage of a specific BCG vaccine but not the other vaccines (Ibnouf, Van den Borne et al. 2007).

Another example of a study that focuses on the determinants of access was by Aziem on access to family planning methods in Kassala State, Eastern Sudan from 2011 (Ali, Rayis et al. 2011). Aziem found that parity, or the number of times a woman gives birth to a foetus at the gestational age of 24 weeks or more, and the couple's education level (secondary or higher) were significantly associated with a greater employment of family planning services. The study tested five independent variables but household income was not included.

Bedri, on the other hand, concentrated on the pathways, factors and processes that influence the use of early and modern care for abnormal vaginal discharge in Sudan

(Bedri 2002). She explored an array of factors involved in access to healthcare, comparing the way women sought healthcare for vaginal discharge and malaria treatment. Different approaches towards understanding the pathway and the processes of how women responded to the two illnesses were taken. The findings suggested that better educated women and women with educated husbands had higher chances of seeking healthcare versus their less educated counterparts. Further, the differences in the process of seeking healthcare for both were highlighted, bringing about valuable insights on health policy implications.

The studies described thus far all possess two important characteristics. First, none of them covered the entire country of Sudan. Second, these studies only centred their attention on specific health service programs, such as family planning or immunisation, vertical programs that are generally provided free of charge or with substantial government financial subsidy. As such, they contributed little to the formulation of financial health policies in Sudan. Nevertheless, they did promote local interest in research that explicitly aimed to investigate determinants of access with a particular emphasis on the role of HI.

Hence, the present study was designed to fill the knowledge gap left by previous work on factors that determine HI and the impact of HI on healthcare utilisation. The primary goal of this study was to contribute evidence that can be used to counter the debates on the impact of HI on access to healthcare. In addition, the study sought to evaluate the factors that influence insurance enrolment and the role of HI on utilisation of private facilities. There was no intention whatsoever to assess the protective role of insurance in view of the limited data on the relevant variables.

The study put forth here had utilised the 2009 Sudan Household Healthcare Utilisation and Expenditure Survey (SHHUES) data. The surveys were administered from January to December 2009 and were distributed throughout all the states of Sudan. Data was collected from more than 11,000 households, where face-to-face interviews guided by questionnaires were applied. The author had the chance to be involved in designing the questionnaires. However, not all the important variables for the study had been incorporated in the SHHUES surveys as many other variables needed by other stakeholders had to be included and time for the interviews was limited.

1.1.2 Health insurance and access to healthcare services

Access to healthcare is vital for any human being as it correlates with robust health (Marmot, Friel et al. 2008). However, people in developing countries find it burdensome to access healthcare. With relatively poor healthcare systems compared to developed countries, they usually are required to pay out most of their medical expenses from their own pockets. Such a payment mechanism imposes devastating consequences in terms of catastrophic healthcare expenses (Xu, Evans et al. 2003; Su, Kouyate et al. 2006; Yip and Hsiao 2008) and/or impoverishment (van Doorslaer, O'Donnell et al. 2006). As a result, millions of citizens in developing countries have ceased seeking healthcare (Lagarde and Palmer 2008). With this, these challenges have promoted interest in HI as a health finance mechanism that has the potential to resolve such issues.

Access to healthcare is considered a complex concept(Gulliford, Figueroa-Munoz et al. 2002). It is understood as the fit between the characteristics of the providers and expectations of the clients (Penchansky and Thomas 1981). In other words, both characteristics of health systems and people using the systems (clients) are crucial for defining access. For example, healthcare may be available, though people may not able to use it because of their socio-demographic attributes.

Generally, access can be viewed from five dimensions (five As) - affordability, availability, accessibility, accommodation, and acceptability. Affordability is how the provider's charges relate to the client's ability and willingness to pay for services. Availability measures the extent to which the provider has the requisite resources, such as personnel and technology, to meet the needs of clients. Accessibility refers to geographic accessibility, established by how easily the client can physically reach the provider's location. Accommodation reflects the degree to which the provider's

operation is organised in ways that address the constraints and preferences of the client (Penchansky and Thomas 1981)

The complexity of access and its wide interrelated dimensions pose real obstacles to its measurement. Therefore, researchers in this field have used utilisation as an operational term and proxy for access (Xu, Saksena et al. 2010). Certain scholars define utilisation as realised use of health services by a specified population (Andersen, McCutcheon et al. 1983). This definition makes access a measurable concept. Therefore, this study can be said to comply with transformation of measurements and the use of utilisation as a proxy to access is valid.

Factors influencing utilisation of healthcare are traditionally divided into two groups - characteristics related to the healthcare provision and those connected to the population (purchasers) using the healthcare services, and in economic terms, this means the supply and demand sides, respectively. Examples of the supply side are quality, price, and distance of healthcare. The demand side includes socio-demographic characteristics, income, insurance status, and many other attributes of the people (clients) using the service (Andersen and Newman 1973; Adhikari 2012). While both supply and demand are interrelated and inseparable in determining utilisation of healthcare, this study focused on the demand side.

The question of what factors determine utilisation of healthcare has attracted the attention of researchers since the 1950s, especially in the developed world. Many approaches, theories, and models were developed to explain the factors that determine utilisation of healthcare. Three models have been found to be of relevance in this regard: the Rosenstock or health belief model (HBM) (Rosenstock 1974), Andersen's

model or the behavioural model (Andersen 1968), and Grossman's economic models (Grossman 1972).

Despite the importance of the theories underlying each model and their explanatory power regarding access to healthcare, a number of features of Andersen's model qualified it to be the essential framework for this study. The most important elements of this model were the flexibility of the choice of variables and the useful classification of these factors into predisposing, enabling, and needs. Such categorisation is of special value from a policy perspective and for equity judgment.

More specifically, according to Andersen's model, the utilisation of health services is determined by three interrelated and dynamic factors - predisposing, enabling, and needs factors (Andersen and Newman 1973). Predisposing factors have the potential to increase the propensity for utilising healthcare. These include factors such as age, gender, and ethnicity. Enabling factors facilitate or impede the use of healthcare services, and they usually include income, insurance status, education, and social support. Needs factors represent health needs, and in theory should be the prime factor that governs utilisation of healthcare services (Andersen 1968; Andersen and Newman 1973).

1.1.3 Health insurance enrolment

Many health insurance schemes enrol civil workers compulsorily and other workers voluntarily, and this arrangement is usually observed at the beginning of those schemes. During this period, society becomes categorised into the insured and non-insured. In the case of many poor countries, where unaffordability is the major barrier between people and the healthcare services, the insured garner better access to services and, as a result, probably experience better health outcomes.

The 2009 HI scheme in Sudan was a typical example of the scenario described previously. The National Health Insurance Fund (NHIF) employed the same mechanisms of insurance enrolment in other countries, namely compulsory and voluntary. Therefore, it was important to examine the factors that determine the type of insurance memberships. Hence, this study also aimed to understand the insured and non-insured populations as having this information could assist in developing strategies to include the non-insured.

1.1.4 Health insurance and private healthcare providers

For higher profits, the stakeholders involved in HI usually limit the amount of healthcare usage and impose various restrictions on the use of private healthcare. This is particularly applicable when most people perceive that private sector provides better services in terms of quality and timeliness. Without gatekeeping, whereby a patient is prevented from going to a private hospital directly and has to see the primary care provider for referrals, most patients would prefer to seek treatment at private hospital. Private healthcare services are relatively expensive and increase overall health expenditures. In Sudan, and probably in many other countries, there has been great concern for the role of NHIF on utilisation of private health services, which, as would be expected, would upsurge the country's overall health services cost.

1.1.5 General profile - Sudan

The Republic of the Sudan (RoS), or Sudan, represents the part of the nation that remained after the separation of country into northern (Republic of Sudan) and Republic of Southern Sudan (RoSS) in 2011.

Sudan is considered one of the Low Middle-Income Countries (LMICs). Figure 1.1 (page 18) displays a map of the Sudan that occupies the north east of Africa with a long coastline to the Red Sea. Sudan shares borders with, Egypt, Libya, Chad, the Central African Republic, The Republic of South Sudan, Ethiopia, and Eritrea. The land mass of the Republic of Sudan is 1800 square kilometres with a total population of 32.32 million[1], and an annual population growth of 2.8[1]. 60% of the Sudanese live in rural areas, however there is a rapid urbanisation as people migrate from rural areas to big cities, especially to the capital, Khartoum (Witter 2010).

The political system of Sudan

To better understand the political system of Sudan, it is important to know the history of Sudan's formation. Since independence from the British in 1956, historically, Sudan was considered two separate entities, North and South Sudan. In 1972, the north part of Sudan was subdivided into five administrative regions (Northern, Eastern, Central, Kurdufan, Darfur) while South Sudan remained united as one contiguous region. The capital of all of Sudan was Khartoum, a separate province. In 1992, the country adopted a new federal decentralised system with three well-defined levels - federal, state, and locality. Based on this system, each region, including South Sudan, was subdivided further into two to three states. As a result, there were 25 states; 15 were part of northern Sudan and 10 constituted southern Sudan. Concomitant with the described 1992 transformation, the political system also shifted from parliamentary to presidential.

[1] Health Sector Strategic Plan 2012-2017: projections from Census 2008 .

In 2011, after long civil war, South Sudan sought separation from Republic of Sudan, marking the birth the Republic of Southern Sudan (RoSS). This study was initially conducted in and continued in the northern part of Sudan, the Republic of Sudan, only.

In today's Sudan, there are 15 states (Figure 1.2, page 17) and each state is subdivided into four to eight localities. Each state is ruled by a state governor, has its own parliament, and eight to ten state ministers.

Economic and Developmental Indicators:

Sudan economy had suffered much from the separation of RoSS. The exact economical and developmental consequences are yet to be settled. Several authorities have reported a substantial deterioration in macroeconomic indicators of Sudan (World Bank 2013). The most significant separation implications were the loss of three quarters of its exported oil (600 barrels a day), and 28% of its land which went to the RoSS. After the separation, the gross domestic product of Sudan (GDP) in 2011 was estimated to USD 58.77 billion with a per capita income of USD 1500 (World Bank 2013).

Agricultural activities have traditionally served as the backbone of the economy for Sudan, but just recently, the country witnessed the growth of a massive gold mining industry, of which the output has reached roughly 50 tons per year as of 2012 (NMOF 2012). Nevertheless, poverty is still rampant and increasing, with 42% of the population living below the national poverty line (World Bank 2013). Such facts raise concerns for the fairness in the distribution of resources and income.

In contrast to economic indicators, health indicators of Sudan have shown improvement following separation based on the longstanding disparity between the two parts of the country. The maternal mortality ratio (MMR) was estimated at 216 (WHO 2012) compared to 1117 before separation (FMOH 2006). The under-five mortality rate

(U5MR) was 78, while the neonatal mortality rate (NMR) was 33 (WHO 2012). In 2009, Sudan spent approximately 6% of its GDP on healthcare, which represented 6.6% of total government expenditure. 67% of that expenditure came directly from Sudanese citizens' pockets (FMOH 2011).

Figure 1.1. **Map of the Sudan** (Source: World Atlas; countries bordering Sudan were named by the author)

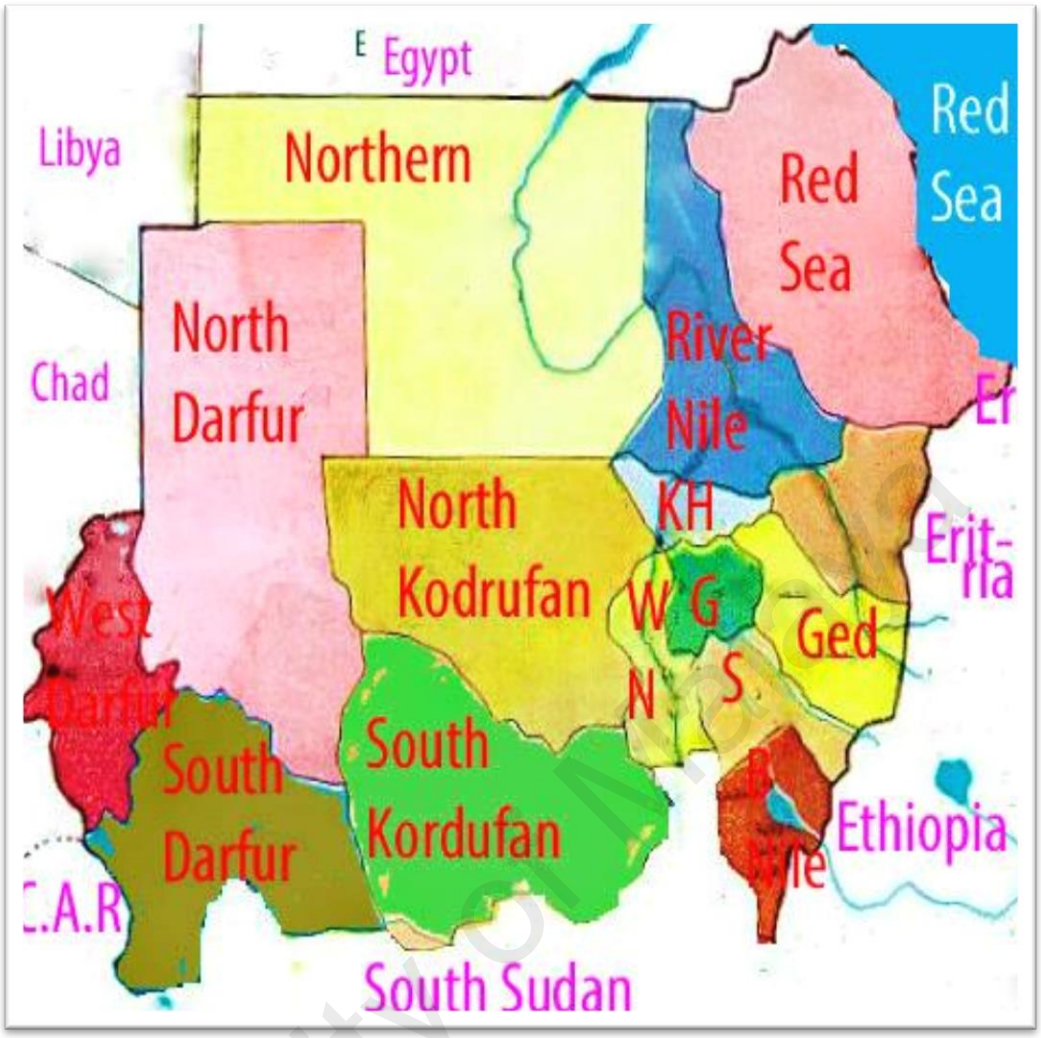

Figure 1.2. **Sudan map by states**

1.1.6 The Sudanese health system

The health system (HS) of Sudan is better described as being a mixed system with respect to both the provision of healthcare services and funding mechanisms, reflecting the history of British rule in Sudan from 1898-1956. However, since independence in 1956, the system witnessed a series of transformations in its organisation, finance and provision of the healthcare services to accommodate national demand.

The structure of the existing health system followed the governmental ruling system. Since 1992, it has been a decentralised system that works on three levels - federal, state, and locality. The federal level is responsible for setting national policy and planning for the entire country. Each state has its own state ministry of health, headed by a state minister of health and a general director. The state ministry of health deals with local health legislation, financing, and provision of health services for its citizenry. The most basic level is that of the locality's health authorities, addressing the localities' health issues, such as provision of the primary healthcare programs in health centres and dispensaries.

Financing of the health system

The current scenario for health finance in Sudan is one of a mixed health finance system. It operates all major types of funding mechanisms - tax-based, HI, and out-of-pocket. The main source of funding for curative care is out-of-pocket payments and the NHIF .The government funds most of the preventive services, such as immunisation, child health, and family planning through public taxation. The government also provides certain curative services, like renal dialysis and transplantation free-of-charge or with substantial subsidy. Besides the government, international donors contribute to the funding of special vertical programs, such as malaria, tuberculosis, human

immunodeficiency virus/acquired immunity deficiency syndrome (HIV/AIDS), immunisation, and family planning.

From the point of independence in 1956 till the beginning of the 1980s, Sudan's health system was paid for predominantly through tax-based revenues and provided healthcare services for all citizens at no charge. However, subsequent major transformation took place thereafter. The private sector became licensed to provide curative healthcare services, especially in Khartoum and other more privileged municipalities. In 1990, faced with budget constraints, the government adopted a fee-for-service strategy to inject more funds into the health sector and improve quality of the services provided at public facilities. To ameliorate the negative consequences of fees for services, the government implemented laws regarding HI in 1994, first as a social HI corporation, and later being transformed into the NHIF in 1995 (Mustafa 2005; WHO 2006)

Public funding of the health system is at both the federal and state levels. The state, besides its own resources, receives its share (budget) from the federal government and has the right to allocate these funds solely based on its local priorities but guided by federal protocol. However, the formula for distribution of this budget between states is not clear, and many researchers have reported that it is biased towards certain states (Witter 2010).

The health finances of the each state are influenced by many factors, such as the amount of budget received from the federal government, the economic infrastructure of the state, and the priorities outlined at the state level. These factors have resulted in a disparity in access to healthcare and health indicators between the states and regions.

Healthcare organisation and provision

In Sudan, healthcare service are organised at three levels - the primary, secondary, and tertiary levels. The most fundamental accepted facilities are health centres in urban areas and dispensaries in the rural settings. All health centres are run by a general medical practitioner (GP), while the dispensaries are administered by medical assistants or nurses.

In general, the provision of healthcare services is a public-private partnership. Many different members of this alliance provide healthcare services, including the federal and state ministries of health, armed forces, police, universities, the private sector (both for-profit and philanthropic), and civil society. However, all these entities act in isolation based on ill-defined coordination and guidance (Mustafa 2005). With this, private for-profit and voluntary facilities are generally clustered in urban areas.

1.1.7 National health insurance fund (NHIF)

The NHIF of Sudan is a national, semi-autonomous fund, regulated under the auspices of the Ministry of Social Welfare (NHIF). The scheme enrols formal and informal workers. Membership is compulsory for the former, primarily consisting of civil workers, while the latter is mostly on a voluntary basis.

The membership unit is a whole family, not on an individual basis. The contribution for the formal comes from both the employee and his employer. The total amount is equivalent to 10% of the worker's salary. 40% of this amount is deducted from the employee's salary and 60% is supplied by their employer. The non-formal premium is a flat rate and currently is approximately 15-20 SDG (USD 5.6-7.5). Many governmental and non-governmental organisations (NGOs) pay the premium on behalf of the poor. At the top of these organisations is the *Zakat Champer*, which is a para-statal chamber that collects money from rich Muslims and distributes it to the underprivileged.

According to the estimation of the NHIF in 2008, 40% of Sudanese were insured (NHIF 2009.). In a survey conducted by the MOH, it was estimated that just 10% of the population were covered (FMOH 2006). With respect to real insurance coverage, both reports demonstrated that insurance coverage was not evenly distributed between the states and regions. For instance, the highest insurance coverage was seen in Khartoum, as well as the northern and the River Nile states, while the citizens of Darfur were the least insured (NHIF 2009.). The majority of the fund's enrolees were civil servants, although there was a steady increase in subscription among the poor and the informal sector (NHIF 2009.)

The NHIF offers a relatively generous benefits package to its member. It includes free medical consultations, free diagnostic and laboratory tests, all surgical interventions, and 75% of the cost of all drugs. The NHIF provides roughly 20% of health services through its own facilities and purchases the remainder from other public or private providers. In 2008, the NHIF had purchased 50% of all purchased curative services from the Sudanese Ministry of Health's facilities, 10% of healthcare service was purchased from private providers, and the rest from all other healthcare providers, like the armed forces, police, and universities.

In 2010, the government had released a policy document that mandated the NHIF to stop providing healthcare and instead purchase services from other providers so that they could devote all their efforts and resources to expand HI enrolment. The challenges faced by the NHIF in doing so were guaranteeing the availability of healthcare service delivery of utmost quality and reachable by all, including those in rural areas. In this effort, the NHIF applied the concept of universal health coverage to ensure adequate coverage.

1.2 Motivations of the study

This study was primarily inspired as a response to local health policy issues in Sudan. However, understanding the importance of the same questions from other broad stakeholders added the passion. For purpose of better organisation, this section moves from broad factors to specific factors pertaining to Sudan.

Around the world, rich and poor countries alike, there is the general recognition of the importance of health financing as a factor possessing a strong influence on people's interactions with healthcare systems that they use (WHO 2000). In fact, this recognition has most likely resulted in the current diversity of health finance mechanisms. Today, as stated before, most healthcare around the world is broadly paid for through general taxation, HI, and out-of-pocket spending (Wang, Switlick et al. 2012). Each of these health finance mechanisms has its own effect on access to healthcare (Wagstaff 2010). For instance, paying for healthcare out-of-pocket is widely practiced in many developing countries and has been largely reported to deter millions of people from using healthcare. Yet, pre-payments, including HI and tax-based funding, have been found to promote utilisation. Accordingly, studies on the association between health finance mechanisms like HI and access to healthcare are pivotal to the international community as they enrich the on-going debates on health finance options and provide more insights from the developing world.

Since the 1980s, there has been growing interest in HI in many developing countries. In 2005, The 57 member World Health Assembly, which was held in Argentina, stated unambiguously that "health-financing systems in many countries need to be further developed in order to guarantee access to necessary services while providing protection against financial risk" (WHO 2005). That policy has fostered and ratified the growing

interest in HI in many African and Asian countries. In parallel, such preference for HI has also stimulated research on the impact of HI, evidenced by an observable increase in the number of published papers on the effect of HI on health systems around the world. Yet, the impact of HI on access has not been conclusive. While the majority of works in the area have established that HI promotes access to healthcare, a number have reported that insurance has no effect on access. One possible explanation for this variability is the different country contexts, justifying more country-specific studies.

Encouraged by the success of evidence-based medicine (EBM) to guide decisions in clinical practice (Dobrow, Goel et al. 2004), many health systems researchers and decision makers have been eager to see evidence-based health policy becoming more common (Hunter 2009). In reality, the world is far from reaching such a goal as a result of the complexities of the health system field (Hunter 2009). However, this aspiration is enough to push forward research, along with country-specific studies, on the predictors of access to healthcare.

The choices involved in alternatives of health financing for developing countries has rarely been based on evidence coming from the countries in which they are applied. In most cases, it has been prescribed directly or indirectly by more affluent countries and/or international organisations. The most obvious example is the privatisation of healthcare services and implementation of user charges promoted by the World Bank (WB) in 1987, and/or International Monetary Fund (IMF), as part of structural adjustment programs, and which have been proven to be disastrous to both developing countries' population health and development. Moreover, it has been demonstrated to deter million from using healthcare, increase inequality and push further millions into poverty. With NHI being proposed as a substitute to user charges or fee for services (FFS), the focus of health policy had shifted to the role of insurance in developing

countries. The contribution of this ongoing international and regional effort is the answering of vital health policy questions, certainly a valuable investment and sufficiently rewarding outcome.

Sudan has established a HI scheme in the midst of many theoretically unfavourable conditions, such as negative economic circumstances, widespread poverty, a slim formal sector, civil war, and natural and man-made health disasters. As such, research on the impact of HI in the context of Sudan is expected to be of interest to many other developing countries and many international donors.

Sudan, like many other developing countries, is facing a rapid change in demographic structure and disease patterns, such emerging and re-emerging diseases. The country also suffers from a very challenging economic landscape, and this is further compounded with escalating healthcare costs. For instance, in 2009, just as mentioned earlier, healthcare consumed around 6% of the national GDP; nearly 70% of this was out-of-pocket (FMOH 2010). Such an excessive burden may compromise Sudan's potential for development. To meet these challenges, and to offer adequate access to healthcare, the government has been required to restructure the health financing system based on sound local evidence. This study may contribute to this arena by identifying factors that determine utilisation of healthcare and through making recommendations of possible health policy options in order to expand access and move towards UHC.

As a response to the many challenges discussed until now in this thesis, Sudan has introduced major changes to the economy and completely reformed the political system. Liberalisation of the economy and privatisation of all services,

including healthcare, were the most remarkable consequences. As such, the country also established the NHIF to remedy many of the expected drawbacks of that reform. These gross changes were expected to affect most aspects of healthcare, including access. Therefore, understanding access in the context of these factors is very integral.

In 2007, a Sudan Household Health Survey (SHHS 2006) report underscored two important facts about the Sudanese health system. For one, 50% of Sudanese who were ill did not seek any type of healthcare. Secondly, there was a remarkable disparity in the use of healthcare both between states and different societal groups. Such concerns ignited serious national debate on the role of the NHIF, which was accused of excluding the poor and marginalized societal groups and therefore widening the existing gap between the well-off and the rest of the population. However, no studies were carried out on these possible claims.

Sudan established its HI scheme in 1995, yet studies assessing the impact of it have remained far and few between. To the author's knowledge, no single study has explicitly assessed the link between the insurance status and access to healthcare. In fact, few studies on the determinants of access have even been conducted. With this, those that have suffer from two major shortcomings - limited coverage and/or scope. A portion of these studies only reviewed certain parts of Sudan, like Khartoum state. Meanwhile, others had limited their scope to just the vertical preventive programs, such as family planning or immunization, usually provided free-of-charge or with substantial government subsidy. These two limitations undermined the generalizability of these studies at the national level health policy. Thus, here, the objective was to fill this knowledge gap.

While HI has the potential to promote utilisation of healthcare, there is much public concern that it will promote utilisation of the private sector by contracting private providers' healthcare services, potentially elevating the overall cost of the health system and subsequently adding more burdens to the society in the form of taxes. Understanding the relationship between insurance status and the use of private healthcare providers is also necessary to make certain the insurance fund is sustainable.

While the general goal of this study was to evaluate the role of insurance on access to healthcare, technically, it was not possible to do so without exploring many other possible determinants of access. Reviewing other features of access would contribute to a greater comprehension of access and, therefore, aid in devising strategies to improve it.

Studies on factors that influence demand of healthcare or on determinants of health-seeking behaviour have been observed since the 1950s, especially in the developed world. However, the results have perpetually been viewed within the construct of the developing world, increasing in numbers (Ensor and Cooper 2004; Pokhrel and Sauerborn 2004; Lopez-Cevallos and Chi 2010). Nevertheless, the need for more work in this field is justified from both theoretical and empirical perspectives. Theoretically speaking, there is a necessity to assume and propose new models of access based on the on-going refinement of the existing theoretical models, such as Andersen's model or the HBM. Empirically, studies of these models in different contexts contribute to their maturation and enhancement of their predictive power.

One important feature of access to healthcare and the factors that determine it is dynamicity over time. It is known that access to the healthcare is influenced by both supply and demand of the healthcare system. A demand is generally defined as the

ability or willingness to buy a particular commodity, in this case healthcare services, at any given point of time. That said, people's abilities and willingness to purchase services are arguably clearly dynamic or change over time. Moreover, factors such as age, income, or education of an individual or population are not static. Based on this argument, factors that determine access have to be assessed over time and this study was expected to follow this paradigm.

HI has been promoted and praised as a magic bullet for solving all health policy challenges for the developing world (WHO 2000; WHO 2005; Wagstaff 2010). HI has been implemented since the 1990s in many developed countries while the beginning of the current century has seen its implementation in a number of countries in Africa (Ghana 2003, Sudan 1995, and Nigeria 1997). However, not many countries have evaluated the outcomes of this.

The present study attempted to fill this knowledge gap, and is hence considered timely for several reasons. Firstly, it is the only study in Sudan to date that has used representative national household survey data to examine the utilisation of healthcare. Second, the nature of demand in and of itself, with the empirical prerequisites, the interactions, and changeability with different country contexts, has added insights to the study that have contributed to revising Andersen's model, is the favourite among demand researchers. Third, there have been many reforms that have occurred in Sudan, particularly with respect to user fees and HI, the former being continuously attacked publically and the latter gaining popularity. Understanding the precise impact on the demand of the healthcare services is an urgent necessity for Sudan's national policy makers and for the international community on the whole, especially in developing countries where these types of reforms have been implemented or have been tabled for adoption. Fourth, there is an international growing concern for equity and efficiency in

the utilisation of resources. From an equity point of view, healthcare services are not considered equitable unless utilised according to needs, not means(WHO 2000). A plain understanding of the definition of equity would only be realised with exact measurements of healthcare utilisation and a clear description of its distribution within a population making use of it.

Also from an equity perspective, this study shed light on marginalised groups; what their demands are regarding healthcare and factors of real significance to them. In determining healthcare delivery efficiency, knowledge of such groups and their influences could facilitate effective redistribution of resources.

The factors explaining and determining the utilisation of healthcare are dynamic; over time, the age structure of a population is altered, and so, too, might be the choices made. The ever-changing medical landscape, with constant innovation, exerts enormous impacts on the way people demand and seek healthcare. The model from this study could be evaluated over time and considered a baseline model for HI in Sudan. It also accounts for the predictors of enrolment in the NHIF and estimates its coverage. As well, a number of the predictors of access were of use in the development of health policy alternatives that could help aid Sudan in achieving UHC.

1.3 Research questions

1. What are the factors that determine enrolment in NHI?
2. What is the role of insurance status on utilisation of healthcare services?
3. What is the role of HI on use of private healthcare services?
4. What are the health policy alternatives relevant to the government of Sudan for accomplishing UHC?

1.4 Objectives of the study

1.4.1General objective

The primary aim of this study was to assess the impact of insurance status on access to the healthcare services in Sudan.

1.4.2 Specific objectives

1. To describe the respondents of the SHUEHS (2009).
2. To describe the insurance enrolees in 2009 and identify factors that predict enrolment.
3. To describe utilisation of healthcare for acute conditions and characterize factors predicting utilisation of healthcare for such conditions.
4. To describe utilisation of healthcare for chronic conditions and to characterize factors predicting the utilisation of healthcare for such conditions.
5. To describe utilisation of inpatient healthcare services and to determine factors associated with utilisation of inpatient care.
6. To describe utilisation of the private healthcare services and to identify the factors determining the use of private healthcare.
7. To propose health policy alternatives that could aid the government of Sudan in achieving the goal of UHC.

1.5 The Layout of this thesis:

Following the introductory chapter, this thesis is organised in the following sequence:

I. In Chapter Two, the literature on the concepts, theories, and models that explain how people utilise healthcare was reviewed. It also covers the empirical findings on the predictors of healthcare utilisation.

II. Chapter Three covers the methodology applied in this study. It firstly describes household planning, processes, and data management. Then, the chapter describes the methodology employed in this study to address the objectives. A full list of variables of interest is provided and their relevance explained.

III. Chapters Four, Five, and Six present the results of this study. They are organised with respect to the sequence of the study objectives; hence, the results follow the same sequence of the objectives. First, the survey respondents and the NHIF enrolees, as well as predictors of insurance enrolment, are described. Next, healthcare utilisation and its predictors for acute conditions, chronic conditions, and hospitalisation are detailed.

IV. Chapter Seven is the discussion. The findings of this study in relation to the existing knowledge are elaborated upon. Strengths and weaknesses of the study are also put forth, and the chapter is then concluded with policy recommendations and suggestions for future research.

V. Chapter eight gives conclusions.

1.6 Summary of Chapter

The government of Sudan considered achieving UHC by expanding the NHIF which was established in 1994. The scheme mainly covers civil workers, biased towards affluent regions, and its enrolment among the poor was limited. As a result, there was a public concern about the possibility of NHIF to aggravate the existing inequity in accessing healthcare. This study was designed to assess the impact of NHIF on healthcare utilisation and explore factors that determine insurance enrolment. The study used national representative data from the Sudan Health Utilisation and Expenditure Household Survey, 2009 (SHUEHS 2009). Good understanding the insurance enrolment and the impact of HI on access to healthcare will help policy makers to rely on a solid ground when considering transforming the NHIF to a scheme that covers the whole country. At the same time the study was expected to contribute to the public debates about the impact of NHIF on utilisation of healthcare and the exclusion of the poor.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter begins with a description of the process involved with and outcomes from the literature review. It then explores and clarifies specific relevant concepts required for this work, such as HI, access to healthcare, and UHC. Afterwards, it presents empirical findings on the impact of HI on access, focusing on studies from developing countries. Finally, it puts forth the conceptual framework developed to guide this study.

Generally, the process of obtaining literature on access was not straightforward as the studies on access to healthcare come from different scientific disciplines. Each discipline has its own approach, terminologies, and key words. For example, economists prefer to use concept of demand of healthcare, which is similar to utilisation of healthcare or access to healthcare seen in other fields.

PubMed and Embase were the main website sources of information. However, many other online sources were searched, including Google Scholar and Google's Search. Furthermore, websites of certain institutions concerned with health policy and research, such as the WHO and WB, were visited for the relevant documents and publications. Abstracts of articles were scanned for relevance. Qualified articles were downloaded and reviewed. Again, references from these articles and related links were traced for more information. Text books of relevant subject matter were also obtained and searched through, typically from the university library. As well, unpublished government documents and reports were also reviewed. Finally, a number of sources recommended by experts in the field were also been found and reviewed.

It was observed that, generally, most studies on access follow one of the three major models - the HBM, the psycho-social model or Andersen's model, and the economic model or Grossman's model. However, often studies that use the same theoretical model as guide also use varying subsets of variables. In fact, there is an on-going modification process and refinements of the theoretical model, most likely as a response to the criticism coming from their application in the field. In addition, it was also observed that till the year 2015, studies from developing countries were still scarce, though fortunately there now seems to be an upward trend.

The subsequent sections will first cover the major concepts such as Health Insurance (HI), access to healthcare and demand for healthcare. Then the section explores Approaches, theories, and models of utilisation of healthcare. Then it provides overview of the relevant empirical reviewed literature on the impact of health insurance on access to healthcare. And finally, the chapter ends with a conceptual framework specifically for this study.

2.2 Health insurance

Healthcare is associated with uncertainty pertains to the time when it is needed and the costs it imposes (Jowett 2004). Thus, a particular kind of health insurance is required to protect people from the financial crises that frequently result from medical expenditures.

The concept Health Insurance (HI) was defined as a formal arrangement in which the insured persons (beneficiaries) are protected from the costs of medical services which is covered by the HI organisation (Folland and Goodman 2004; Wang, Switlick et al. 2012).

Historically, the first known HI was established in Germany in 1883 as a national (compulsory or statutory) scheme (Wagstaff 2010). The earliest versions of HI developed without any significant government intervention. Industrialisation brought with it the emergence of large firms, and the workers in these firms started to organise themselves into trade unions(Mossialos, Dixon et al. 2002). The current HI organisations were shaped by subsequent reforms and transformations that occurred around the world, to answer countries specific objectives, such as increasing insurance coverage, promoting health equity, or offering flexibility in the choosing healthcare providers.

Inspired by the Germany experience, many developed countries, including France, Canada, and Sweden had implemented some kind of HI (Mossialos, Dixon et al. 2002; Wagstaff 2010). In developing countries, HI is relatively new. It has been observed that over the last thirty years, HI has spread in many

African and Asian countries; examples include Vietnam in 1993, Nigeria in 1997, Tanzania in 2001, and Ghana in 2005(Wagstaff 2010)

Currently, four broad categories of HI do exist, namely: national health insurance (NHI), social health insurance (SHI), community-based health insurance (CBHI), and private health insurance (PHI) (Wang, Switlick et al. 2012). Basically, these types of HI, share two basic characteristics : risk sharing and cross subsidies between its members(Mossialos, Dixon et al. 2002). However, these categories differ in the revenue collection and pooling of funds. In the case of NHI, revenues are usually collected from the general tax. In SHI contributions are shared between the employees and employers, but sometimes specific groups of the societies are paid for out of the general tax. Private health insurance premiums are paid by an individual, shared between the employees and the employer, or paid wholly by the employer(Mossialos, Dixon et al. 2002; Folland and Goodman 2004; Wang, Switlick et al. 2012). CBHI is generally a voluntary scheme in which revenues are usually collected from its members by the insurance plans.

The prime welfare objectives of social health insurance are to: prevent large out-of-pocket expenditure; provide universal healthcare coverage; increase appropriate utilisation of health services; and improve health status(WHO 2010).

HI removes a portion of the financial barriers between users and healthcare services. As a result, HI, in theory promotes access to healthcare and has the potential of protecting its member from catastrophic health expenditures (Wagstaff 2010; Wang, Switlick et al. 2012). Empirically, there is a firm

evidence that health insurance had improved access to healthcare and provided financial protection, at least, to its members.(Spaan, Mathijssen et al. 2012; Levine, Polimeni et al. 2016). However, HI also has many shortcomings features, such as exclusion of the poor and therefore widening the inequity between the insured and non-insured in term of access to healthcare, which in turn may produce health inequalities. HI, if not well-designed, could also shift the use of healthcare from cheaper public facilities to higher-priced private facilities with the possibility of increasing the overall cost of healthcare systems (WHO 2000; Wagstaff 2010; van den Heever 2012)

Based on Andersen's model, factors determine access to healthcare were grouped into: predisposing, enabling and need factors. Health Insurance in this study is considered as an enabling factor. Therefore, a review of studies on the impact of health insurance on utilisation of healthcare will be provided in section 2.5.2.1 page 53.

2.3 Definition of other basic concepts

In this section access to healthcare and demand for healthcare will be covered.

2.3.1Access and utilisation

Access to healthcare is central in the performance of healthcare systems around the world (WHO 2000). Definition of access is an especially important policy objective as it is related to the definition and assessment of the goal of equity of health systems - equitable access is often interpreted as equal access for equal needs (Oliver and Mossialos 2004). Yet, the concept is considered, just as mentioned before, complex, as exhibited by its interpretation by many authors (Levesque, Harris et al. 2013).

Etymologically, access is defined as the way to approaching, reaching, or entering a place, as the right or opportunity to reach, use or visit (Barber 1998). In healthcare, access always refers to gaining use of services, providers, or institutions. These differences in defining access have resulted in what is included in access measurements.

Access to healthcare has been conceptualised in numerous ways. Most authors have realised that access is influenced by attributes of the native country's health system and its customers (or clients, consumers, and populations) that use the services. Economists consider characteristics of the services to be found on the supply side while characteristics of clients are on the demand side.

Several recent lines of inquiry have viewed access as an opportunity to identify healthcare needs, to seek services, and to actually have the needs for healthcare services fulfilled (Levesque, Harris et al. 2013). This definition regards access

as a continuous process and highlights the ability to perceive, seek, reach, pay for, and engage with services. As such, these stages can be employed (through study) to improve the access of care process.

Andersen and other behaviourists defined access as the actual use of personal health services and everything that facilitates or impedes their use (Ronald M. Andersen). Based on this, access is the link between the health services system and the population it serves. However, access can be difficult to measure and, hence, utilisation has often been made use of as a proxy to access. With that in mind, it has been reported that utilisation is the best available proxy for access (Andersen and Newman 1973; Levesque, Harris et al. 2013).

Andersen conceptualised utilisation as manifested access. His view of utilisation, more specifically, was that of actions that determined by population characteristics (predisposing, enabling, and needs) and health systems' characteristics, such as policies, resources, and organisations (Aday and Andersen 1974; Andersen 1995).

2.3.2 Demand for healthcare services

The word demand is borrowed from economic terminologies - it is an economic principle that describes a consumer's desire, willingness, and ability to pay a certain price for a specific good or service. Demand also signifies the ability or the willingness to buy a particular commodity at a given point of time, and describes the quantity of goods or services that an individual purchases and consumes given the unique combination of prices and income of the consumer (Adhikari 2012).

Demand (for health services) is defined as a willingness and/or ability to seek, use and, in some settings, pay for services. Sometimes further subdivided into expressed demand (equated with use) and potential demand or need(WHO 2004).

In health economics terms, demand for healthcare is another conceptual alternative to access to healthcare, and is a function of the many important supply and demand facets of the health systems (Mooney 1983; Ensor and Cooper 2004; O'Donnell 2007). Therefore, Studies deal with demand of healthcare usually assess factors that affect the individual’s decision to use, and the quantity of, healthcare services, such as price of the service, individual income, the quality of service and the supply of services(Belay Mohammed 2013).

2.4: Approaches, theories, and models of utilisation of healthcare

2.4.1 Introduction

The literature search revealed that many approaches and models are relevant to the factors that determine utilisation of healthcare. Three models were found to be particular applicable when assessing access to healthcare and establishing its determinants - Rosenstock's model or the HBM (Rosenstock 1974), Andersen's model or the behavioural model (Andersen 1968), and Grossman's economic models (Grossman 1972).

HBM constitutes an example of a model that represents a psycho-social approach. The model postulates that individual perception, which is influenced by health beliefs on vulnerability to a particular health threat and the consequences of the health problem, influences an individual's readiness to take action, and this readiness interacts with many other socio-demographic, structural, and perceived benefits that results in service actions, such as utilisation (Rosenstock 1974; Pokhrel and Sauerborn 2004).

The behavioural or Andersen's model is the most widely-used model in assessing access. Accordingly, and as stated earlier, the utility of health services is determined by three interrelated and dynamic factors: predisposing, enabling, and needs (Andersen and Newman 1973). The predisposing factors are those with the potential for increasing the propensity of reporting illness and utilising healthcare. These can include factors such as age, gender, and ethnicity. Enabling factors facilitate or impede the use of healthcare services, and usually include income, insurance status, social support, and education. Needs are health needs and, theoretically, should be

the prime factor for promoting utilisation of healthcare services (Andersen 1968; Andersen and Newman 1973).

Grossman's model (Grossman 1972) is basically an economic model. It assumes that factors, such as price and income, covariate with a set of socio-demographic and needs factors to produce demand for healthcare, most often represented by its utilisation (Pokhrel and Sauerborn 2004). Some authors have expand this model to assess the role of the family as producer of health(Jacobson 2000)

Despite the importance of the theories behind each of these models and their relevance to utilisation or access to healthcare, some of the features of Andersen's model made it the best possible model to serve as the basic framework for this study. Notably, this was because of its flexibility in the choice of variables and has its classification of these variables into predisposing, enabling, and needs. Such categorisation is of special importance from a health policy and equity judgement perspective.

2.4.2 Andersen's model

Andersen's model is probably the most influential and well-known theoretical model for predicting and explaining utilisation of healthcare(Babitsch, Gohl et al. 2012). The model was developed by Ronald Andersen in the 1960s (Andersen 1968). It was developed initially to assist in understanding why families use health services, to define and measure equitable access to healthcare, and to help in the construction of policies that target equitable access (Andersen 1968; Andersen 1995). However, it has been continuously revisited and refined to accommodate different research needs and scholarly critiques that have arisen over the last forty years (Babitsch, Gohl et al. 2012). The model has undergone several stages of transformation in response to these events.

The original model, suggests that people's use of healthcare services is a function of three interrelated factors - their predisposition to use healthcare factors that either enable or impede their utility of it and their actual needs for care (Andersen 1968). Later, in the 1970s, the second phase was developed by Aday (1974) and other collaborators (Andersen and Newman 1973; Aday and Andersen 1974). In that updated version, the health system characteristics were included as an important determinant for population use of healthcare. To this same version was also added, rather explicitly, the outcome of services, particularly consumer satisfaction. A third modification evolved in the 1980s and early 1990s to comprise the external environment (including physical, political, and economic conditions) as important components for understanding healthcare utilisation. The latest version of the model is a multileveled, incorporating both individual and

contextual determinants of health service use, and divides the major components of the contextual characteristics in the same way as the individual characteristics have traditionally been divided into predisposing, enabling, and needs factors (Andersen 1995; Babitsch, Gohl et al. 2012).

Andersen's model was initially focused on the family as the principle unit of analysis because medical care an individual receives was considered a function of social and economic demographic characteristics of their family (Andersen 1995). However, in subsequent work, Andersen shifted to the individual level as a unit of analysis based on the difficulty in measurement encountered when family was used as the unit (Andersen 1995).

Overall, this model is not mathematical; rather, it is a flexible tool that was designed to help organise the concepts into a logical framework. It targets exploring the potential variables that may explain and predict healthcare use. The framework can then be used to identify and test the importance and statistical weighting from the empirical groundwork. Andersen's grouping of the variables into three categories - predisposing, enabling and need factors – and, again, the flexibility in the selection of the variables assigned to each group is indeed, and as stated before, strength of the model. The grouping of the variables and the flexibility of the sets of the variables may explain the broad and increased acceptance and application of this model by health researchers dealing with utilisation of healthcare services (Babitsch, Gohl et al. 2012).

From the aforementioned description of Andersen's model, one can characterise it as a prediction model, or a model that provides insight into

healthcare utilisation by predicting levels and patterns of utilisation instead of explaining why these processes occur.

The original Andersen's model assumed that a sequence of conditions contributed to the individual decision to use healthcare, being the predisposition, enabling and needs factors.

Predisposing factors: These factors indicate propensities of an individual to use healthcare services prior to episodes of any specific illness, and reflect the fact that a number of individuals are more inclined to use healthcare services than others. It could be understood as an attribute related to the individual themselves; that is, certain individuals have a greater propensity towards utility of healthcare more than others (Andersen and Newman 1973). This propensity for utilisation can be predicted by the individual characteristics, including demographic features, social structure, and attitudinal beliefs (Andersen and Newman 1973). Demographic factors consist of age, gender, marital status (Andersen 1995). Age and gender represent biological imperatives suggesting the amount, timing, and the type of healthcare people may need. Social factors refer to the hierarchy in the individual's community, serving as a gauge of the resources available for the individual to deal with ill-health and their coping mechanisms for both the problem of ill-health and the sequences related to solving such a problem (Andersen and Newman 1973). Operationally, social factors have been measured by education, occupation and ethnicity of an individual (Andersen 1995). Health beliefs are attitudes, values, and knowledge of an individual and their family with relation to illness, health and healthcare services. These beliefs may influence the individual's perception and

understanding of their illness and, therefore, their health needs, often the first theoretical and empirically direct motive for seeking healthcare (Rosenstock 1974; Andersen 1995).

Enabling factors: Resources and means of an individual and/or their family that facilitate or impede their decision to seek healthcare (Andersen and Newman 1973). Even if an individual perceives having ill-health and believes in seeking professional help, these factors can modify the process of translating the felt health need into a decision to seek professional care. Enabling resources must be present for health utilisation to occur. Enabling factors are traditionally divided into two categories - individual factors and community attributes. Individual factors are sufficient income and insurance for the individual to cover the cost of seeking healthcare and its financial consequences. Community attributes include the individual's access to health personnel and facilities (geographic settings and availability of professionals), along with the transportation means necessary to reach those services. Enabling variables frequently include income, HI, and availability of healthcare, as well as travelling and waiting times (Andersen 1995; Babitsch, Gohl et al. 2012). In his final model, Andersen added social network as an enabling factor (Andersen 1995), a result of the criticism from neglecting such factors in the first iteration of the model.

Enabling factors are fundamentally important for two reasons: 1) the majority of these factors are mutable or amenable to change with health policy intervention; 2) these factors are important for assessing inequity of the healthcare system according to Andersen's definition of inequitable

utilisation of healthcare services, which states that utilisation is inequitable if it is determined by enabling factors rather than needs or predisposition factors (Andersen 1968; Andersen 1995).

Needs factors: Health needs are the most immediate influences responsible for use of healthcare services (Andersen 1968; Andersen and Newman 1973). Andersen and Newman (1973) had categorised these into two groups - perceived needs and evaluated needs. Perceived needs are the subjective individual views of their symptoms, all consequences of the illness conditions, and the requirement to consult medical professionals (Andersen 1968). Evaluated needs are objective based on professional judgement of an individual's health status and their need for healthcare. From these definitions, and as Andersen had commented, it is clear that perceived needs are responsible for the individual's decision to seek healthcare, while evaluated needs determine the type and extent of health services care. For that reason, self-reported episodes of illness and health status have been used extensively to measure the need of an individual and are found to be reasonably accurate in most cases (Roberts, Bergstralh et al. 1996; Ritter, Stewart et al. 2001; Palmer, Johnston et al. 2012)

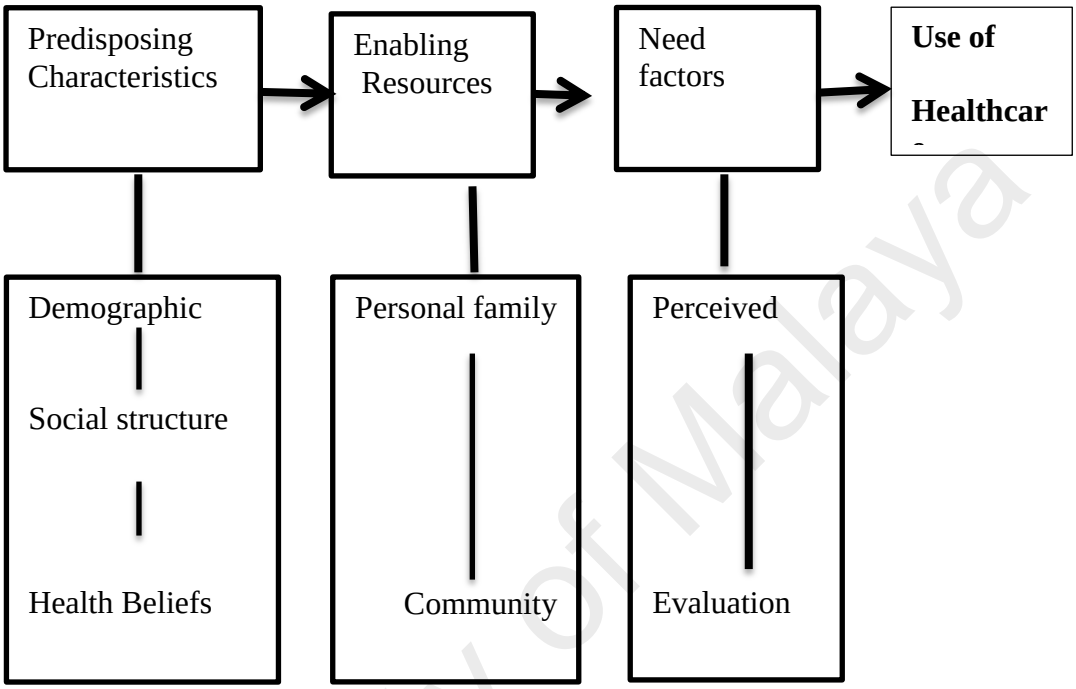

Figure 2.1. Andersen's model - phase I (1960s) (Andersen 1995)

2.5 An empirical review of studies on utilisation

2.5.1 Predisposing factors

As previously defined, predisposing factors are those with the potential to increase an individual's propensity to report illness and utilise healthcare. These factors include age, gender, and ethnicity.

Age and gender are biologically imperative, and therefore they are expected to influence the use of healthcare. The effect of age on utilisation of healthcare services is important for the purpose of planning healthcare services to meet changing healthcare demands according to the concomitant changes in a population's age structure. This point is of special concern in countries forecast to undergo a major demographic transition.

Gender, ethnicity, and occupation are mainly studied with respect to their relationship to equity in order to assist policy makers in managing the inequity in healthcare resultant from these variables.

Age: Children and the elderly are expected to have greater utilisation of healthcare services based on their obviously unique biological attributes. As readily supposed, many researchers have reported a significant association between age and utilisation of healthcare services (Ibnouf, Van den Borne et al. 2007; Ahn 2011; Babitsch, Gohl et al. 2012). However, the significance and direction of this association was found to be variable (Babitsch, Gohl et al. 2012). Most have reported that the use of healthcare increases with age (Ahn 2011; McColl 2011). Ahn and colleagues reviewed factors connected with overuse and underuse of healthcare services in Korea, observing that the odds

of utilisation of healthcare services in age groups above 65 years is five times higher than at 34. In a study in Canada, McColl examined the effects of disability and age on health service utilisation, reporting that there was a moderate increase in utilisation for every five year increase in age after the age of 65 (McColl 2011). This has major policy implications – it ultimately implies that the amount of healthcare required by any society is expected to increase as the mean age of a nation increases. Another important finding from that study was that age is a modifying factor for health needs; elderly individuals with disabilities were found to attribute many of their healthcare needs to the effects of aging, and therefore did not seek healthcare.

Children are biologically at risk of experiencing more episodes of illness than young adults; many studies have found that children were more likely to use healthcare services than adults. However, the perception of its seriousness or the severity of these illnesses, and how to respond to them, was an adult decision. Age also interacts with perception of the illness; for example, young adults may neglect mild conditions, especially males. The elderly were much more needy regarding healthcare than young adults, however they usually attribute many treatable conditions to the effects of the aging. In many communities within developing countries, the priority of allocating resources to treat illness is age dependent, in favour of bread winners.

Gender: Women and men are biologically different with regards to their perceived health status and consequently in their utilisation of healthcare services. It is well-documented in the literature that women report more episodes of illness than men (Verbrugge 1985; Ruiz and Verbrugge 1997).This

is consistent within all age groups and is vital for constructing an integrated model that takes into account gender differences (Bird and Rieker 1999).

A number of societies have regularly reported that male children are preferred over females, even during early neonatal life (Chowdhury, Thompson et al. 2011). In one study conducted in Bangladesh, it was observed that for approximately 50% of female new-borns, healthcare was not sought compared to 30% of their male counterparts. Furthermore, multiple consultations were also offered to males compared to females (Chowdhury, Thompson et al. 2011)

2.5.2 Enabling factors

Enabling factors behind utilisation of healthcare have been extensively studied in the literature and include HI, income, and education. In this study, the HI will be the main focus as it represents the main objective of the study.

2.5.2.1 Health Insurance

Most studies on the effects of insurance on the utilisation of healthcare services, from many countries around the world, are observational. Such types of studies may yield biased results as the insured individuals may differ from the non-insured in terms of health status, income, and many other socioeconomic indicators. Nevertheless, the findings of such observational studies have been regularly concurred with by others and increasingly confirmed by further work. There are two known experimental studies that have been conducted in the USA regarding the impact of insurance. The most famous is the RAND study conducted in the 1970s and the other is the also highly known Oregon study that began in 2008. Recently, some experimental studies regarding the impact of HI was also reported from Cambodia(Levine, Polimeni et al. 2016)

The Oregon study (Finkelstein, Taubman et al. 2012): In 2008, a group of uninsured low income adults in Oregon were selected through a lottery to be insured. The type of lottery selection was a random inclusion in a study population, and this mechanism of selection was an appropriate experimental study design for gauging the effects of public health insurance on the utilisation of healthcare use and for evaluating other outcomes. The newly-insured enrolees were compared with the control individuals not selected for insurance and therefore remaining as non-insured. The study objectives were to evaluate the impact of insurance on the utilisation of healthcare services and its effect on the participant's financial constraints as well as its impact on health. Both administrative records and a mail survey were employed as the tools for data collection to assure reliability of the data collected. Overall, the results revealed

that the insured had a substantial, statistically significantly higher healthcare utilisation and better self-reported health status. Insurance coverage was found to result in a 30% increase in hospital admission and a rise by 35% in outpatient visits. Moreover, insurance was found to elevate adherence to preventive programs, like cholesterol check-ups and mammograms (Finkelstein, Taubman et al. 2012).

The RAND study (or "Health insurance and the demand for medical care: evidence from a randomized experiment" (Manning, Newhouse et al. 1987): A large-scale, randomized study conducted between 1971 and 1982 in the USA that recruited 2750 families encompassing more than 7700 individuals with the objective of evaluating the change in individuals' demand for healthcare with regards to different levels of co-payment. These objectives constituted the basic theoretical background for HI, and therefore, the study is quite relevant here as a historical investigation of HI. In it, the participants were randomly assigned to one of five types of HI plans created specifically for the purpose of the study. Four of the five plans operated as a fee-for-service payment arrangement with 0% (free care), 25%, 50%, and 95% co-payments. The fifth payment mechanism was a non-profit HMO-style group co-operative whereby participants were given free-of-charge services. Families participated for three to five years in the study. The resulting data indicated that cost sharing reduced the use of nearly all healthcare services; participants with cost sharing made one to two less annual visits to physicians and were less frequently hospitalised than those with free care. Declines were similar for other types of services, as well, including dental visits, prescriptions, and mental health services (Manning, Newhouse et al. 1987).

A recent experimental study was conducted in Cambodia(Levine, Polimeni et al. 2016). The study evaluated the impact of HI on three dimensions: health care utilisation, economic, and health outcomes. The study found that HI had increased the use of the healthcare that was covered by the insurance package, and decreased utilisation of private (uncovered) healthcare services such as selling shops and pharmacy. The authors concluded that there was a shift from private care to public healthcare facilities.(Levine, Polimeni et al. 2016)

Observational studies, especially those coming from the developing world, are generally scarce, however there is general agreement between those that exist - HI increases access to healthcare and promotes utilisation of those services. One study from Burkina Faso (Gnawali, Pokhrel et al. 2009) investigating community-based health insurance (CBHI) reported that compared with those who were not enrolled in the CBHI, the overall increase in outpatient visits given illness in the insured group was about 40% higher, while the differential effects on utilisation of inpatient care between insured and non-insured groups was insignificant. Not only were the very poor less likely to enrol in CBHI, but even once insured, they were less likely to utilise health services compared to their wealthier counterparts, and therefore the conclusion was that the overall effect of CBHI on healthcare utilisation was significant and positive, though the benefit of CBHI is not equally enjoyed by all socioeconomic groups.

Two systematic reviews on CBHI regarding outcomes (Preker, Carrin et al. 2002; Ekman 2004) from the form of insurance that typically exists in developing countries arrived at the same conclusions, being that HI enrolment increased the utilisation in 14 countries. In addition, similar results were reported by another systematic review(Buchmueller, Grumbach et al. 2005)

which found consistent significant effects of insurance on all types of utilisation. Insurance coverage increased outpatient utilisation by roughly one visit per year for children and between one and two visits for adults(Buchmueller 2005). A more new and comprehensive systematic review on the impact of NHI on utilisation of healthcare services and financial protection in African and Asian countries, conducted by Spaanin 2012 (Spaan, Mathijssen et al. 2012). It concluded that HI improved access to the healthcare and provided financial protection to its members. In contrary to these findings, a systematic review reported no strong evidence to support the impact of social health insurance schemes as a means of increasing financial protection from health shocks or of improving access to health care.(Acharya, Vellakkal et al. 2012)

A study from Rwanda (Saksena, Antunes et al. 2011) in a similar vein, in another investigation from Senegal (Jütting 2004), it was observed that HI members frequently used the hospital more often than non-members and paid less for a visit. All these results seem to confirm our hypothesis that community financing through pre-payment and risk sharing reduces financial barriers to healthcare, as is apparent through increased utilisation, and lower out-of-pocket expenditure. In addition, they indicate that risk pooling and pre-payment, no matter how small-scaled, can improve financial protection for the poor with respect to healthcare services.

2.5.2.2 Education

Education as a determinant of healthcare utilisation is a complicated variable - it confounds with other factors that influence the utilisation of healthcare quite pronouncedly, such as accessibility of services, urbanization, and income. In addition, education can also modify health behaviour. Therefore, assessing the direct impact of education on utilisation requires specific study design and cautious interpretation. Therefore, with this, to many researchers, attributing the effect of education reported from studies conducted from developing countries to the economic privileges resulted from better education (Cleland and Van Ginneken 1988). Notwithstanding, studies that have reported the positive effects of education on utilisation are abundant worldwide (Raghupathy 1996; Simkhada, Teijlingen et al. 2008; Agha and Carton 2011) and suggest that education has an independent role in utilisation. Most research has found that education increases the likelihood of health services utilisation than does income or employment status (Halldórsson, Kunst et al. 2002; Habicht and Kunst 2005; Morris, Sutton et al. 2005)

The education of a mother is a particularly important factor determining the utilisation of maternal and child healthcare services. Such findings have been established in both developed countries (Halldórsson, Kunst et al. 2002) and developing countries (Becker, Peters et al. 1993; Govindasamy and Ramesh 1997; Ibnouf, Van den Borne et al. 2007; Agha and Carton 2011).

2.5.2.3 Income

It is not surprising to find that income constitutes the main enabling factor that determines utilisation of healthcare, and thus is postulated and incorporated in

many models designed to assess the utilisation of healthcare services (Grossman 1972; Andersen and Newman 1973).

Empirically, well-off people use more healthcare services than the less advantaged in both developed (Morris, Sutton et al. 2005) and developing countries (Su, Kouyaté et al. 2006; Kesterton, Cleland et al. 2010). However, there is research that suggests the opposite - that the poor more highly utilises GPs and family physicians than the wealthy (Veugelers and Yip 2003).

2.5.3 Needs factors

Health needs are considered the prime factor that promote utilisation of healthcare services (Andersen 1968; Andersen and Newman 1973). However, health needs are not always translated into health demands. Moreover, other socioeconomic factors, like education, income, and perception, may contribute to this phenomenon. Such is frequently observed in developing countries where the enabling factors may exhibit more prominently in utilisation of healthcare. Empirically, people with great needs may be constrained by unaffordability (Ibnouf, Van den Borne et al. 2007) or their economic status (Kesterton, Cleland et al. 2010). Low priority and discrimination in terms of utilisation of healthcare services have been reported in studies from Africa (Su, Kouyaté et al. 2006). For example, one study from Ghana showed that although females have a greater need for health services than males, they do not utilise health services as much, in contrast to findings from others (Buor 2004).

2.6 Conceptual framework

This study, as mentioned earlier, employed Andersen's model as a framework of health services utilisation (Andersen and Newman 1973; Andersen, McCutcheon et al. 1983; Babitsch, Gohl et al. 2012). According to this framework, utilisation of health services is considered to be a function of three characteristics: (1) predisposing factors, including age, place of residence, gender, occupation, ethnicity, social networks, social interactions, culture, attitudes, values, and knowledge that people have concerning healthcare system; (2) enabling factors, consisting of personal/family traits, community characteristics, and income; and (3) need factors that include perceived and objective needs.

With regards to predisposing factors, this study used age, region, residence, gender, marital status, and occupation. Ethnicity was not made use of as it was never used in Sudan in any official policy for the reason of sensitivity related to the issue. Perceptions and beliefs were not included in the survey questionnaire, either.

As for the enabling factors, income, education, and insurance status were employed. Andersen's model did not include HI, however, relying on his definition of enabling factors, HI fit the definition, and was therefore incorporated here. Moreover, others have used HI as an enabling factor (Valencia-Mendoza and Bertozzi 2008; López-Cevallos and Chi 2009).

Self-reported illnesses and symptoms were used to approximate health needs.

Figure 2.2, next page, shows schematic model of the predictors of utilisation of healthcare services. The figure was drawn on Andersen's model.

Conceptual framework

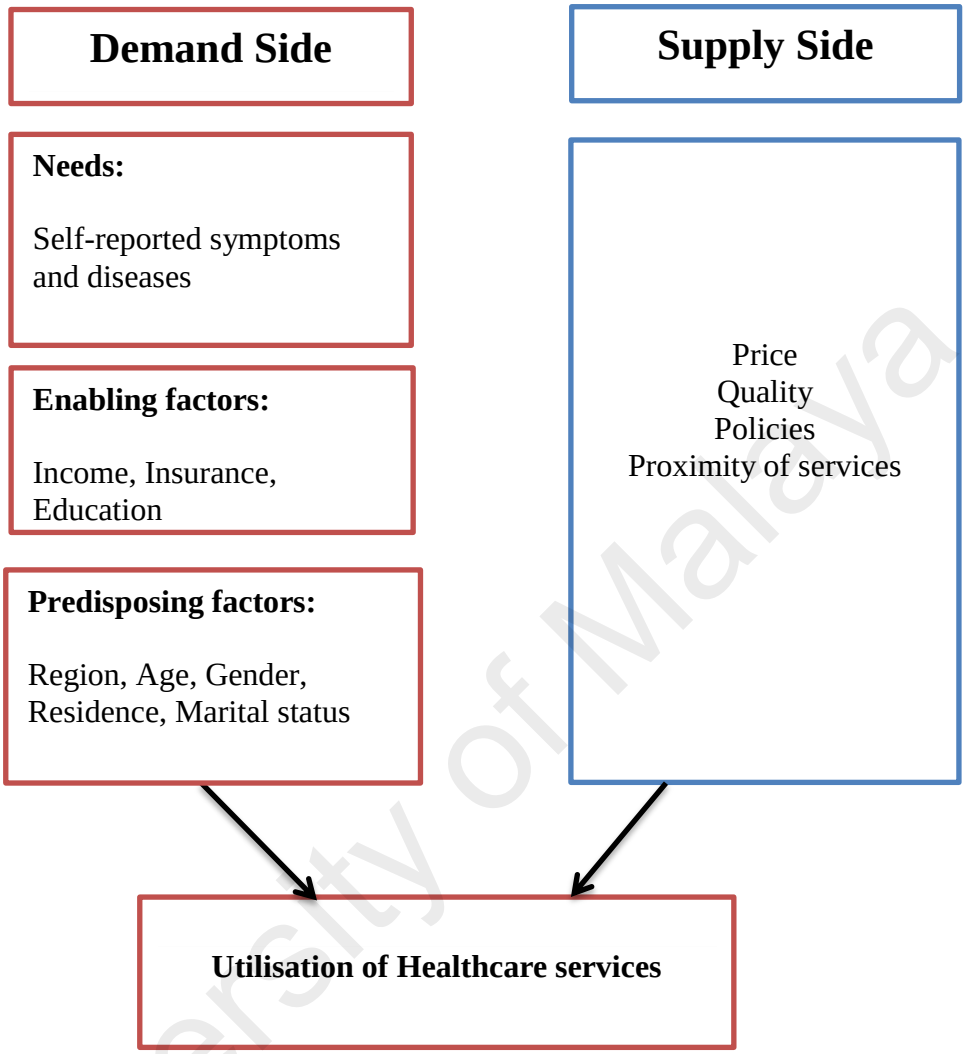

Figure 2.2. Schematic model of the predictors of utilisation of healthcare services

(Adapted from Andersen's models of access)

Chapter 3: METHODOLOGY

3. Introduction:

This chapter describes the methodology employed in this study; first, it details the SHUES (2009) as a source of the requisite information, and then outlines the variables of interest specifically chosen to address the objective of this study according to the conceptual framework put forth in the previous chapter.

3.1 The survey

In the year 2009, the Federal Ministry of Health (FMOH) of Sudan and the National Bureau of Statistics (CBoS), in collaboration with the technical support arm of the WHO, had conducted the Health Utilisation and Expenditure Household Survey 2009 (SHUEHS 2009) as a part of the National Health Account (NHA). The survey administered between January and December 2009, covering a sample of roughly 75000 respondents that belonged to approximately 12600 households. This was a national study that included households residing in a dwelling in the respective state for at least six months prior to the interview. Under the present federal system in Sudan, the country is divided into 15 states; the state is considered a semi-autonomous entity mandated to the affairs of the citizen, providing governance, and is responsible for planning, policy formulation, and implementation of annual programs. This survey was administered in all 15 states of Sudan (previously North Sudan).

3.1.1 Sampling frame

The sampling frame followed the sample frame used in a similar survey conducted in 2006, namely the Sudan Household Health Survey 2006 (SHHS

2006). The sample frame was developed by the Sudan CBoS in 2006 and had given the number of all households in each state and locality (district).

3.1.2 Sampling

A complex cluster sampling was made use of in this study. It started with stratifying the states into urban and rural areas. Then, a two-stage cluster sampling design was applied to both areas whereby villages and quarters were randomly selected from the rural and urban areas, respectively. These villages and quarters were identified as the primary sampling units (PSU). During the second stage, households within the each selected PSU were randomly selected and named as secondary sampling units (SSU).

3.1.3 The sample size

The calculation of sample size was based on a continuous measure (healthcare expenditure) and the variability was measured by coefficients of variation. The equation below provided the approximate sample size per state:

$$n = \frac{z^2 V^2 deff}{\delta^2 (1-r)}$$

where:

n = the required sample size (number of households) for each state

z = the value in the normal distribution that provides level of confidence 95% (z = 1.96)

v = the relative variance for expenditure (V=269.248/389.138) obtained from a similar study undertaken by Khartoum State Ministry of Health.

r = the non-response rate (r = 10%)

deff = the design effect (deff = 2)

δ = the margin of error (δ=0.07)

By replacing the variables in this formula with values, a total of 834 (rounded to 840) households were required from each state. As there were 15 states, the minimum sample size, or SSU, needed for this study was 12600 households.

Data collection was conducted across three rounds of surveys. In the first round, the survey covered 14 PSUs (with 210 SSUs in each PSU) while during the second and third surveys, there were 21 PSUs, respectively (each having 315 SSUs).

3.1.4 Sample selection

Within each state, the number of PSUs selected was determined by the probability proportional to the size of the number of households (PPS). Clusters, i.e., quarters in urban areas and villages in rural areas, were selected with the PPS procedure. This selection was performed centrally and each state was given a list of the selected quarters and villages.

The SSUs (households within each selected PSU) were selected randomly with the random digit table. Equal probability of selection for each segment was assigned because it was assumed that the size of all segments was approximately equal.

3.1.4.1 Mapping and listing

Once the selection of the quarters and villages was complete, the field supervisor drew maps of the clusters based on natural boundaries. They then listed the households in the selected segment. Subsequently, the choosing of households within each selected segment was carried out through systematic sampling with circular intervals.

3.1.4.2 Identification of respondents

The principal respondent for the entire set of questionnaires, as described in the following, was the head of the household that was presumed to be the main bread winner and potentially also be the person that decided on health spending and seeking healthcare. In the absence of a household head, the next person in the household that made/influence decisions was interviewed. However, other family members available at the time of the interview could participate to complement the responses of the principal respondent.

3.1.5 Data collection

3.1.5.1 Data collection tool

Questionnaires of this study were based on the structured questionnaires from the study on the health expenditure in Khartoum State (2007), and was further developed and modified with assistance from international experts in health economics. In addition, opinions and input from other stakeholders from the FMOH and NHIF were also considered.

The information on HI and related issues with respect to insurance were added to fulfil the objectives of this study. The variables were mainly derived from Andersen's model, as reflected in the conceptual framework (see Figure 2.2). The list of variables and their definitions will follow in the subsequent chapter which elaborates upon the conceptual framework.

Data that were collected through interviews with the heads of households included information about the household in general. All other relevant questions pertaining to details of each individual, particularly regarding illness episodes and utilisation of healthcare services, were posited to individual members within the household.

In order to be interviewer-friendly, the questionnaires were grouped by section:

Section (1): Dealt with questions on the characterisation of the household. It sought information on the states, districts, administrative units, and residence (rural/urban), as well as the cluster. Accordingly, an identity number for the household and each member of the family were assigned.

Section (2): Focused on demographic and socio-economic characteristics of household members, including gender, age, and marital status for those above 12 years, educational level, and the main economic activity of the head of the household and other members of the family at the age of productivity. Individuals eligible for any of the morbidity questionnaire were identified.

Section (3): Concentrated on insurance and included insurance status, whether the respondents were insured or otherwise, the type of enrolment if insured, who had been enrolled in terms of, either of the respondents, their dependents or other family members, and on the name of the scheme or organisation under which the individual was covered. The amount of premium paid was also enquired. Finally, respondents were asked whether they had used the insurance for healthcare within the period of one year preceding the survey and the reasons if not while still having the privilege of insurance.

Section (3 A-B): Enquired as to history of utilising outpatient curative healthcare services for chronic diseases; the presence of chronic diseases amongst household members, frequency and type of healthcare used for chronic diseases, and on the amount of expenditure incurred from utilising healthcare within the period of four weeks preceding the survey.

Section (4 A-B): Enquired as to the history of utilising outpatient curative healthcare for acute diseases; episodes of acute illness during the period within four weeks preceding the survey, frequency and type of healthcare used for acute diseases, and on

the amount of expenditure incurred during the period of four weeks preceding the survey, if any.

Section (5): Investigated hospital admission; frequency of hospital admission during the period within 12 months preceding the survey and OOP expenditure incurred during hospitalisation.

Section (6): Focused on healthcare sought outside the country; the frequency of healthcare used outside the country within the period of 24 months preceding the survey and how much OOP expenditure incurred in such scenarios.

Section (7): Investigated dental care; episodes of dental conditions requiring medical attendance within the period of 12 months preceding the survey, frequency and type of curative dental care use, and the amount of OOP expenditure incurred, if any.

Section (8): Reviewed HI; coverage of household members under HI, type of HI coverage, value of monthly premiums for HI, and use of HI services within the period of 12 months preceding the survey.

Section (9): Enquired as to preventive healthcare activities; use of preventive healthcare (e.g. immunization, antenatal care, postnatal care, growth monitoring, family planning, and vector control, etc.) by the household members within the period of 12 months preceding the survey and the OOP expenditure for the services.

Section (10): Requested information on the household expenditures for medical equipment.

Section (11): Investigated the expenditure on healthcare for deceased household members; the number of household members who died

within the period of 12 months preceding survey and OOP expenditure on outpatient curative care and related hospitalisation within the period of four weeks and 12 months preceding the survey, respectively.

Section (12): Included questions on household assets to determine social status and triangulate responses.

Section (13): Focused on the characteristics of household dwellings, including information that could reflect the well-being of the households, like whether the house was rented or owned, building and roof materials, water and electricity sources. This section also sought details on the number of rooms and type of kitchen, as well as latrines type. Such information would ultimately provide insights into family income.

Section (14): Concentrated on the household's monthly and annual general expenditure on items other than healthcare. This spending was classified into food, clothes, education, public transportation and the cost of fuel, books, leisure, rent, money transferred to sons and daughters, salary for servants, and many other expenditures which were paid each month. Other constituents of such expenditure that could not be captured by monthly expenditures and were on a yearly basis, like clothes and car insurance, loan repayment, and other *ad hoc* expenditures. These were reported as an estimated total sum for each entire household.

Section (15): Ascertained household income through the number of members engaged in economic activities and their respective incomes. The total income of all members within the household was then summed.

Section (16): Enquired on coping mechanisms adopted by households to deal with OOP expenditure on healthcare.

3.1.5.2 Field testing of the questionnaire

Once the preparations for the survey were completed and the questionnaires were ready to be administered, they were pre-tested in order to ascertain the technical feasibility of the study. Important lessons came from these exercises that were accounted for in the finalization of the survey arrangements and questionnaires.

This exercise was conducted in urban as well as rural areas by the core team and state coordinators after they had received training. In total, 90 households were involved in the pre-test. The author of this report had the honour of conducting the pre-test.

In summary, the activities involved in the pre-test were:

I. Briefing of the team on the exercise
II. Transporting the team to the enumeration areas
III. Segmentation of the enumeration areas
IV. Identification of the clusters and households
V. Interviewing the respondents
VI. Evaluating the results and editing and compiling the questionnaires
VII. Providing feedback to the survey team, including recommending re-training or additional training if warranted.

3.1.5.3 Training of interviewers

In each state, data were collected by two field-work teams, each consisting of one field supervisor and four interviewers. They were recruited jointly by the State Ministry of Health and State Statistical Office. After receiving the training from the trainers' course, the state coordinators with the help of the members of the core team, trained the field work teams in their respective states. The training consisted of 15 courses which were conducted over the course of two days and were held at the state level. The training materials were developed by a consultant consisting of the following topics:

I. Background to the study;
II. Study design;
III. Job descriptions of the team members;
IV. Sample selection techniques;
V. Interview technique;
VI. Common mistakes and omissions made during fieldwork;
VII. Orientation to the questionnaires;
VIII. Ethics and bias; and
IX. Logistics arrangements and fieldwork details.

3.1.5.4 Coordination mechanisms for the study

At the FMOH, a core team established in the Health Economics, Research and Information Department, had two sub-teams - one for mapping the financing agents and major health services providers, and another for household health expenditure and the health services utilisation survey. At the state level, the Director of Health Planning and Development and Director of the State Statistical Office were responsible for setting up the state's teams for the

collection, handling, and safe transmission of all information to the core team at the FMOH.

3.1.5.5 The survey team

The surveys were administered via joint efforts between the FMOH, State Ministries of Health, WHO and Sudan CBS. The author of this thesis had been involved in conducting the surveys in certain areas. Figure (2) outlines the organisation of the household survey team at the national, state and field levels.

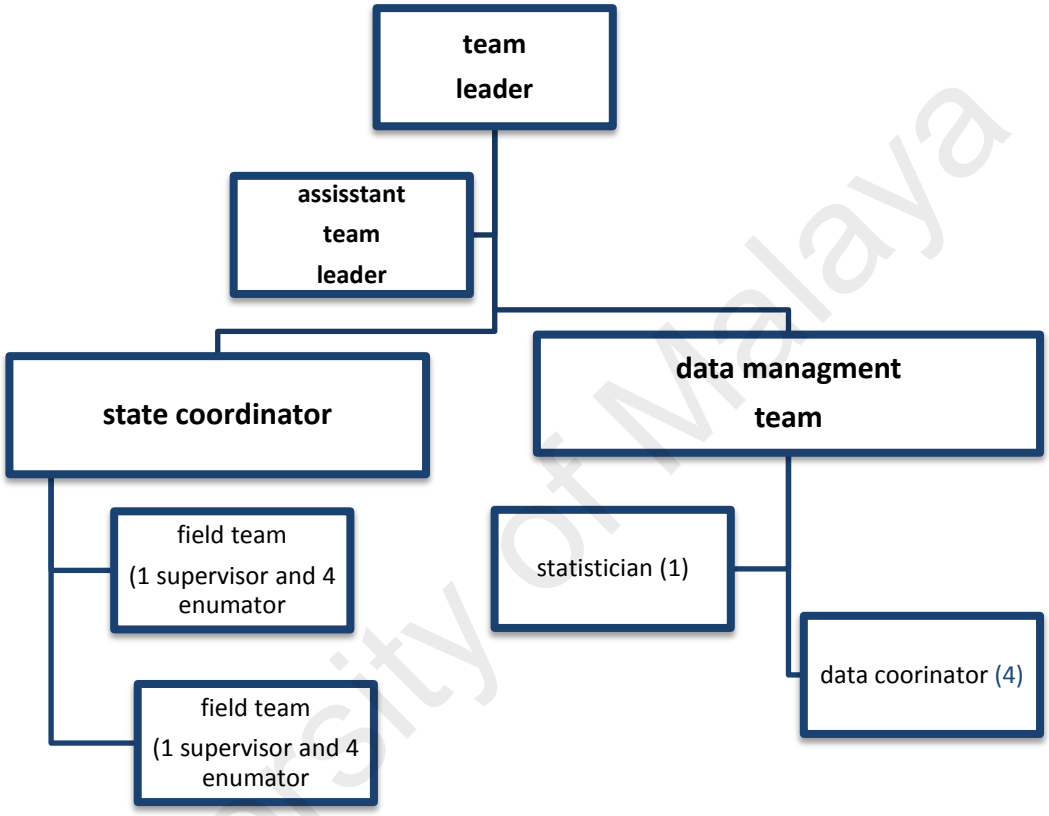

Figure 2.3 Organisation of the field work teams and their responsibilities

The team was headed at the national level by a Survey Team Leader assisted by an Assistant Team Leader and a National Survey Coordinator. The Data Management team was organized at the national level and consisted of Office Editors, Programmers, Data Entry Clerks, and a Statistician.

At the state level, the state management team was composed of two State Coordinators (one from the Ministry of Health and the other from the State Statistical Office). The responsibility of the State Coordinators was to manage and supervise the process of survey implementation at the state level. This team was located at the state capital with regular supervisory visits to the field work teams. In each state, there were two field work teams, each comprising one Field Supervisor and four Field Interviewers. The field work team was organized based on the assumption that for each state, there was a total of 56 clusters. The surveys were conducted in three rounds during a year-long period, covering a total of 840 households.

3.1.5.6 Fieldwork operations

After receiving the list of selected PSUs (enumeration areas) in the state from the National Survey Coordinator, the survey team divided the PSUs accordingly so that for each round, any observed variations in expenditure could be pinpointed based on seasonal variations. Two field work teams were assigned to conduct the surveys in each PSU. Each team was led by a Supervisor that was assisted by local health authorities to identify the cluster and households for interviewing according to the standard methodology.

Each interviewer administered four questionnaires per day. The supervisor administered only one questionnaire per day but was also verifying the completeness of the questionnaires.

3.1.6 Data management

The Supervisor of each field team was responsible for handing over the completed questionnaires, along with the unfilled or destroyed questionnaires to the State Coordinators, who in turn, after verification, handed over the documents to the National Survey Coordinator. Data management was performed centrally in Khartoum city by a specific Data Management team. For the goal of production of clean and edited data files, primary data processing was carried out according to the following steps:

I. Entering all data from the questionnaires into the data file (CSpro);
II. Checking the structure of the data file;
III. Entering the data a second time and then verifying the data file again;
IV. Backing up the checked and verified the data file;
V. Performing a second edit on the data file; and
VI. Backing up the edited or final data file.

3.2 Variables for the current study

The utilisation of health services can be viewed as a type of individual behaviour. The behavioural sciences have attempted to explain individual behaviour as a function of the characteristics of individuals themselves, characteristics of the environment in which they live, and/or certain interactions of these individuals and societal factors. Ideally, the utilisation of healthcare services would reflect health needs, however, apart from needs-related factors, various studies have found that healthcare utilisation is also determined by other socioeconomic factors, such as age, gender, and ethnicity, just as described earlier.

According to Andersen's model described in the previous chapter, utilisation of healthcare is determined by societal determinants that include technology and norms and health services system characteristics, including resources and organisation of that system. Both societal and health system determinants interact with individual determinants, predisposing factors, enabling factors, and needs factors, and determine the utilisation of healthcare services. According to these determinants, and based on the difficulties in developing a study that could capture all these domains, this study focused on the individual determinants and used the subset of variables that was confined to these determinants. The idea behind this was that the assumption that any change in societal or system components could be reflected in some form at an individual level, and the other reason was because of challenge in designing any study that could capture all variables for all determinants at the one time, especially when this study used survey data from a study designed for many other objectives and stakeholders.

As has been repeatedly mentioned, according to Andersen's model, the individual determinants are classified into three groups - predisposing, enabling, and needs factors.

3.2.1 Predisposing factors

Predisposing factors are the individual characteristics that exist prior to the onset of specific episodes, and increase the propensity for using healthcare services. People with these characteristics are more likely to take advantage of healthcare services, though these factors are not directly responsible for seeking healthcare. Such characteristics include demographic traits, social structure, and attitudinal beliefs. In this study, the variables were:

a. Age:

Age of the respondent; it is known that certain diseases are age specific. Alzheimer's disease is a prime example of an age-specific disease. Age is known risk factor for certain chronic conditions, like, for example, hypertension. In this study, both age, as a continuous variable, and age group were used as explanatory variables. A child in this study was defined as any respondent whose age was below or equal to 15 years, and they were further categorized into two groups - under five and from five to 15. An adult was defined as any respondent whose age was 16 years or greater, and they were classified into particular age groups - from 16 to 24, from 25 to 39, from 40 to 65, and older than 66. Elderly was specified in this study as those individuals whose age was 66 or above for both health and productivity considerations. The logic behind any of this classification was related to either health or productivity.

b. Sex (or gender): It is reported in the literature that women and men differ with respect to their perception of illness, seeking healthcare and the means available for them to make use of healthcare services. In some societies, parents may prefer a male child to a female child; in other circumstances, women cannot often decide on whether to seek healthcare for her own condition or for her children. In this study, gender was analysed for different purposes; we used the variable female as a variable of interest to gauge gender differences for both reporting and seeking behaviours. We also analysed women, as the head of household, from the perspective that families led by a woman may be less empowered in terms of decision making and have less available resources and income.

c. Ethnicity: Though it is documented in the literature that there is a difference in healthcare use with regards to different ethnic groups, in addition to the fact that it is mentioned in Andersen's model as one of the predisposing factors, in Sudanese society, it is a sensitive issue and therefore has never been used in any formal categorisation. However, the administration regions and states could provide some idea about such ethnicity issues. For instance, Darfur is a political region, however it possesses an ethnic label with respect to the domination of the Darfurian ethnic groups living there. In this study, we included the variable region, or states, to indicate ethnic differences. The label 'Other regions of the country" was less helpful in this regard.

d. Marital status: In this study, we categorized the respondents into single, married, divorced, and widowed**.** We included "widowed" because we assumed that a number of families were headed by

widows because of the long history of war in Sudan. This group was considered in many definitions of poverty and has special consideration for enrolment in HI and subsidy policies.

e. **Social structure variables:** These were groups of variable that could highlight the status of the individual in his/her society. These variables, according to Andersen, are education, occupation of the family head, size of the family, and religion; in this study, we used these variables,

f. **Education**: We included both the individual education level and the education of the head of household; the two may affect different healthcare use processes, while the individual education level may govern the way they perceive illness and subsequently their decision to seek the healthcare. It is also of importance for choosing the provider of healthcare. The education of the head is important as a reflection of family well-being, and it is also of special importance in the decision-making process. We had also ascertained the educational background of the mother as it has been observed to influence the reporting of illness and the utilisation of healthcare for children.

g. **The occupation**: Occupational status was only obtained from the head of the household, though there was the intention originally to collect it from each member of the household that was working.

h. **The family size:** This variable was included in the list of variables because of its effect on income and consumption, as well as serving as a clue to how a family lives. Having extended family could determine health seeking behaviour; for example, grandparents may interfere with their beliefs in traditional medicine and mystic healers. Extended families may also influence the decision-making process in

the family; for example, women may be restricted from seeking healthcare far from their residence, especially in rural settings.

i. **The religion:** Religion is an important factor in the use of healthcare as it may create preference to certain religious rituals, especially for a number of conditions, like mental disorders.

The variables related to beliefs in healthcare and attitudes towards healthcare services were not collected because such variables were difficult to obtained information via surveys.

3.2.2Enabling factors

Enabling factors were the conditions that permitted a family to act based on values or satisfy a need regarding healthcare use. These enabling conditions made health services resources available to the individual.

According to the model, enabling factors are as follows:

a. **Income**: In general, researchers calculate household income or consumption per capita and develop five equally-sized points or quintiles of income; the lowest 20% quintile is the poorest quintiles and the highest 20% is the well-off quintile. Self- reported income, consumption (Grosh and Glewwe 2000), and expenditure were used as proxies for income. The preference for the use of consumption as a proxy for income is increasingly found in the literature (Grosh and Glewwe 2000) as a result of the sensitivity of reporting income and the variability of income by seasons in developing countries, where the main economic activity is agriculture, seasonal by nature, and people use different mechanisms to sustain constant consumption throughout the year. From this standpoint,

in this study, the expenditure, rather than income, was employed to develop income quintiles

b. **Insurance**: HI is a finance mechanism by which a person pays a specific amount of money (a premium) to an organisation known as an insurer; this organisation in turn pays for healthcare expenses on behalf of that person when they fall ill. The insured in this study were any persons that were a member of any insurance scheme in the country. However, because of the small numbers of all other types of insurance organisations, operationally, the insured person was considered enrolled by the NHIF if not specified. The unit of analysis for enrolment in the NHIF was the family; therefore, the insured head implies that the members of their family are also insured.

c. **Proximity**: The proximity of a health facility is the distance of the healthcare facility from the user. Proximity of healthcare can affect the utilisation of healthcare. In this study, the distance of the facilities where the respondent sought healthcare was determined.

d. **Regions**: The region or residence of an individual, though accounted for by the model as enabling factors, can also be predisposing. In a variety of contexts, certain regions are endemic with a number of diseases, or are more prone to natural disasters than others. In a number of countries, certain regions are dominated by specific tribes or ethnicities. However, in conforming to the model, residence as an enabling factor was considered, though in the analysis, this consideration had, to some extent, affect the equity judgement, in particular that healthcare was considered as inequitable if the means or enabling conditions determine utilisation. In this context, it was of vital importance to reconsider a reclassification of the residence or region in which the people lived.

e. The price of healthcare used was not included because the expenditure for healthcare in this study was collected in the form of OOP payment.

3.2.3 Needs factors

Needs are defined, according to the economic lexicon, as a motivating force that compels action for its satisfaction. Needs range from basic survival needs (common to all human beings) satisfied by necessities to cultural, intellectual, and social needs. Needs are finite but, in contrast, wants (which spring from desires or wishes) are boundless. From the marketing perspective, it is a driver of human actions that marketers try to identify, emphasise, and satisfy, and around which promotional efforts are organised.

Health needs are the most important determinant of the use of healthcare. In the presence of the predisposition to an illness, and enabling means, one should perceive that he or she is ill in order to take action towards seeking healthcare. The individual's or his family's perception of illness is of great importance on the decision of whether and where to seek care.

Measuring the perception of illness includes the symptoms and number of days that an individual experiences them within a given time period. Other measurement is self-reporting of one's general state of health, like, for instance, excellent, good, fair, or poor. In addition to perceived needs, evaluated needs can also be measured, which means the health condition that is judged by medical professionals. The choice between these two measurements is significant - while self-reporting is subjective, it reflects the felt needs and is more reflective of individual knowledge and attitudes. The latter is more

objective, however it requires more expensive techniques, a laboratory setting, and a medical professional, none of which are feasible in the context of national surveys. If the accuracy of the self-perceived need may be questioned, the evaluated need could also overestimate the actual need based on provider-induced demand, also a known phenomenon in healthcare utility.

In this study, self-reported symptoms as measurements of need were used. A group of symptoms were employed for acute conditions, while evaluated needs (confirmed diagnosis) were used for chronic conditions. The recall period of acute conditions was four weeks, whereas for hospitalisation, it was over the previous one year. Self-reporting and medical diagnosis were employed to determine malarial infection, while for other acute conditions, they were determined by self-reporting. For diabetes and hypertension, only diagnosed cases were considered. For bronchial asthma, those with a history of recurrent wheezing were considered asthmatics. It is clear that the applied measurements may underestimate malarial cases, hypertension, and diabetes, as not all people considered malaria a serious condition. The same applies to diabetes and hypertension, where widespread traditional medicine was used. Disability days were determined by self-reporting with a recall period of four weeks.

Episodes of hospitalisation were obtained with a recall period of one year. Detailed information for both the use as well as the expenditure of hospitalisation was collected.

3.3 Analyses of data:

We described the data according to states and region, weighted and non-weighted, to compare our findings with the census conducted in 2008. The purpose of the descriptive information was to judge the comparability of the findings to the general population.

Descriptive analyses were also conducted for the enrolment in the insurance scheme despite the fact the insurance status was an explanatory variable. However, from the policy point of view, this study targeted assessment of the impact of insurance on utilisation of healthcare. The sample was categorised into two groups - insured and non-insured. Binary logistic regression was applied to identify factors that predict insurance enrolment.

Descriptive analyses were done for reporting illnesses and using healthcare (inpatient and outpatient).

For assessing predictors of access to healthcare, binary and multinomial logistic regressions analyses were applied where needed.

CHAPTER 4: CHARACTERISTICS OF THE RESPONDENTS AND THE ENROLMENT TO HEALTH INSURANCE

4. Introduction

This chapter deals with the first two specific objectives of the study as presented in Section 1.4.2. Moreover, this chapter has two rationales. First, it describes the socio-demographic characteristics that put forth a general overview of the entire country of Sudan and the context in which NHIF functions. Second, while the description of insurance enrolment will provide a better understanding of the insured population, the identification of the predictors of enrolment will facilitate the scheme to insure more people.

The first section regarding the current general characteristics of the Sudanese population studied here was compared to the results of a national census conducted in 2008. We applied the statistical weightings of the sample to represent the society in entirety and to be analogous with the results of 2008 national census. Table 4.1.2 lists the socio-demographic characteristics of the respondents based on the sample (not weighted).

Regarding enrolment, Table 4.2.1 describes the profile of the insured population (the enrolees). Thereafter, the section illustrates the results of the analyses of the enrolment predictors. Table 4.2.2 presents a univariate analysis of independent factors that explain the enrolment and Table 4.2.3 lists the results of the binary logistic regression analyses of the predictors of insurance enrolment. A summary of the findings follow each of the two sections.

4.1.1 General profile of the Sudanese population

Table 4.1.1 outlines the features of the Sudanese population obtained from this study (weighted) compared to the findings of the National Census 2008. The overall population of Sudan was estimated to be 31,119,000 in 2008 population census. Khartoum State had accommodated about one-sixth of the population of Sudan. Darfur and the central regions had accommodated around 25% each , while the northern regions are home to just above 6%. In both surveys approximately 70% of Sudanese live in rural areas and men slightly outnumber women.

Table 4.1.1 Characteristics of the Sudanese compared to the Sudan population census from 2008

Variables	Present (SHHUES 2009)	Census (2008)*
Sudan N (%)	**31,119,409 (100)**	**30,894,000(100)**
Regions		
Northern	1,773,865 (5.70)	1819506 (5.89)
Eastern	4,375,776 (14.06)	4534294 (14.68)
Khartoum	4,962,091 (15.95)	5274321 (17.07)
Central	7635713 (24.54)	7423038 (24.03)
Kordufan	4618909 (14.84)	4327396 (14.01)
Darfur	7753055 (24.91)	7515445 (24.33)
Residence		
Rural	21193445 (68.1)	21777181 (70.49)
Urban	9925963 (31.9)	9116819 (29.51)
Gender		
Males	15797743 (50.8)	15786677 (51.1)
Females	15321666 (49.2)	15107323 (48.9)

* National Population Census conducted in 2008

4.1.2 Characteristics of the respondents

The respondents in this study were individuals who had completed all the components of the questionnaire, proven by the presence of the requisite data in the master file received from the Sudan CBoS. Therefore, the total number of respondent in this study was less than that reported in the SHHUES 2009 Report (MOH Sudan 2011)

As Table 4.2.1 shows, the total number of respondents was 72,526 , and of those respondents, 63.4% were living in rural areas. Males constituted 50.8%, slightly outnumbering females.

The mean household size was 6.7 with a standard deviation of 2.2. However, the household size varied by region, income quintiles, and residency. Kordufan had the largest household size with a mean of seven individuals, compared to 6.4 in the northern region. The household size was much bigger for rural dwellers compared to those in urban centres (6.8 and 6.6, respectively).

The mean age of the sample was 23.3 (+/- 17) years. However, this demonstrated a substantial difference along the lines of regions, places of residence, and income quintiles. The mean age was highest in the north (27.4) compared to 21.0 years in Darfur. The age distribution was categorised into children (0-15), adults (16-65), and the elderly (66 and above), mirroring the socio-economic development of Sudan with children accounting for 43.7%, and only 3.2% of the total population being elderly.

To infer household income, household expenditure was used as a proxy. After calculation of mean household income, the samples were categorised into five income groups. The lowest 20% of household income was labelled as the poorest, while the highest was referred as the well-off or the wealthiest, with the second, third, and fourth quintiles situated between these two, starting from the poorest all the way to the wealthiest. Of note is that the wealthiest quintile, or the well-off, constituted just 17% of the population versus the poorest reaching 20.7%.

With regards to education, illiterate adults were defined in this study as people who were not able to read or write, comprising 23.6% of the sample population, whereas 45% had a basic education and about 5% of the participants had reached the university level or higher.

Figure 4.1.1 page 93 depicts the profile of the eligible working population (greater than 15 years old), showing that 32% of the Sudanese population had no work, 27% were farmers, and government civil servants constituted only about 10%.

Participants' health status:

9892 (13.6%) of the participants reported that they had an acute illness, defined as a health condition that would end in less than two weeks.3503(4.9%) of those cases were diagnosed as malaria, 2566 (3.5%) as upper respiratory infections and 3823 (5.3%) as all other acute conditions.

Out of the total 72526 respondents, 4632 (6.4%) had at least one chronic illness, which was defined as any condition that was supported by a follow-up

card or being identified as a chronic disease by the interviewers. Among all respondents, 1217 (1.7%) had hypertension, 626 (0.9%) had diabetes mellitus (DM), and 373 (0.5%) had bronchial asthma (BA).

However, while these findings represent the entire population, there is a substantial difference between regions, income quintiles, and insurance status as presented in table 4.1.3. It shows that people living in Khartoum and the northern regions reported the lowest rate of Malaria but were also those with the highest prevalence of chronic illness. In contrast, people living in Darfur and Kordufan described the opposite.

Insured individuals reported more illness in terms of both acute and chronic conditions. For instance, the prevalence of DM among the insured was 1.3% versus just 0.8% within the non-insured population.

Table 4.1.2 Socio-demographic characteristics of respondents

Factor	N (%)
Sudan	**72,526 (100)**
Regions	
Khartoum	4,799 (6.6)
Northern	9,351 (12.9)
Central	20,204 (27.9)
Eastern	13,522 (18.6)
Kordufan	10,180 (14.0)
Darfur	14,470 (20.0)
Residence	
Urban	26,520 (36.6)
Rural	46,006 (63.4)
Gender	
Females	35,685 (49.2)
Male	36,841 (50.8)
Age groups	
Children (0-15)	31,716 (43.7)
Adult (16-65)	38,495 (53.1)
Elderly (66 and above)	2,315 (3.2)
Income	
Well-off	12,624 (17.4)
4th quintile	14,729 (20.3)
3rd quintile	14,924 (20.6)
2nd quintile	15,227 (21.0)
Poorest	15,022 (20.7)
Education	
Less than school age	9,767 (13.5)
Basic	33,158 (45.7)
Secondary	8,653 (11.9)
University or higher	3,811 (5.3)
No education at all	17,137 (23.6)
Occupation	
Less than working age	22,882 (31.6)
Not working	16,005 (22.1)
Other	5,465 (7.5)
Merchant	3,442 (4.7)
Farmer	19,984 (27.6)
Civil servant	4,748 (6.5)

Table 4.1.2 Socio-demographic characteristics of respondents (continued)

Factor	N (%)
Marital status	
Less than 12 years	22,880 (31.5)
Widowed	1,215 (1.7)
Divorced	708 (1.0)
Single	16,491 (22.7)
Married	31,232 (43.1)
Insurance status	
Insured	14,461 (19.9)
Non-insured	58,065 (80.1)
Health Needs	
Malaria	3,504 (4.8)
Respiratory	2,566 (3.5)
Other acute conditions	3,823 (5.3)
Hypertension	1,217 (1.7)
Diabetes Mellitus	626 (0.9)
Bronchial Asthma	373 (0.5)
Other chronic conditions	2,416 (3.3)

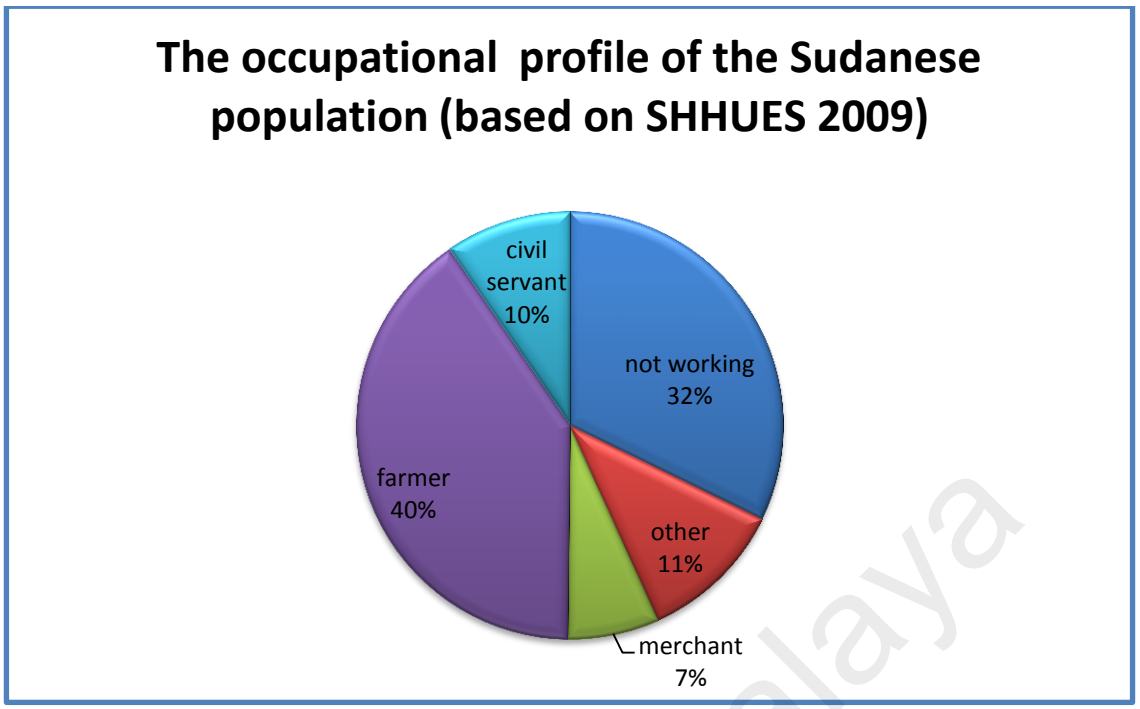

Figure 4.1. Profile of the working Sudanese population

Table 4.1.3: Health conditions distributed by regions, residence, and Health Insurance status

	Malaria		BA		Hypertension		DM	
Factor	N	(%)	N	(%)	N	(%)	N	(%)
Sudan	**3504**	**(4.8)**	**373**	**(0.5)**	**1217**	**(1.7)**	**626**	**(0.9)**
Darfur	490	(3.4)	79	(0.6)	89	(0.6)	45	(0.3)
Northern	243	(2.6)	59	(0.6)	363	(3.9)	154	(1.6)
Central	1302	(6.4)	123	(0.6)	331	(1.6)	176	(0.9)
Eastern	831	(6.1)	70	(0.5)	158	(1.2)	101	(0.7)
Kordufan	512	(5.0)	23	(0.2)	94	(0.9)	38	(0.4)
Khartoum	126	(2.60	36	(0.8)	182	(3.8)	112	(2.3)
Residence								
Rural	2301	(5.0)	243	(0.5)	722	(1.6)	381	(0.8)
Urban	1203	(4.5)	147	(0.6)	495	(1.9)	245	(0.9)
HI status								
Insured	810	(5.6)	95	(0.7)	358	(2.5)	183	(1.3)
Non-insured	2694	(4.6)	295	(0.5)	859	(1.5)	443	(0.8)

4.1.3 Summary

The socio-demographic characteristics of the respondents obtained from this study were not much different from the Sudanese socio-demographic profile of the national 2008 census. The country remains predominantly rural with approximately 70% of all people living in rural areas. The Sudanese nation continues to be a young nation, evidenced by a mean age of only 23 (+/- 17) years, and children representing up to 43.7% of the total population with just roughly 4% considered elderly. Males slightly outnumbered females. Approximately 30% of citizens were not educated. The majority of Sudanese were farmers, and roughly a third of the eligible working population had no work, with the government or civil servant sector very slim.

The reported morbidity profile was dominated by acute diseases or infections, including malaria. The prevalence of chronic illnesses was not generally high. However, there is a major difference between regions of the country.

4.2 Insurance enrolment

4.2.1Background

Insurance enrolment is the act of becoming insured, or a member of an insurance organisation, the insurer (Wang, Switlick et al. 2012). A person that is covered by an insurance scheme is referred to as a member, beneficiary, or subscriber; such terms are used interchangeably. In this study, the insured are those individuals covered by the NHIF.

The current NHIF enrols civil servants compulsorily and employees of informal sectors voluntarily. Such an arrangement excludes a large proportion of Sudanese society based on their perceptions and socio-economic attributes. Therefore, understanding the background of the insured and the factors that determine enrolment is vital for fulfilling the government's goal of UHC.

4.2.2 The socioeconomic profile of the insured population

Table 4.2.1 shows that, among the 72526 respondents, 14461 (19.9%) had health Insurance. However, this figure substantial masks variability with respect to population background.

Enrolment was highest in Khartoum at 34% and lowest in Darfur and Kordufan, each equating to roughly 14%, 17% of rural citizens were insured versus 25% among urban dwellers. Men and women were enrolled alike with no differences related to marital status. Adults and the elderly were similarly insured, the elderly slightly more so than children. Insurance enrolment in the poorest two quintiles was only around 15% compared to 28% of the well-off. Approximately 50% of those with university education or higher had insurance compared to just 15% among citizens with no formal education. Among the civil servants, 56% were insured versus only 14% of farmers.

Insurance enrolment was observably greater among those who had reported some kind of disease. 30% of those with DM were insured, 31% among the hypertensive, and roughly 20% of those with malaria.

Table 4.2.1 Socio-demographic characteristics of the insured

	Total	Insured	
		Number	(%)
Sudan	**72526**	**14461**	**19.9**
Regions			
Khartoum	**4799**	**1636**	**34.1**
Northern	9351	2704	28.9
Central	20204	4097	20.3
Eastern	13522	2508	18.5
Kordufan	10180	1448	14.2
Darfur	14470	2068	14.3
Residence			
Urban	26520	6698	25.3
Rural	46006	7763	16.9
Gender			
Females	35685	7249	20.3
Male	36841	7212	19.6
Age group			
Children (0-15)	31716	5578	17.6
adult (16-65)	38495	8394	21.8
Elderly (66 and above)	2315	489	21.1
Income			
Well-off	12624	3633	28.8
4th quintile	14729	3239	22.0
3rd quintile	14924	2900	19.4
2nd quintile	15227	2293	15.1
The poorest	15022	2396	15.9
Education			
Less than school age	9767	1727	17.7
Basic	33158	5852	17.6
Secondary	8653	2363	27.3
Higher	3811	1825	47.9
No education at all	17137	2694	15.7
Occupation			
Not applied	22882	4019	17.6
Not working	16005	3210	20.1
Other job	5465	1005	18.4
Merchant	3442	707	20.5
Farmer	19984	2818	14.1
Civil servant	4748	2702	56.9

Table 4.2.1 Socio-demographic characteristics of the insured (continued)

	Total	Insured	
Variable	N	N	%
Marital Status			
Married	31232	6590	21.1
Single	16491	3417	20.7
divorced	708	142	20.1
widow	1215	293	24.1
Not applied (<12 yrs)	22880	4019	17.6
Health Needs			
hypertension	1217	379	31.1
Diabetes Mellitus	626	191	30.5
Bronchial Asthma	373	89	23.9
Malaria	3503	819	23.4
Chest infection	2566	604	23.5

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4.2.3 Predictors of insurance enrolment

Many factors were assumed to determine insurance enrolment. These included household income, level of education, residence (whether rural or urban), age, and health needs. Based on this, each factor was assessed as an explanatory variable. Chi^2 test results were obtained by univariate analyses. Afterwards, a multivariate binary logistic regression was performed for the significant factors obtained from the univariate analyses.

Table 4.2.2 presents the findings of the univariate analyses, exhibiting that most factors were significant as explanatory independent variables for insurance enrolment. The only non-significant factors were gender and marital status.

Table 4.2.3 presents the odds ratios (ORs) and 95% confidence interval (95% CI) results from the multivariate binary logistic regression analyses. It revealed factors that remained statistically significant, like the region, residence (urban/rural), income quintile, education, occupation, and presence of illnesses.

Citizens of all regions, apart from Khartoum and those in the Northern were found to have less opportunity for insurance enrolment. Case in point, people living in Darfur and Kordufan had approximately 50% less of a chance of being enrolled in insurance compared to residents in the capital, Khartoum (OR 0.46 95% CI (0.431- 0.50) and OR 0.50 95% CI (0.463- 0.55), respectively. Urban dwellers had a 26% greater likelihood of enrolment compared to rural Sudanese (OR 1.26, 95% CI (1.213- 1.31)). People belonging to the well-off income quintile had a 40% greater chance for enrolment compared to the

poorest quintile (OR 1.429, 95% CI (1.341-1.52)). Regarding education, insurance membership was favoured in terms of those with better education, and respondents with a university education or higher had 64% greater odds compared to those with no education (OR 1.642, 95% CI (1.487-1.81)).

As expected in the case of the NHIF, which began as a social insurance plan, civil servants had the privilege of a nearly 80% higher likelihood to be enrolled compared to farmers (OR 0.201(95% CI (0.185-0.289)), merchants (OR 0.231, 95% CI (0.207-0.250)), and those who were unemployed (OR 0.26, 95% CI (0.239-0.28).

Greater chances for enrolment were observed among those that reported any kind of disease. People suffering from malaria had approximately 30% higher enrolment versus those without malaria (OR 1.308, 95% CI (1.203-1.42)). The same applied to chronic diseases - hypertension increased the odds of enrolment by about 30% (OR 1.319, 95% CI (1.158- 1.50), and DM increased enrolment odds by roughly 25% (OR 1.251, 95% CI (1.06-1.47)).

Table 4.2.2 Factors associated with insurance enrolment

Factors	Insured N (%)	Non-Insured N (%)	p value
Regions			0.012
Khartoum	1636 (34.1)	3163 (65.9)	
Northern	2704 (28.9)	6647 (71.1)	
Central	4097 (20.3)	16107 (79.7)	
Eastern	2508 (18.5)	11014 (81.0)	
Kordufan	1448 (14.2)	8732 (85.8)	
Darfur	2068 (14.3)	12402 (85.7)	
Residence			0.015
Urban	6698 (25.3)	19822 (74.7)	
Rural	7763 (16.9	38243 (83.1)	
Gender			0.124
Females	7249 (20.3)	28436 (79.7)	
Males	7212 (19.6)	29629 (80.4)	
Age groups			0.042
Children (0-15)	5578 (17.6)	26138 (82.4)	
Adults (16-65)	8394 (21.8)	30101 (78.2)	
Elderly (66 and above)	489 (21.1)	1826 (78.9)	
Income quintiles			P<0.01
Well-off	3633 (28.8)	8991 (71.2)	
4th quintile	3239 (22.0)	11490 (78.0)	
3rd quintile	2900 (19.4)	12024 (80.6)	
2nd quintile	2293 (15.1)	12934 (84.9)	
The poorest	2396 (15.9)	12626 (84.1)	
Education level			0.010
Less than school age	1727 (17.7)	8040 (82.3)	
Basic	5852 (17.6)	27306 (82.4)	
Secondary	2363 (27.3)	6290 (72.7)	
Higher	1825 (47.9)	1986 (52.1)	
No education at all	2694 (15.7)	14443 (84.3)	
Occupation			P<0.01
Not applicable	4019 (17.6)	18863 (82.40)	
Not working	3210 (20.1)	12795 (79.90)	
Other job	1005 (18.4)	4460 (81.6)	
Merchant	707 (20.5)	2735 (79.5)	
Farmer	2818 (14.1)	17166 (85.9)	
Civil servant	2702 (56.9)	2046 (43.1)	
Marital status			0.310
Married	6590 (21.1)	24642 (78.9)	
Single	3417 (20.7)	13074 (79.3)	
Divorced	142 (20.1)	566 (79.9)	
Widow	293 (24.1)	922 (75.9)	
Not applicable (<12 years)	4019 (17.6)	18861 (82.4)	

Table 4.2.2 Factors Associated with insurance enrolment (continued)

Factors	Insured N (%)	Non-Insured N (%)	p value
Health needs			
Hypertension	379(31.1)	838(68.9)	P<0.01
Diabetes Mellitus	191(30.5)	435(69.5)	P<0.01
Bronchial Asthma	89(23.9)	284(76.1)	0.032
Malaria	819(23.4)	2684(76.6)	P<0.01

Table 4.2.3 Determinants of insurance enrolment

Factors	OR	95% CI	P-value
Khartoum	1		
Northern	0.96	(0.890; 1.04)	0.379
Central	0.68	(0.637; 0.74)	P<0.01
Eastern	0.66	(0.617; 0.72)	P<0.01
Kordufan	0.50	(0.463; 0.55)	P<0.01
Darfur	0.46	(0.431; 0.50)	P<0.01
Residence			
Urban	1		
Rural	1.265	(1.213; 1.31)	P<0.01
Gender			
Females	1		
Males	1.049	(1.007; 1.09)	0.021
Age groups			
Children (0-15)	1		
Adults (16-65)	1.052	(0.964; 1.14)	0.252
Elderly (66 and above)	0.965	(0.840; 1.10)	0.613
Income quintiles			
Well-off	1.429	(1.341; 1.52)	P<0.01
4th quintile	1.305	(1.227; 1.38)	P<0.01
3rd quintile	1.162	(1.093: 1.23)	P<0.01
2nd quintile	1.103	(1.038; 1.17)	P<0.01
The poorest	1		
Education level			
Less than school age	1.088	(1.003; 1.18)	0.042
Basic	1.023	(0.967; 1.08)	0.430
Secondary	1.175	(1.088; 1.26)	P<0.01
Higher	1.642	(1.487; 1.81)	P<0.01
No education at all	1		
Occupation			
Not applicable	0.244	(0.096; 0.61)	P<0.01
Not working	0.260	(0.239; 0.28)	P<0.01
Other job	0.218	(0.197; 0.24)	P<0.01
Merchant	0.231	(0.207; 0.25)	P<0.01
Farmer	0.201	(0.185; 0.21)	P<0.01
Civil servant	1		
Marital status			
Married	1		
Single	1.005	(0.945; 1.06)	0.869
Divorced	0.912	(0.748; 1.11)	0.364
Widow	1.126	(0.975; 1.30)	0.106
Not applicable (<12 yrs.)	1.146	(0.453; 2.89)	0.773

Table 4.2.3 Determinants of insurance enrolment (continued)

Factors	OR	95% CI	P-value
Health Needs			
Hypertension	1.319	(1.158; 1.50)	P<0.01
Diabetes Mellitus	1.251	(1.061; 1.47)	P<0.01
Bronchial Asthma	1.008	(0.912-1.115)	0.059
Malaria	1.308	(1.203; 1.42)	P<0.01

4.2.4 Summary

NHIF covered approximately 20% of the total population of Sudan with a substantially unequal distribution in favour of the country's affluent regions, urban residences, civil servants, the wealthy, and better educated. With this, individuals that reported any health problems were enrolled more than the rest.

Assessment of the predictors of insurance enrolment revealed several significant factors - the administrative region of the individual, their residence (urban/rural), income quintile, education level, occupation, and health status. Citizens living in considerably affluent regions like Khartoum and the Northern had a much higher chance of being enrolled in a HI scheme compared to all other regions. Urban residents had greater chances of being insured than rural area dwellers. Civil servants had a nearly 80% higher chance of having HI compared to farmers. As well, the well-off and better educated had higher probabilities of being insured. People with health problems, whether acute or chronic, also had increased odds for insurance.

CHAPTER5: THE ROLE OF HEALTH INSURANCE IN ACCESS TO HEALTHCARE

5.1 Introduction

This chapter presents the results related to the main aim of this study, being to assess the role of HI on access to healthcare services. It deals with specific objectives 3, 4, and 5 presented in Section 1.4.1.

As stated numerous times in this work, access is a complex concept (Gulliford, Figueroa-Munoz et al. 2002). It can be understood as the fit between characteristics of the services or its providers and attributes of the clients or customers using these services (Penchansky and Thomas 1981). For example, healthcare may be available and of good quality, however people may not use those services based on reasons related to their socio-economic traits. This complexity dictates how many researchers query how utilisation should be measured. In this study, according to precedent, utilisation was used as a proxy for access (Xu, Saksena et al. 2010). Therefore, this study complies with this transformation, and therefore employs utilisation of healthcare to examine access to healthcare.

HI, in theory, is assumed to promote access to healthcare services by paying most of the direct medical costs. Empirical findings from both developed and developing countries support this notion.

5.2 Utilisation of healthcare for acute conditions

Acute illness was defined in this study as a condition that lasted for less than two weeks or was included in the lists of acute diseases provided by the interviewers with a four week period of recall.

Table 5.2 portrays the utilisation patterns of health services for acute illnesses. It indicates that utilisation of care did not always correspond to the reported prevalence of the diseases (health needs), but was rather influenced by a variety of socio-demographic or socio-economic characteristics of the specified groups. Further, it shows that among all 72526 respondents, 9825 (13.5%) reported having an acute illness condition; 6124 (62.3%) of that group sought healthcare while the remaining 3701 (37.7%) did not. Among the 4799 citizens of Khartoum, 751 (15.6%) reported having acute illness, and among them, 520 (69.2%) actively sought healthcare. The picture was different in Darfur, where among the 14470 survey participants that lived there, 1934 (13.4%) were ill. Among those individuals, only 921 (47.6%) looked for care. Though urban and rural dwellers reported similar disease prevalence, 65% of urban inhabitants sought healthcare versus 60.4% of the rural survey participants. There were no gender differences regarding the reported episodes of contracting acute diseases and healthcare utilised. Regarding age groups, the proportion of healthcare used increased with age. For income, though all respondents reported, for the most part, having the same disease episodes, seeking healthcare was observed to rise with income, and 64.4% of the wealthy segment of the population sought healthcare compared to 60% among the poor. Around 70% of participants, who were ill, sought care versus just 58.5% of those without education. 70% of the civil servants surveys who were stricken with acute diseases sought healthcare compared to 59.3% of farmers. Interestingly, there was no difference in terms of seeking healthcare related to marital status. 73% of the insured

sought care compared to 67% among those without insurance. Further, 76% of people with malaria sought healthcare versus 52% in the population with respiratory conditions, and 55.9% of those with other acute diseases.

Table 5.2 Utilisation of healthcare services for acute conditions

	All respondents	Reported illness		Sought care	
Factors	**Total**	**Number**	**(%)**	**Number**	**(%)**
Sudan	**72526**	**9825**	**(13.5)**	**6124**	**(62.3)**
Region					
Khartoum	4799	751	(15.6)	520	(69.2)
Northern	9351	769	(8.2)	609	(79.2)
Central	20204	2999	(14.8)	2148	(71.6)
Eastern	13522	2416	(17.9)	1288	(53.3)
Kordufan	10180	956	(9.4)	631	(66.0)
Darfur	14470	1934	(13.4)	921	(47.6)
Residence					
Urban	26520	3581	(13.5)	2346	(65.5)
Rural	46006	6244	(13.6)	3771	(60.4)
Gender					
Females	35685	4786	(13.4)	2993	(62.5)
Males	36841	5039	(13.7)	3124	(62.0)
Age groups					
Children (0-15)	31716	4307	(13.6)	2646	(61.4)
Adults (16-65)	38495	5216	(13.5)	3265	(62.6)
Elderly (66 or more)	2315	302	(13.0)	206	(68.2)
Income quintiles					
Well-off	12624	1658	(13.1)	1070	(64.5)
4th quintile	14729	1932	(13.1)	1224	(63.4)
3rd quintile	14924	2128	(14.3)	1339	(62.9)
2nd quintile	15227	2125	(14.0)	1295	(60.9)
The poorest	15022	1982	(13.2)	1189	(60.0)
Education level					
Less than Sch. age	9767	1352	(13.8)	813	(60.1)
Basic	33158	4457	(13.4)	2811	(63.1)
Secondary	8653	1049	(12.1)	704	(67.1)
Higher	3811	487	(12.8)	339	(69.6)
No education at all	17137	2480	(14.5)	1450	(58.5)
Occupation					
Not applicable	22882	3119	(13.6)	1904	(61.0)
Not working	16005	2136	(13.3)	1390	(65.1)
Other	5465	812	(14.9)	493	(60.7)
Merchant	3442	479	(13.9)	316	(66.0)
Farmer	19984	2662	(13.3)	1578	(59.3)
Civil servant	4748	617	(13.0)	436	(70.7)

Table 5.2 Utilisation of healthcare services for acute conditions (continued)

	All respondents	Reported illness		Sought care	
Factors	**Total**	**Number**	**%**	**Number**	**%**
Marital status					
Less than12	22880	3117	(13.6)	1902	(61.0)
Widowed	1215	157	(12.9)	92	(58.6)
divorced	708	94	(13.3)	59	(62.8)
Single	16491	2183	(13.2)	1374	(62.9)
Married	31232	4274	(13.7)	2690	(62.9)
Insurance status					
Insured	14461	2163	(15.0)	1588	(73.4)
Non-insured	58065	5062	(8.7)	3418	(67.5)
Health Needs					
Malaria	3503	3503	(100.0)	2672	(76.3)
Respiratory	2566	2566	(100.0)	1358	(52.9)
Other conditions	3823	3823	(100.0)	2137	(55.9)

5.3 Predictors of utilisation of healthcare for acute conditions

Table 5.3 lists the results of a multinomial logistic regression analysis, the dependant factors including sought healthcare, not seeking healthcare, and not reporting illness. The analysis revealed that the utilisation of healthcare was associated with four significant factors - the region, household income, insurance status, and type of disease. Citizens of all regions, except central Sudan, had less of a chance seeking healthcare compared to citizens in Khartoum. For example, citizens of Kordufan (western part of country) had approximately 50% less of chance to utilise healthcare versus those in Khartoum (the reference, "1") (OR 0.48 (95% CI (0.39-0.57)). With regards to income, as the income of a household rose, the chance of seeking care did, as well. The wealthy had twice as many opportunities to seek care versus the poor (the reference"1") (OR 2.02 (95% CI (1.8 - 2.3)).

The insured had a 31.6 %, higher possibility of seeking care than the non-insured OR 1.316 (95% CI (1.2- 1.45)). People that reported having malaria had a five times greater potential of seeking healthcare (OR 5.09 (95% CI (3.15-8.23)), and chest infection increased the odds of using healthcare services by 166% OR 2.66 (95% CI (1.59- 4.40)).

Table 5.3 Determinants of utilisation of healthcare for acute conditions

Factor	OR	95% CI	P value
Regions			
Khartoum	1		
Northern	0.660	(0.556; 0.783)	P<0.01
Central	0.876	(0.755; 1.017)	P<0.01
Eastern	0.660	(0.562; 0.776)	P<0.01
Kordufan	0.475	(0.394; 0.574)	P<0.01
Darfur	0.775	(0.662; 0.906)	P<0.01
Residence			
Urban	1.058	(0.972; 1.152)	0.194
Rural	1		
Age groups			
66 and above	0.844	(0.636; 1.119)	0.238
0-15	1.126	(0.946; 1.342)	0.183
16-65	1		
Gender			
Males	1.028	(0.948; 1.114)	0.506
Females	1		
Income quintiles			
The well-off	2.029	(1.788; 2.302)	P<0.01
4^{th}	1.734	(1.531; 1.963)	P<0.01
3^{rd}	1.283	(1.132; 1.456)	P<0.01
2^{nd}	1.206	(1.065; 1.366)	P<0.01
The poorest	1		
Education level			
Basic	0.945	(0.851; 1.049)	0.291
Secondary	0.861	(0.736; 1.007)	0.060
University or higher	0.830	(0.664; 1.038)	0.102
less than school age	0.973	(0.831; 1.138)	0.729
no education at all	1		
Marital status			
Not applicable	0.289	(0.069; 1.210)	0.089
Widowed	0.924	(0.680; 1.255)	0.612
Divorced	1.006	(0.682; 1.485)	0.976
Single	0.964	(0.850; 1.093)	0.566
Married	1		
Occupation			
Not applicable	3.361	(0.803; 14.066)	0.097
Civil servant	1.004	(0.819; 1.230)	0.972
Farmer	.978	(0.853; 1.121)	0.749
Merchant	1.004	(0.817; 1.233)	0.971
Other	1.122	(0.949; 1.325)	0.177
Not working	1		

Table 5.3 Determinants of utilisation of healthcare for acute conditions (continued)

Factor	OR	95% CI	P value
Insurance	1.316	(1.198; 1.446)	P<0.01
Health Needs			
Malaria	5.093	(3.152; 8.229)	P<0.01
Chest infection	2.658	(1.594; 4.433)	P<0.01

5.4 Utilisation of healthcare for chronic illnesses

A chronic condition was a disease that was diagnosed by a health professional prior to the survey, or among the conditions mentioned in the list provided by the interviewers. Examples of chronic conditions were DM, BA, and hypertension. 4608 (6.4%) of all respondents reported having chronic illness over the previous four weeks before participating in the survey. Among those that reported a chronic illness, 2351 (51%) had sought healthcare while the rest did not.

Table 5.4 shows the socio-demographic characteristics of the population interviewed by the section of the questionnaire that dealt with chronic disease. More specifically, it exhibits that the distribution of the diseases were substantially varied between the country's regions and socio-demographic backgrounds of the population. Among citizens living in Khartoum, 625 individuals (13.6%) reported having chronic illness; this figure represents the highest reported prevalence of chronic disease in the country. Among that group, 339 (54.24%) individuals had sought healthcare - the rest did not. The lowest reported prevalence was in Kordufan, where 342 (3.4%) reported a chronic illness; among those individuals, 170 (49.7%) sought healthcare. 1847 (7.0%) urban residents described having chronic illness compared to 2761 (6.0%) of the rural population. In both groups, roughly 50% sought care. Males and females alike reported having chronic conditions and seeking healthcare. 181 (6.2%) of children claimed to have chronic illness, and among them, 997 (50.3%) sought healthcare. In the adult group (16-65 years), 2482 (6.4%) had reported having chronic illness, and 1279 (51.5%) individuals of this population sought healthcare. In the elderly group, 66 years and above, among the 145 (6.3%) people with chronic illness, 75 (51.7%) sought healthcare.

Regarding income, a systematic pattern was observed. The reported prevalence of chronic diseases and the proportion of people seeking healthcare increased with income.

Of all people in the better-off quintile, 996 (7.9%) reported having chronic illness, and among those individuals, 528 (53.0%) sought healthcare compared to 798 (5.3%) in the poorest quintile that did report chronic illness. With regards to the latter, just 400 (50.1) had sought healthcare, nearly half of the wealthy. The same income phenomenon was observed in terms of education - among the people without education, of the 964 (5.6%) that reported chronic illnesses, 465 (48.2%) individuals had sought healthcare. When looking at the people with university and higher education, 324 (8.5%) described having chronic illness and 173 (53.3%) sought healthcare.

Reporting chronic illness also varied by occupation, as among people not working, 1061 (6.6%) reported illness, and only 546 (51.5%) sought healthcare. Similarly, of all civil servants, 413 (8.7%) had chronic conditions and 228 (55.2%) pursued healthcare services. There were 1190 (8.2%) people that were insured claiming to suffer from chronic illness, and 707 (59.4%) sought healthcare. The distributions of respondents according to chronic illness showed 769 (1%) were diabetic, 1245 (1.7%) hypertensive and 390 (0.5%) asthmatic. Of those groupings, 484 (62.9%) diabetics, 798 (64.1%) hypertensive individuals, and 192 (49.2%) asthmatics sought care.

Table 5.4. Utilisation of outpatient healthcare services for chronic illness

	Total (Sudan)	Reported illnesses		Sought care	
Factors	N	Number	%	Number	%
Sudan	**72526**	**4608**	**6.4**	**2351**	**51.0**
Regions					
Darfur	14470	963	6.7	394	40.9
Northern	9351	838	9.0	537	64.1
Central	20204	1088	5.4	554	50.9
Eastern	13522	725	5.4	357	49.2
Kordufan	10180	342	3.4	170	49.7
Khartoum	4799	652	13.6	339	52.0
Residence					
Urban	26520	1847	7.0	970	52.5
Rural	46006	2761	6.0	1381	50.0
Gender					
Females	35685	2262	6.3	1156	51.1
Males	36841	2346	6.4	1195	50.9
Age group					
Children (0-15)	31716	1981	6.2	997	50.3
Elderly (66 and above)	2315	145	6.3	75	51.7
Adults (16-65)	38495	2482	6.4	1279	51.5
Income					
Well-off	12624	996	7.9	528	53.0
4th quintile	14729	999	6.8	524	52.5
3rd quintile	14924	958	6.4	501	52.3
2nd quintile	15227	857	5.6	398	46.4
The poorest	15022	798	5.3	400	50.1
Education					
Less than school age	9767	574	5.9	304	53.0
Basic	33158	2057	6.2	1038	50.5
Secondary	8653	689	8.0	371	53.8
University or higher	3811	324	8.5	173	53.4
No education at all	17137	964	5.6	465	48.2

Table 5.4 Utilisation of outpatient healthcare services for chronic illnesses (continued)

	Total (Sudan)	Reported illnesses		Sought care	
Factors	**Number**	**Number**	**%**	**Number**	**%**
Occupation					
Not applicable	22882	1374	6.0	683	49.7
Not working	16005	1061	6.6	546	51.5
Other	5465	376	6.9	217	57.7
Merchant	3442	263	7.6	145	55.1
Farmer	19984	1121	5.6	532	47.5
Civil servant	4748	413	8.7	228	55.2
Marital status					
Less than12	22880	1374	6.0	683	49.7
Widowed	1215	86	7.1	43	50.0
Divorced	708	42	5.9	22	52.4
Single	16491	1134	6.9	589	51.9
Married	31232	1972	6.3	1014	51.4
Insurance Status					
Insured	14461	1190	8.2	707	59.4
Non-insured	58065	3418	5.9	1644	48.1
Health needs					
Diabetes Mellitus	769	769	100.0	484	62.9
Hypertension	1245	1245	100.0	798	64.1
Bronchial Asthma	390	390	100.0	192	49.2

5.5 Predictors of utilisation of healthcare for chronic conditions

Table 5.5 outlines the results from the multinomial logistic regression performed for the predictors, which were found to be significant with univariate analysis and assumed to be significant. In particular, it suggests that the region, income, insurance status, and type of disease associated with utilisation of healthcare. Khartoum region was set as a reference and therefore assigned an OR =1; compared to Khartoum, citizens living in the north had more of an opportunity to seek care (OR 1.675 (95 CI% (1.334- 2.101)). Citizens in the central, eastern, and Kordufan regions were not significantly different from Khartoum (OR 1.169 (95% CI 0.945; 1.447), OR 1.311 (95% CI (0.964-1.69), and OR 1.199 (95% CI (0.925-1.998), respectively. However, citizens living in Darfur had less possibilities of seeking care (OR 0.517(95% CI (0.431- 0.711)).

Compared to the poorest quintile, the second quintile did not differ statistically from the poorest, while the third, fourth, and fifth (or well-off quintile) showed a steady increase in the odds of seeking healthcare services as income increased. These three quintiles bestowed the individuals within them higher odds of seeking healthcare services (OR 1.77 (95% CI (1.4-2.2), OR 2.2 (95% CI (1.7-2.7), and OR 2.7 (95% CI (2.2-3.4), respectively. The insured had 38% more chances to seek care compared to the non-insured (OR of 1.38 (95% CI (1.19-1.6)). DM and hypertension were found to elevate the chances of healthcare utilisation (OR 1.6 (95% CI (1.3-1.9), and 1.8 (95% CI (1.6-2.13), respectively. Bronchial Asthma was not a statistically significant predictor of healthcare utilisation.

Table 5.5 Predictors of utilisation of outpatient care for chronic diseases

Factor	OR	95% CI	P value
Regions			
Khartoum	1		
Northern	1.675	(1.334; 2.101)	P<0.01
central	1.169	(0.945; 1.447)	0.15
Eastern	1.311	(0.964;1.69)	0.13
Kordufan	1.199	(0.925;1.998)	0. 60
Darfur	0.517	(0.431; 0.711)	0.03
Residence			
Rural	1.063	(0.928; 1.217)	0.38
Urban	1.015	(0.893; 1.154)	0.822
Age groups			
Adults (16-65)	1		
Children (0-15)	1.23	(0.938; 1.615)	0.135
Elderly (66 and above)	0.767	(0.491; 1.198)	0.244
Income groups			
The poorest	1		P<0.01
2nd quintile	1.215	(0.962; 1.533)	0.101
3rd quintile	1.772	(1.418; 2.215)	P<0.01
4th quintile	2.215	(1.78; 2.757)	P<0.01
Well-off	2.757	(2.228; 3.412)	P<0.01
Education			
No education at all	1		
Basic	0.892	(0.747; 1.065)	0.206
Secondary	0.882	(0.694; 1.121)	0.306
University or higher	0.8	(0.577; 1.109)	0.181
Less than school age	1.221	(0.939; 1.588)	0.137
Occupation			
Not working	1		
Civil worker	1.094	(0.817; 1.466)	0.546
Farmer	1.054	(0.845; 1.315)	0.638
Merchant	1.278	(0.934; 1.747)	0.125
Other	1.367	(1.047; 1.783)	0.021
Marital status			
Not applicable	0.927	(0.692; 1.243)	0.614
Married	1		
Single	1.105	(0.907; 1.347)	0.32
Widowed	0.905	(0.478; 1.712)	0.759
Divorced	0.923	0.583; 1.461)	0.732

Table 5.5 Predictors of utilisation of outpatient care for chronic diseases (Continued)

Factor	OR	95% CI	P value
Insurance status	1.383	(1.194; 1.603)	P<0.01
Health Needs			
Diabetes Mellitus	1.6	(1.347; 1.901)	P<0.01
Hypertension	1.846	(1.594; 2.137)	P<0.01
Bronchial Asthma	1.2	(0.961; 1.497)	0.107
Constant	0.242		P<0.01

5.6 Inpatient healthcare

Hospitalisation (or inpatient care) is a critical stage of disease complication. Therefore, hospitalisation should be predicted by the health status or type of diseases. Nonetheless, many other factors were found to be important for making use of hospital care.

5.6.1 Pattern of utilisation of inpatient healthcare services

1776 (2.4%) of all respondents reported that they were hospitalised in the previous one year prior to the survey and Table 5.6.1 describes their characteristics. It is observed that the type of the disease played a major in the use of hospital care. However, other socio-demographic attributes were also found to influence inpatient healthcare. Further, it was also found that health needs were major factors that defined the use of hospital care. Citizens of Khartoum and central Sudan reported higher rates of hospitalisation, equating to 3.2%, versus the less developed regions of Darfur and Kordufan, together only equivalent to 1.8%. Urban citizens described having slightly higher hospitalisation rates (2.6%) compared to their rural counterparts (2.4%). Males and females were almost equivalent at 2.4% and 2.5%. Hospitalisation rate increased with age, with children reporting 2.4%, adults 2.5%, and the elderly 2.6%. Hospitalisation also increased with income, with the poorest quintile hospitalised at a rate of 1.6% versus 3.6% among the wealthiest. 3% of the insured stated being hospitalised compared to 2.3% of the non-insured.

As expected, people with specific types of diseases demonstrated greater rates of hospitalisation ; 61 (7.9%) diabetics were hospitalised, 93 (7.5%) of the hypertensive, 40 (10.3%) asthmatics, 188 (5.3%) of those with malaria, and 107(4.2%) of individuals with chest infections were hospitalised.

Table 5.6.1 Description of utilisation of inpatient healthcare services

Factors	Total	Hospitalized	
	N	N	%
Sudan (total)	72526	1776	2.4
The regions			
Khartoum	4799	152	3.2
Northern	9351	192	2.1
central	20204	655	3.2
Eastern	13522	333	2.5
Kordufan	10180	182	1.8
Darfur	14470	262	1.8
Residence			
Rural	46006	1088	2.4
Urban	26520	688	2.6
Gender			
Males	36841	915	2.5
Females	35685	861	2.4
Age group			
Adults (16-65)	38495	965	2.5
Children (0-15)	31716	750	2.4
Elderly (66 and above)	2315	61	2.6
Income			
The poorest	16782	267	1.6
2nd quintile	15586	311	2.0
3rd quintile	14785	367	2.5
4th quintile	13427	406	3.0
Well-off	11946	425	3.6
Education			
No education at all	17137	411	2.4
Basic	33158	818	2.5
Secondary	8653	228	2.6
university or higher	3811	79	2.1
Less than school age	9767	240	2.5
Occupation			
Not working	16005	416	2.6
Civil worker	4748	122	2.6
Farmer	19984	452	2.3
Merchant	3442	82	2.4
Other	5465	160	2.9
Not applicable	22882	544	2.4

Table 5.6.1: **Description of utilisation of inpatient healthcare services (continued)**

factor	Total N	Hospitalised N	Hospitalised %
Marital status			
Married	31232	772	2.5
Single	16491	400	2.4
Divorced	708	22	3.1
Widowed	1215	37	3.0
Less than 12	22880	545	2.4
Insurance status			
Insured	14461	436	3.0
Non-insured	58065	1340	2.3
Health Needs			
Have DM	769	61	7.9
No DM	71757	1715	2.4
Have hypertension	1245	93	7.5
No Hypertension	71281	1683	2.4
Asthmatics	390	40	10.3
No Asthma	72136	1736	2.4
Have Malaria	3547	188	5.3
No malaria	68979	1588	2.3
Chest infection	2566	107	4.2
No chest infection	69960	1669	2.4

5.6.2 Predictors of utilisation of hospital healthcare services

Table 5.6.2 shows that the region, income, insurance, and type of diseases were statistically significant predictors of utilisation of hospitalisation. Compared to citizens living in Khartoum, citizens living in the Northern region and Darfur had less opportunity for hospitalisation OR 0.71 (95% CI 0.568-0.886) and 0.76 (95% CI 0.6-0.9) respectively. Those living in the Central region had a 27% higher chance of being hospitalised OR 1.27 (95% CI 1.05-1.54).

Income had an increasing pattern, and compared to the poorest quintile, all quintiles had greater possibilities of using inpatient services with rising income OR 1.2 (95% CI 1.02-1.4), with incremental enhancements in the 2nd quintile OR 1.4 (95% CI 1.26-1.74), in the 3rd OR 1.8 (95% CI 1.55-2.1), in the 4th, and, finally, in the well-off quintile OR 2.0 (95% CI 1.7-2.3). With regards to education, people with a university or higher level of schooling had less chance for hospital admission compared to people without any education OR 0.64 (95% CI (0.4-0.85)).

The insured were 20% more likely to use inpatient services than the non-insured OR 1.2 (95% CI (1.07-1.349)). People with health conditions were also more likely to use inpatient care; respondents with malaria had a 120% higher probability of going to hospital than those without it OR 2.2 (95% CI (1.89-2.59)); patients that reported chest infections had an 80% higher chance OR 1.8 (95% CI (1.4-2.2)), those with DM had a 130% higher chance to be hospitalised OR 2.3 (95% CI 1.7-3.0)), with hypertension a 160% greater chance to use inpatient services OR 2.6 (95% CI (1.9-3.1), and asthmatics have four fold higher chances for hospital admission OR 4 (95% CI (2.8-5.7)).

Table 5.6.2 Determinants of utilisation of hospital (inpatient) healthcare services

Factor	OR	95% CI	P value
Khartoum	1		
Northern	0.709	(0.568; 0.886)	0.002
central	1.276	(1.056; 1.543)	0.012
Eastern	0.995	(0.809; 1.223)	0.96
Kordufan	0.834	0.661; 1.051)	0.124
Darfur	0.755	0.61; 0.935)	0.030
Residence			
Urban	1		
Rural	1.043	0.939; 1.159)	0.432
Gender			
Female	1		
Male	0.933	(0.843; 1.031)	0.175
Age group			
Adults (16-65)	1		0.343
Children (0-15)	0.859	(0.7; 1.053)	0.143
Elderly (66 and above)	0.984	(0.74; 1.297)	0.91
Income			
The poorest	1		
2nd quintile	1.204	(1.02; 1.421)	0.029
3rd quintile	1.485	(1.264; 1.745)	P<0.001
4th quintile	1.82	(1.551; 2.135)	P<0.001
The well-off	2.024	(1.72; 2.382)	P<0.001
Education			
No education at all	1		
Basic	0.991	(0.87; 1.128)	0.888
Secondary	0.938	(0.779; 1.129)	0.496
University or higher	0.642	(0.481; 0.856)	0.003
Less than school age	1.051	(0.864; 1.279)	0.62
Occupation			
Not working	1		
Civil worker	0.967	(0.756; 1.237)	0.789
Farmer	0.865	(0.733; 1.021)	0.087
Merchant	0.794	(0.612; 1.03)	0.083
Other	1.039	(0.85; 1.269)	0.71
Less than working age	0.307	(0.05; 1.892)	0.203
Marital status			
Married	1		
Single	0.977	(0.844; 1.13)	0.752
Divorced	1.291	90.836; 1.993)	0.249
Widowed	1.221	(0.865; 1.723)	0.256
Not applicable	3.215	(0.521; 19.846)	0.209
Insurance			
Insured	1.202	(1.071; 1.349)	P<0.01

Table 5.6.2 Determinants of utilisation of hospital (inpatient) healthcare services (continued)

Factor	OR	95% CI	P value
Malaria	2.218	(1.894; 2.597)	P<0.01
Chest infection	1.816	(1.483; 2.224)	P<0.01
Diabetes Mellitus	2.294	(1.728; 3.046)	P<0.01
Hypertension	2.5	(1.985; 3.147)	P<0.01
Bronchial Asthma	4.07	(2.896; 5.719)	P<0.01
Constant	0.017		P<0.01

5.7 Summary of results

Utilisation of inpatient and outpatient healthcare services was influenced by both socio-demographic characteristics of the respondents and their health status. Insurance status was found to significantly increase the chances of seeking healthcare for acute and chronic conditions, and, astonishingly, the insured had reported more hospitalisation than their non-insured counterparts. It was also evidenced here that there was a regional disparity in the use of healthcare for inpatient services as well as outpatient. The citizens of Khartoum and those from central Sudan and the northern regions, considered affluent regions, had significantly greater probabilities for making use of healthcare compared to other less developed regions, such as Darfur and Kordufan. Urban dwellers had a more significant probability of using outpatient and inpatient services compared to the rural population. Additionally, the wealthy had a significantly greater likelihood of utilising outpatient and inpatient healthcare services. Moreover, it was not surprising that the use of healthcare services was determined by the type of disease.

CHAPTER 6: HEALTH INSURANCE AND HEALTHCARE PROVIDERS

6.1 Introduction

In Sudan, healthcare is provided by many organisations, including the FMOH, NHIF, military hospitals, police, and private for-profit and not-for-profit providers. The NHIF, according to a government health strategy released in 2010, would be best concentrating its efforts on expanding insurance enrolment and leaving healthcare provision to other public and private providers. This strategy raised public worries about its impact to overall health system costs. Keeping that in mind, this study's objective was to address these public concerns by assessing the role of the insurance status on the use of private healthcare providers. This chapter describes healthcare provision and then it outlines the assessment of the predictors of utilisation of private healthcare for both outpatient and inpatient healthcare services.

Many people perceive private providers as having better quality, therefore it is expected that the insured would prefer this type of service if it was not properly regulated. Such use of private facilities may result in increase in medical costs paid by the NHIF and possibly threaten its financial viability. For these reasons, this study intended to garner understanding of whether insurance membership would enhance the use of private healthcare.

6.2.1 Providers of healthcare for acute conditions

Table 6.2.1 outlines the socio-demographic characteristics of the populations and healthcare providers. Amongst the entire population, 4497 (73.4%) had sought healthcare services in the public sector, 1264 (20.6%) had visited private care facilities, and 363 (5.9%) sought complementary service care. However, the ratios varied according to socio-demographics and health needs of the populations. People living in different regions demonstrated varied preferences for providers. The utilisation of private care in Khartoum (37.4%) was twice as high than those living in Kordofan (15.3%) and Darfur (16.8%). Urban citizens employed private care more than those living in rural regions, at 22.1% to 19.7%, respectively. However, women and men showed no difference in their provider of choice. Yet, different age groups had unique provider choices, though children (0-15) and adults (16-65) had nearly the same preferences, equating to 20.5% and 20.8%, respectively; elderly citizens preferred to use private care more (27.2%).

With regards to income, it was observed that as income increased, private providers were preferred. While utilisation of private care among people in the poorest quintile was only 8.5%, it was almost 34.1% in the well-off quintile. The same pattern could be seen with regards to education. While around 18% of people without education decided to go to private facilities, 27% of those with university or higher education chose to obtain the healthcare they need from private facilities. Additionally, only 17% of farmers favoured private care compared to 25% of civil workers. As for insurance status, insured and non-insured used private care almost equally at 21.7% and 20.3%, respectively.

Table 6.2.1 Healthcare providers for acute conditions

	Public		Private		Traditional		Total
	N	%	N	%	N	%	Total
Sudan	**4497**	**73.4**	**1264**	**20.6**	**363**	**5.9**	6124
Khartoum	303	58.9	192	37.4	19	3.7	514
Northern	446	72.3	157	25.4	14	2.3	617
central	1583	73.7	396	18.4	168	7.8	2147
Eastern	985	76.4	267	20.7	38	2.9	1290
Kordofan	500	79.1	97	15.3	35	5.5	632
Darfur	680	73.6	155	16.8	89	9.6	924
Residence							
Rural	2811	74.4	745	19.7	221	5.9	3777
Urban	1686	71.8	519	22.1	142	6.1	2347
Gender							
Males	2301	73.6	641	20.5	185	5.9	3127
Females	2196	73.3	623	20.8	178	5.9	2997
Age group							
Adults (16-65)	2441	74.6	658	20.1	175	5.3	3274
Children (0-15)	1921	72.7	550	20.8	173	6.5	2644
Elderly (66 and above)	135	65.5	56	27.2	15	7.3	206
Income quintiles							
The poorest	779	81.8	81	8.5	92	9.7	952
2nd quintile	927	78.4	163	13.8	92	7.8	1182
3rd quintile	961	74.8	245	19.1	78	6.1	1284
4th quintile	997	72.8	319	23.3	54	3.9	1370
Well-off	833	62.4	456	34.1	47	3.5	1336
Education							
No education at all	1095	75.5	264	18.2	91	6.3	1450
Basic	2065	73.4	577	20.5	170	6.0	2812
Secondary	520	73.6	151	21.4	36	5.1	707
University	229	67.4	92	27.1	19	5.6	340
Less than school age	588	72.1	180	22.1	47	5.8	815
Occupation							
Not working	1021	73.4	296	21.3	74	5.3	1391
Civil worker	304	69.2	111	25.3	24	5.5	439
Farmer	1201	75.9	276	17.4	105	6.6	1582
Merchant	226	71.7	75	23.8	14	4.4	315
Other	358	72.6	116	23.5	19	3.9	493
Not applicable	1387	72.8	390	20.5	127	6.7	1904

Table 6.2.1 Healthcare providers for acute conditions (continued)

	Public		Private		Traditional		Total
	N	%	N	%	N	%	Total
Marital status							
Married	2010	74.5	540	20.0	149	5.5	2699
Single	990	72.2	301	21.9	81	5.9	1372
Divorced	49	83.1	9	15.3	1	1.7	59
Widowed	62	67.4	25	27.2	5	5.4	92
Not applicable	1386	72.9	389	20.5	127	6.7	1902
Insurance status							
Insured	1138	71.7	344	21.7	105	6.6	1587
Non-insured	3359	74.0	920	20.3	258	5.7	4537
Health needs							
Have malaria	2075	76.8	480	17.8	147	5.4	2702
No malaria	2422	70.8	784	22.9	216	6.3	3422
Have chest infection	977	72.5	288	21.4	83	6.2	1348
No chest infection	3520	73.7	976	20.4	280	5.9	4776

6.2.2 Determinants of utilisation of private healthcare for acute conditions

Table 6.2.2 presents significant determinants of utilisation of private healthcare services for acute diseases which are: regions, age group, income, and health needs. Compared to people living in Khartoum, all individuals living in other regions, apart from the north, were less likely to utilise private healthcare facilities. The Odd Ratios of the regions were as follows: Central 0.65 (95% CI (0.524-0.806)), Eastern 0.604 (95% CI 0.419-0.758), Kordufan 0.562; 95% CI (0.419-0.753), and Darfur 0.346; 95% CI (0.27-0.445).

The elderly were more likely to use private healthcare (OR 1.613 (95% CI 1.15-2.25)), compared to adults. The poorest quintile, as income rose, the odds of using private care steadily increased. The well-off quintile had seven times higher odds of making use of private healthcare (OR 7.11 (95% CI 5.51-9.17)) compared to the poorest segment of the population. People who had chest infections were less likely to use private providers (OR 0.799 (95% CI 0.681-0.940)) versus those without chest infections. Malaria did not significantly affect the utilisation of private healthcare facilities. Moreover, insurance showed no significant effect on the use of private healthcare services for acute conditions.

Table 6.2.2 Determinants of utilisation of private healthcare for acute conditions

Factor	OR	95% CI	P value
Regions			
Khartoum	1		0.000
Northern	0.811	(0.628; 1.047)	0.107
the Central	0.650	(0.524; 0.806)	p<0.01
the Eastern	0.604	(0.481; 0.758)	p<0.01
Kordufan	0.562	(0.419; 0.753)	p<0.01
Darfur	0.346	(0.27; 0.445)	p<0.01
Residence			
Rural	0.993	(0.866; 1.139)	0.925
Gender			
Male	1.045	(0.919; 1.19)	0.499
Age groups			
Adults (16-65)	1		0.012
Children (0-15)	1.179	(0.911; 1.525)	0.212
Elderly (66 and above)	1.613	(1.156; 2.251)	0.005
Income quintiles			
The poorest	1		
2nd quintile	2.086	(1.583; 2.75)	p<0.01
3rd quintile	3.242	(2.492; 4.216)	p<0.01
4th quintile	4.467	(3.456; 5.773)	p<0.01
The well-off	7.112	(5.514; 9.173)	p<0.01
Education			
No education at all	1		
Basic	1.073	(0.903; 1.274)	0.425
Secondary	1.045	(0.817; 1.336)	0.728
University or higher	1.214	(0.867; 1.7)	0.259
Less than school age	1.257	(0.974; 1.623)	0.079
Occupation			
Not working	1		
Civil worker	1.148	(0.843; 1.564)	0.381
Farmer	1.029	(0.826; 1.282)	0.799
Merchant	1.149	(0.84; 1.57)	0.384
Other	1.079	(0.834; 1.396)	0.564
Not applicable	2.946	(0.419; 20.698)	0.277
Marital status			
Married	1		
Single	1.079	(0.896; 1.299)	0.425
Divorced	0.76	(0.374; 1.544)	0.448
Widowed	1.16	(0.726; 1.854)	0.535
Not applicable	0.318	(0.045; 2.263)	0.253

Table 6.2.2 Determinants of utilisation of private healthcare for acute conditions (continued)

Factor	OR	95% CI	P value
Insurance status			
Insured	1.101	(0.952; 1.274)	0.193
Health needs			
Have malaria	1.036	(0.899; 1.195)	0.623
Have chest infections	0.799	(0.680; 0.94)	0.007
Constant	0.059		p<0.01

6.3.1 Providers of healthcare for chronic conditions

Chronic conditions require more healthcare services than acute conditions and are generally more costly. The choice between public, private or complementary providers is influenced by population characteristics. In this study, of those who reported chronic illnesses, 2366 sought healthcare services for their chronic conditions, and among them 1592 (67.3%) went to public provides while 671 (28.4%) selected private and 103 (4.4%) opted for complementary healthcare.

36% of residences of Khartoum elected to go for private facilities compared to just 19.4% of those living in Darfur. Urban citizens had slightly higher rates of utilisation compared to the rural populace, at 30.1% and 27.1%, respectively. In addition, male utilisation of private care was slightly less than that of the females, at 26.2%, and 30.6%, respectively. It was logical that the utilisation of private care increased with the increase of income and education. With income, the rate was lowest among the poor (only 16.8%) compared to 37.6% among the well-off. The same trend was seen in terms of education; the lowest utilisation rate was 24% among people with no education versus approximately 30% among those who had education at the secondary level, namely university or above. The insured and non-insured populations were almost similar in the rate of utilisation, equating to 28% in both groups. With regards to specific disease groups, 29.7% of diabetics did not use private care followed by hypertensive (27%) and asthmatics (17%).

Table 6.3.1 Description of providers for chronic diseases

	Public		private		Complementary		total
	N	%	N	%	N	%	N
Sudan (Total)	**1592**	**67.3**	**671**	**28.4**	**103**	**4.4**	**2366**
Regions							
Khartoum	213	61.7	126	36.5	6	1.7	345
Northern	388	72.4	136	25.4	12	2.2	536
Central	346	61.9	158	28.3	55	9.8	559
Eastern	219	61.0	139	38.7	1	0.3	359
Kordufan	128	75.3	35	20.6	7	4.1	170
Darfur	298	75.1	77	19.4	22	5.5	397
Residence							
Rural	952	68.7	376	27.1	57	4.1	1385
Urban	640	65.2	295	30.1	46	4.7	981
Gender							
Males	838	69.8	315	26.2	48	4.0	1201
Females	754	64.7	356	30.6	55	4.7	1165
Age group							
Adults (16-65)	854	66.4	377	29.3	56	4.4	1287
Children (0-15)	674	67.2	283	28.2	46	4.6	1003
Elderly (66 and above)	64	84.2	11	14.5	1	1.3	76
Income							
The poorest	147	72.8	34	16.8	21	10.4	202
2^{nd} quintile	204	73.9	52	18.8	20	7.2	276
3^{rd} quintile	309	73.2	105	24.9	8	1.9	422
4^{th} quintile	402	69.7	146	25.3	29	5.0	577
The well-off	530	59.6	334	37.6	25	2.8	889
Education							
No education at all	329	70.1	117	24.9	23	4.9	469
Basic	694	66.4	302	28.9	49	4.7	1045
Secondary	251	67.5	114	30.6	7	1.9	372
University or higher	119	68.0	51	29.1	5	2.9	175
Less than school age	199	65.2	87	28.5	19	6.2	305
Occupation							
Not working	359	65.5	164	29.9	25	4.6	548
Civil worker	147	63.9	78	33.9	5	2.2	230
Farmer	370	69.3	135	25.3	29	5.4	534
Merchant	106	71.1	36	24.2	7	4.7	149
Other	145	66.5	69	31.7	4	1.8	218
Not applicable	465	67.7	189	27.5	33	4.8	687

Table 6.3.1 Description of providers for chronic diseases (continued)

	Public		private		Complementary		total
	N	%	N	%	N	%	N
Marital status							
Married	678	66.6	297	29.2	43	4.2	1018
Single	403	67.6	168	28.2	25	4.2	596
Divorced	17	77.3	5	22.7	0	0.0	22
Widowed	29	67.4	12	27.9	2	4.7	43
Not applicable	465	67.7	189	27.5	33	4.8	687
Insurance status							
Insured	470	66.1	203	28.6	38	5.3	711
Non-insured	1122	67.8	468	28.3	65	3.9	1655
Health needs							
Diabetes Mellitus	323	67.0	143	29.7	16	3.3	482
No Diabetes Mellitus	1269	67.4	528	28.0	87	4.6	1884
Hypertensive	554	69.7	216	27.2	25	3.1	795
Not hypertensive	1038	66.1	455	29.0	78	5.0	1571
Have BA	143	74.1	34	17.6	16	8.3	193
No BA	1449	66.7	637	29.3	87	4.0	2173

6.3.2 Determinants of utilisation of private healthcare

Table 6.3.2 outlines the predictors of utilisation of private healthcare, conditioned on seeking healthcare. Factors which were observed to be statistically significant were region, age group, income, and the type of disease. Compared to Khartoum, citizens living in the northern states and Darfur had less opportunities to use private healthcare facilities (OR 0.713 (95% CI 0.5-0.98)) and OR 0.491 (95% CI 0.34-0.70), respectively). Citizens of the Eastern region demonstrated a 53% greater likelihood of taking advantage of private care (OR 1.53 (95% CI 1.09-2.1)). The elderly had less of a possibility of using private facilities compared to adults (OR 0.366 (95% CI 0.180-0.750)).

Income was found to be statistically significant. Compared to the poorest quintile as the reference, the second quintile was not statistically different from the poorest quintile, while the third, the fourth, and the well-off quintiles had increased chances of opting for private care(OR 1.56 (95% CI (1.006-2.4)), OR 1.62 (95% CI (1.06-2.5), and OR 3.08 (95% CI 2.04-4.65), respectively). People with hypertension and asthma were unlikely to go to private care facilities (OR 0.76(95% CI 061-0.9) and OR 0.48 (95% CI 0.32-0.72), respectively). HI was not a significant predictor of utilisation of private care for chronic conditions.

Table 6.3.2 Predictors of utilisation of private care for chronic diseases

Factor	OR	95% CI	P value
Regions			
Khartoum	1		
Northern	0.713	(0.52; 0.98)	0.037
Central	0.875	(0.641; 1.193)	0.398
Eastern	1.538	(1.097; 2.156)	0.012
Kordufan	0.643	(0.406; 1.018)	0.059
Darfur	0.491	(0.34; 0.707)	p<0.01
Residence			
Rural	1.025	(0.833; 1.262)	0.815
Gender			
Males	1.212	(0.994; 1.478)	0.058
Age group			
Adults (16-65)	1		
Children (0-15)	1.034	(0.706; 1.515)	0.865
Elderly (66 and above)	0.366	(0.18; 0.746)	0.006
Income quintiles			
The poorest	1		
2nd quintile	1.057	(0.648; 1.724)	0.824
3rd quintile	1.564	(1.006; 2.432)	0.047
4th quintile	1.626	(1.059; 2.496)	0.026
The well-off	3.082	(2.042; 4.651)	p<0.01
Education			
No education	1		0.651
Basic	1.188	(0.894; 1.579)	0.236
Secondary	1.092	(0.761; 1.566)	0.634
University or higher	0.939	(0.578; 1.525)	0.800
Less than school age	1.269	(0.838; 1.921)	0.261
Occupation			
Not working	1		0.337
Civil worker	1.267	(0.827; 1.942)	0.277
Farmer	0.933	(0.662; 1.317)	0.695
Merchant	0.743	(0.46; 1.2)	0.224
Other	0.997	(0.68; 1.463)	0.989
Not applicable	0.749	(0.492; 1.141)	0.178
Marital status			
Married	1		0.865
Single	0.931	(0.704; 1.23)	0.615
Widowed	0.68	(0.243; 1.907)	0.464
Divorced	0.957	(0.466; 1.967)	0.905

Table 6.3.2 Predictors of utilisation of private care for chronic diseases (continued)

Factor	OR	95% CI	P value
Insurance status			
Insurance status	0.907	(0.73; 1.127)	0.378
Health needs			
Diabetes Mellitus	0.863	(0.679; 1.096)	0.227
Hypertension	0.763	(0.619; 0.941)	0.012
Bronchial Asthma	0.486	(0.325; 0.726)	p<0.01
Constant	0.266		p<0.01

6.4 Predictors of utilisation of private hospitals

Table 6.4 presents the factors that predict utilisation of private hospitals, and the significant ones that influenced the use of private hospitals were regions, income, insurance, and certain diseases. There was a regional disparity in the utilisation of private hospitals. Compared to people living in Khartoum, citizens living in northern Sudan and Darfur had less of a probability of making use of private inpatient services (OR 0.523 (95% CI 0.27-0.98)) and OR 0.50 (95% CI 0.276-0.93), respectively). Males had a 40% higher chance of using private hospitals versus females (OR 1.4 (95% CI 1.07-1.99)).

The second and third income quintiles were not found to be statistically different from the poorest one with regards to their odds of using private hospitals. People in the fourth and fifth income quintiles had two to three times greater likelihoods of using private hospitals compared to the poorest (OR 2.03 (95% CI 1.2-3.38) and OR 3.61 (95% CI 2.22-5.87), respectively). The insured had a 40% higher likelihood of using private hospitals versus those without insurance (OR 1.4 (95% CI 1.123-1.99)). The probability of using private hospitals increases with certain illnesses, like malaria (OR 2.1 (95% CI 1.30-3.4)), chest infections (OR 2.0 (95% CI 1.13-3.5)), hypertension (OR 2.06 (CI 95% 1.05-4.06), and bronchial asthma (OR 4.09 (95% CI 1.65-10.16)). There was no significance for DM.

Table 6.4. Predictors of utilisation of private hospitals

Factor	OR	95% CI	P value
regions			
Khartoum	1		
Northern	0.523	(0.279; 0.982)	0.044
Central	1.103	(0.669; 1.820)	0.700
Eastern	0.971	(0.558; 1.689)	0.917
Kordufan	0.617	(0.311; 1.228)	0.169
Darfur	0.507	(0.276; 0.934)	0.029
Residence			
Rural	1.312	(0.953; 1.807)	0.096
Gender			
Males	1.462	(1.071; 1.997)	0.017
Age group			
Adults (16-65)	1		
Children (0-15)	1.121	(0.582; 2.159)	0.734
Elderly (66 and above)	1.359	(0.629; 2.934)	0.435
Income			
The poorest	1		
2nd quintile	1.186	(0.686; 2.050)	0.542
3rd quintile	0.699	(0.370; 1.323)	0.271
4th quintile	2.032	(1.218; 3.388)	0.007
The well-off	3.612	(2.220; 5.876)	P<0.01
Education			
No education at all	1		
Basic	1.053	(0.701; 1.582)	0.803
Secondary	0.776	(0.425; 1.419)	0.411
University or higher	0.554	(0.238; 1.289)	0.171
Less than school age	0.94	(0.514; 1.720)	0.842
Occupation			
Not working	1		
Civil worker	1.934	(0.961; 3.893)	0.064
Farmer	1.242	(0.728; 2.119)	0.426
Merchant	1.06	(0.464; 2.424)	0.890
Other	1.223	(0.650; 2.302)	0.533
Not applicable	1.202	(0.003; 5.110)	0.953
Marital status			
Married	1		
Single	0.864	(0.539; 1.385)	0.545
Divorced	1.07	(0.261; 4.389)	0.925
Widowed	1.479	(0.581; 3.769)	0.412
Not applicable	0.98	(0.002; 45.5)	0.995
Insurance			
Insured	1.428	(1.123; 1.994)	0.036

Table 6.4 Predictors of utilisation of private hospitals (continued)

Factor	OR	95% CI	P value
Health Needs			
Malaria	2.108	(1.301; 3.419)	P<0.01
Chest infection	2.021	(1.139; 3.587)	0.016
Diabetes Mellitus	1.583	(0.669; 3.747)	0.296
Hypertension	2.066	(1.051; 4.064)	0.035
Bronchial Asthma	4.095	(1.650; 10.163)	0.002
Constant	0.001		P<0.01

6.5 Summary of findings

Private facilities were the destination for roughly 20% of respondents that sought outpatient and inpatient healthcare services. However, there were significant disparities in utilisation of such services between the regions of the country. The highest utilisation rate was observed in Khartoum while the lowest rate was recorded in Kordufan and Darfur. As expected, people with better incomes and more education preferred to go to private facilities. The proportion of individuals from the insured and non-insured populations that went to private facilities was not much different.

Utilisation of private outpatient care was significantly influenced by region and income, with better-off regions and enriched societal groups more likely to visit private outpatient providers.

Insurance status was not a significant predictor for utilisation of private outpatient services. However, the insured were more likely to go to private hospitals compared to those without insurance.

CHAPTER 7: DISCUSSION

7.1 Introduction

This chapter discusses the results of this study with the prime goal of translate its findings into worthwhile health policies for the local interest of Sudan. It also compares these findings to data obtained from other countries in order to contribute to the knowledge base of the field of HI. As well, highlighted are the strengths and limitations of the study and strategies to overcome the latter. Moreover, suggestions for future studies to address additional questions that arose as a result of the discussion process are put forth. Finally, a comprehensive summary of this chapter is provided herein.

7.2 The study population

This study estimated the total population of Sudan (Previously Northern Sudan) at 31,119,000 with a socio-demographic profile comparable to that obtained by the national census conducted in 2008. The similarity of the results may support the reliability of this study and therefore its generalizability to the entire country.

The study highlighted several important socio-demographic, developmental, and morbidity characteristics of Sudan. These facts might influence and interact with many aspects of HI schemes, the health system in general, or even the overall developmental goals of the country.

Based on the present study's 2009 data, it is clear that roughly 70% of the Sudan's population lives in rural areas, and that the regional distribution of the population does not match the economic or developmental status of those regions. For example, Darfur region, which is said to be the least developed region in the country, was also the most populated region. Another essential characteristic of Sudan is that it is arguably a young nation as reflected by the mean age of around 23 years, and that there is a total proportion of children equivalent to 40% with a small minority of citizens beyond 65 years.

The development status of Sudan, as reflected by the income, education, and the labour market is stunted. The labour profile of the country is characterised by a slim formal sector estimated to account for only 10% of the working population. The majority of the working population are farmers. Even worse, a fifth of the eligible working population is unemployed. Illiteracy is widespread,

affecting nearly a quarter of the population, and just 5% of Sudanese have the privilege of studying at university or higher.

The distribution of diseases and morbidity embodies the poor developing nature of the Sudan. People suffer much from infectious diseases, such as malaria, yet non-infectious or chronic illnesses are also quite common.

All these aforementioned socio-demographic and morbidity traits jeopardise the potential of an insurance scheme promoting access to healthcare, controlling financial sustainability, and targeting UHC.

In Sudan, as in most parts of developing world, the rural areas lack health facilities and are difficult to reach in terms of transportation; such areas are not attractive to many healthcare professionals. This has important implications for HI schemes, signifying a challenge for leaders of the NHIF that try to attempt to meet the government's policy goals of achieving UHC by transforming the current scheme into a national HI scheme. With the absence of suitable health facilities in rural areas, people living there are most likely already reluctant to enrol in any kind of insurance.

The country context, as framed by this study, is not in harmony with the aspirations of the government that desires speeding up the transformation process of the existing insurance scheme into a national HI organisation that serves every citizen. As an alternative, policy makers should choose to gradually expand the existing scheme and be aware of the potential negative consequences rapid expansion of current schemes solely based on political motives incur.

7.3 Insurance enrolment

In this study, enrolment by the population in insurance in Sudan in 2009 was approximately 20%, which is disappointingly low considering the point in time and compared to other countries' experiences. For instance, Ghana has a similar LMIC development classification. It began its insurance scheme in 2003, or roughly ten years after Sudan. However, it reached around 40% coverage by 2008 (Mensah, Oppong et al. 2010) More strikingly, Rwanda, with even worse economic development than Sudan and subjected to genocide, had achieved much more, at roughly 50% insurance enrolment (Wang, Switlick et al. 2012). Estimation of the overall coverage of insurance in Sudan is one of the areas of disputes between different stakeholders. The FMOH and NHIF authorities are continuously at odds.

The intention of the government, supported by the NHIF law of 2010, was to accelerate the existing NHIF to reach universal health insurance coverage by 2010, through a steady expansion of the existing scheme to enrol the informal sector workers, the poor, and the vulnerable groups. Yet, our findings have revealed that this objective has hardly fulfilled based on the low insurance coverage and slow enrolment process. Such results may strengthen social concerns for the NHIF's potential to exploit the limited resources of Sudan, further exacerbating the existing inequity.

Current insurance enrolment basically favours the affluent regions and social groups. People living in Khartoum and the Northern region were similarly enrolled, though citizens living in other parts of the country statistically had lower chances for insurance enrolment. The same disparity was observed between rural and urban dwellers. Such results should raise flags surrounding the factors behind its existence.

Income and education are probably the primary sources of power in any society. As income reflects people's ability to pay, it is not surprising to find that insurance enrolment is correlated with income (Hidayat, Thabrany et al. 2004). Education is also expected to influence enrolment pronouncedly as it qualifies people for formal employment. It can also increase people's awareness of their health needs, healthcare costs, and the advantages of being insured. Since 2005, all health systems have been mandated to foster the enrolment of the poor and less advantaged groups. In this study, even after adjusting for occupations, well-off and better educated citizens were more likely to be insured. Such findings are in line with studies from many developing countries (Hjortsberg 2003; Basaza, Criel et al. 2008). Education was consistently found to increase the probability of insurance enrolment, not only for schemes operating on a voluntary basis (Schneider and Diop 2001; Chankova, Sulzbach et al. 2008). Even in health schemes that primarily functioned as compulsory, such as in the case of Ghana, it has been seen that among all income quintiles, education was the factor that enhanced the likelihood of enrolment (Jehu-Appiah, Aryeetey et al. 2011).

One policy concern for insurance is its development of adverse selection, a situation where the sick are likely to pursue insurance enrolment (Gottret and Schieber 2005). Our findings uncovered that there was indeed the possibility of such an effect, as people with certain diseases were associated with more chances for enrolment. Diabetics, hypertensives, and even people that reported having malaria were all more prone to be insured. However, as one of the main goals of the system is to promote universal access to healthcare, such findings may be positive, at least in the context of Sudan, where the low utilisation of healthcare predominates the scene. Investigations from other countries, especially those of Africa, have observed no association between increased health needs and enrolment (Mensah, Oppong et al. 2010). Ekman in Jordan had considered a similar findings as a possibility of moral hazards (Ekman 2007)

7.3.1 Policy implications

Findings on insurance coverage reported here could better approximate the actual insurance coverage in Sudan in 2009. Therefore, it may be used as a baseline for further evaluation regarding the progression towards UHC. This study may contribute to better understanding and identifying the socio-economic backgrounds of the groups that require specific government interventions in order to be enrolled in a HI scheme. Moreover, characterization of the relevant factors is required from an equity lens so as to decrease disparities between societal groups and regions. The same data may be useful to the NHIF for shepherding the process of expansion of insurance enrolment. The issue of the association between certain diseases and enrolment, especially those that are chronic, need to be better addressed by future studies that aim to rule out adverse selection in insurance enrolment.

7.3.2 Summary

This study highlighted two main issues: 1) insurance enrolment was unacceptably low in relation to the point in time Sudan finds itself in; 2) there were observable disparities in insurance coverage between different social groups and geographic regions of Sudan. Moreover, the assumption of inequity in insurance enrolment could not be excluded. Fortunately, these concerns are potentially mutable if corrective actions are instituted. Failing to do so may widen the gap between the country's region and groups, potentially leading to further political unrest.

7.4 The role of health insurance on utilisation of healthcare services

The role of HI on the utilisation of healthcare was different for acute and chronic diseases.

7.4.1 Utilisation of healthcare services for acute conditions

The results presented in Section 4.5 underscored that the reported burden of acute conditions in Sudan (13%) did not differ much from the regional figures (Ekman 2007; Basaza, Criel et al. 2008). However, when 40% of the sick were not able to access healthcare, a fifth of them cited unaffordability, and 30% practised self-care, so policy makers, along with the public, should be informed of these alarming trends.

Malaria and upper chest infections are the two chief frequently reported health conditions and account for more than 50% of all acute conditions. Malaria alone is responsible for 30% of all acute conditions. Distressingly, even in the case of malaria, a quarter of those that had malaria did not seek healthcare, probably because of unaffordability. Such results suggest the actual burden of malaria and its impact on utilisation of healthcare services is huge.

The private providers, in all forms, contributed 20% of healthcare services in Sudan. Utilisation of private care was found solely dependent on income, favouring the wealthy and exhibiting regional disparity. For instance, while private sector contributed about 40% of healthcare services in Khartoum, its contribution was very limited in Darfur and Kordufan. That made the practice of traditional and complementary medicine in these regions widespread. Such findings are in line with those from neighbouring countries.

Sudanese citizens from different regions, according to our results, all had less chances of accessing healthcare compared to citizens of the capital Khartoum. Though the reported burden is not so much different, part of this disparity could be possibly explained by the supply side, or infrastructures of healthcare in these regions. However, the possibility of inequity, or a systemic disparity attributed to mutable social factors, cannot be excluded. One example is regarding insurance enrolment, described in Section 5.2 that notes insurance status is recognised as an important determinant of utilisation based on this study's data and in the literature.

The general sentiment is that the poor have more healthcare needs compounded with less affordability (WHO 2000; Marmot, Friel et al. 2008). This study found that the poor have less opportunity to use healthcare service while the wealthy have twice as many chances. The relationship between income and utilisation of healthcare is a known fact in developing countries (Peters, Garg et al. 2008). Nevertheless, its magnitude and impact is grave, especially in an African context (Gertler and Molyneaux 1997), and it is the main cause of destitution (Narayan 2001).

Based on the results presented in this work, HI improved utilisation of healthcare services as the insured were found more likely to seek care compared to the non-insured population. These findings support the positive expected impact of HI and are in line with the reviewed international body of knowledge (Ekman 2004; Spaan, Mathijssen et al. 2012). However, in the context of Sudan, the enrolment in insurance was found inequitably in favour of affluent groups. Therefore, the connection between insurance and utilisation

creates an additional policy concern for the future role of insurance schemes in the utility of healthcare, for the entire population.

While having insurance was associated with positive effects on seeking healthcare, its impact on using private services was not statistically significant. This may address a number of stakeholder concerns on its potential for shifting the current resources, cutting public sector revenues with a negative impact on the quality of provided service. This is very important in the case of Sudan where hospitals and public health facilities rely heavily on service charges to cover much of their running costs.

Previous studies in Sudan have reported a significant positive association between education and access to healthcare (Ibnouf, Van den Borne et al. 2007; Ali, Rayis et al. 2011), however our results did not support this. One explanation is that the previous work measured access for a specific health problem, such as family planning or antenatal care, for which education may play a significant role. Another explanation may be confounding with other factors like income or insurance.

Overall, this study emphasizes that, in the case of Sudan, not only are there health needs, but also other socio-economic and enabling factors, predicting factors, for seeking healthcare. This is in line with Andersen's assumptions on healthcare use (Andersen 1968; Andersen and Newman 1973).

7.4.1.1 Policy implications

Understanding the link between insurance status and utilisation of healthcare services is a useful contribution of this study in the formulation of policies that intend to improve utilisation of healthcare services. On the other hand, it also highlights the potential of HI to widen the disparity between the insured and non-insured populations with regards to healthcare use and, probably, health outcomes, as well.

Under the principles of equity proposed by Aday, the equitable health system is one where the needs determine healthcare use rather than the means or the enabling factors (Andersen 1995). However, this study has established that enabling factors, like income and insurance, are as important as health needs, and such findings are expected to raise public awareness around how equitable the Sudanese health system is, and also promote equity studies.

7.4.2 Utilisation of healthcare services for chronic conditions

The reported prevalence of chronic conditions in Sudan was approximately 6%, which is not that high versus other countries in the region. However, the overall figure masks the serious variability between regions of the country, ranging from just 3% in Kordufan to 13% among citizens of Khartoum. This is hardly explained by differences in epidemiological profiles. Instead, it is better described by the differences in awareness, access to diagnosis, and follow-up. Not any less important was the methodology for identification of the chronic diseases in this study that was based on follow-up of the disease, its medications, or being educated on the topic. Such a conservative approach may underestimate prevalence and create regional variation. Yet, given the diversity of lifestyles and the ethnic backgrounds of Sudanese citizens, actual variation is also possible and this necessitates further research.

The most striking finding was that even in cases of chronic disease, only half of those with them sought care, though again, this was observed with notable regional and socioeconomic disparities. The less affluent regions and groups demonstrated a higher reported prevalence and a relatively greater healthcare seeking rate.

There were also healthcare seeking behaviours that followed education and income. Again, all explanations provided for regional disparities were applied. Income was persistently found to determine seeking care and use of private care.

The insured were more likely to report having chronic illnesses and were more likely to seek care compared to the non-insured. Though these findings may be reflective of the benefits of insurance status to the community, the same findings could raise concerns on the disparity in both healthcare utilisation and health outcomes. Another important

finding was that insurance had no significant role on the employment of private care for chronic illnesses.

Health needs, as approximated in this study by DM, BA, and hypertension, were found to be the most important determinants of seeking care for chronic conditions.

Understanding the positive relationship between income and insurance on utilisation of healthcare creates challenges and opportunities for potential subsidy targeting the poor to improve their own healthcare access and outcomes.

7.4.3 Utilisation of inpatient healthcare services

The use of inpatient healthcare or hospitalisation is probably different from the use of the outpatient services. It is mainly influenced by health needs (Premaratne, Amarasinghe et al. 2005) and health professionals (Rosenblatt and Moscovice 1984). As the role of the latter was not evaluated, the utility of inpatient service is, arguably, mostly governed by the health needs rather than enabling and/or predisposing factors.

The overall, with one-year recall, hospitalisation rate was nearly 2.5%, not much different from the results of SHHS 2006 (FMOH 2006). However, our findings show that the rate of hospitalisation varied along regional and socio-economic lines. While the rate in Khartoum hovered around 3%, it was found to be as low as 2% in Darfur and Kordufan. The same can be said for income and insurance; the wealthy reported being hospitalised twice as much as the poor, and the insured had 50% more hospitalisation episodes than the non-insured. Such disparities in the reported hospitalisation rates can hardly be explained by epidemiological make up, neither is it the effect of recall bias; hospitalisation is a major event, and, as such, the poor are able to readily recall such experiences. These findings should cause the public to take issue with these barriers, especially seeing that they are financial.

Education had an interesting effect on developing countries. In the SHHS 2006, educated individuals reported higher rates of hospitalisation (FMOH 2006), and the same was found in this study. However, other investigations from developed countries observed that education is inversely associated with hospitalisation (DE LA HOZ and Leon 1996).

The insured described higher rates of hospitalisation relative to the non-insured, and such a connection may indicate that the insured have access to the services, better diagnosis and follow-up. It was not expected to be a matter of moral hazard or adverse selection given that many other expenses in the hospitals were not covered by insurance, as well as the high indirect cost.

Hospitalisation was associated with the region, income, insurance status, and morbidity. This was contrary to the initial assumptions on predictors of hospitalisation, and that inpatient services or hospitalisation should be based on health needs. Nevertheless, they were consistent with other studies, particularly from developing countries. This may reflect the importance of enabling factors, such as HI, even with respect to hospitalisation and it also could suggest the magnitude of unaffordability.

7.5 The role of health insurance on utilisation of private healthcare services

In Sudan, just as in many other countries, people perceive that the private health sector is better in terms of quality of services but is more expensive. Therefore, there was public concern for whether the implementation of HI in Sudan would promote utilisation of the private sector and escalation of the overall cost of healthcare. For the NHIF, the elevation of utilisation of private healthcare could threaten financial sustainability in the long run. Accordingly, this study targeted evaluation of insurance status regarding utilisation of private healthcare.

It was found that the insured and the non-insured were not different in their use of outpatient services for both acute and chronic conditions. One probable explanation is that there was a concentration of these private facilities in large cities and towns as well as proper transportation, resulting in other indirect costs. Another is that the NHIF owns a network of facilities, and most provide outpatient services to members, therefore diminishing referral to private providers.

Insurance status was observed to be a significant factor for increasing utilisation of private inpatient services. Two reasons could account for this fact. First, the NHIF has no hospitals and purchases all inpatient services from other providers, including those that are private. Second, inpatient services are costly and the insured usually tried to use their membership in such cases.

7.6 Strength and limitations of this study

This study has a number of strengths and limitations and these are described as follows.

7.6.1 Strengths

One of the most important strengths of this study is its study of HI, an increasingly internationally popular field with major ramifications for developing countries.

Another point of strength is that though Sudan's NHIF in 2009 was nearly twenty years old, this study, to our knowledge, was the first to explicitly assess the impact of it on access to healthcare. Moreover, our work had national coverage and large data sets with a sufficient sample size that accounted for all of Sudan. Such data helped analyses for each region of the country to be compared with the reference Khartoum. Yet another point of strength was that there was a unique opportunity supplied by the SHUEHS 2009 committee to the principal researcher to become a member of that survey committee during the planning stage. This aided in the incorporation of most of the variables required to fulfil the objectives of this study in the survey questionnaire. Integrating these variables added richness to the analyses and results.

Moreover, as a result of the wide variety of variables, this study had split out the analyses for the predictors of utilisation of outpatient services according to the types of health problems, namely acute and chronic illnesses, and the type of service, including outpatient and inpatient services (e.g., hospitalisation), yielding better health policy alternatives.

7.6.2 Limitations

This study suffered many limitations. For one, the cross-sectional data did not allow a causal relationship of predictors of access to be drawn. Further, it is known that the perceptions of diseases and health influence both access and health seeking behaviours. However, here, variables on population perceptions on health and disease were omitted from the survey because of their length. Another important limitation was the distortion of certain variables for medical expenditures that were required to measure devastating household expenditure and equity in finance and, therefore, analysis of these features was not possible.

Yet another important shortcoming was that this study took a very long time to reach the final results based on the many obstacles encountered during the survey itself, the data obtained and the course of the thesis. These obstacles may diminish the value of these results for the Sudanese in terms of the time of release and publication.

7. 7 Recommended studies

In view of the limitations of this study, it is proposed that future studies mitigating them be endeavoured. Among the most important issues to examine are equity studies. Here, certain elements of inequity pertaining to healthcare utilisation were revealed. Therefore, further inquiry is desperately required to understand the impact of the NHIF on the equity of delivery of healthcare services in Sudan. Another important line of inquiry that should be pursued is assessing the economic impact of the NHIF and its effect on catastrophic health expenditure. These two proposed works would permit the gaining of further insight into the NHIF and its function within Sudan.

On a final note, certain elements had been found to threaten the feasibility of the NHIF, such as the association between insurance status and greater episodes of disease, especially chronic disease, and the higher utilisation of private healthcare among the insured population. Therefore, more detailed feasibility studies pertaining to the NHIF are needed immediately so that the appropriate degree adverse selection mechanisms may be implemented and suitable number and distribution of public/private healthcare facilities could be integrated within Sudan's healthcare infrastructure.

7.8 Summary:

Among all respondents, around 13% had reported having acute illnesses, in four weeks prior to the survey, and around 6% had reported chronic diseases. Such reported morbidity for both acute and chronic diseases was more or less similar to most Low and middle income countries of the world(Whiting, Guariguata et al. 2011; Nshisso, Reese et al. 2012; Abeku, Helinski et al. 2015). However, 40% to 50% of Sudanese were not able to access the healthcare they need, mainly due to financial reasons. Fortunately, HI was found to be a significant factor that helped improving access to the healthcare services. However, the insurance enrolment was unacceptably low and inequitably in favour of affluent groups and geographic regions of country.

The connection between insurance and utilisation, found in this study, creates an additional policy concern for the future role of insurance schemes in the utility of healthcare, for the entire population.

This study also highlighted that the socio-demographic and the morbidity traits of the country context in 2009 may jeopardise the potential of an insurance scheme to reach UHC.

CHAPTER 8: CONCLUSIONS

The NHIF was established in Sudan in1994 with a prime goal to mitigate the low utilisation of healthcare resulted from enactment of user's charges. The implementation of scheme raised a number of public concerns such as the inconclusive evidence of the impact of HI scheme in the context of poor countries, its potential to exclude the poor and marginalised groups that aggravates the inequity in utilisation of care, and the possibility of escalating the total cost through purchasing services from expensive private providers. To contribute to the local evidence pertaining to each of these vital questions was the initial motive that triggered this study.

Though this study sought the resolution of a local health policy issue, it holds the potential being relevant to many other stakeholders; health policy makers and researchers from other countries, that face similar challenges, along with health systems researchers, international donors, public health professionals, and international organisations dealing with healthcare such as the WHO and WB.

The main goal of this study was to assess the impact of HI status on access to healthcare in the Sudanese context. It was found that insured populations have greater opportunities for access to healthcare services compared to their non-insured counterparts. This could be considered an advantageous outcome of the NHIF in Sudan. Our work also provides empirical evidence for policies that target improvement of healthcare access through expanding HI enrolment, supporting international preferences for HI as a viable health finance option

that has the potential to resolve the low utilisation challenges created by unaffordability not only in Sudan, but other countries, as well.

However, this association could bring about critical issues in terms of equity, as from a specifically equity perspective, if the insured have increased chances for seeking and utilise healthcare over those without insurance membership, in countries like Sudan, where insurance coverage as reflected in this study was biased towards the affluent societies and regions, then the insurance scheme would result in broadening of the existing inequity.

Equity as a goal of the health system has two main domains - equity in health and equity in healthcare. The first is defined by the WHO as "implying that ideally, everyone should have a fair opportunity to attain their full health potential and, more pragmatically, that no one should be disadvantaged from achieving this potential, if it can be avoided" (WHO 1985; WHO 2000). Equity in healthcare refers to equal access to the available care for equal needs, which Whitehead simplified into fair distribution throughout a country based on healthcare needs and ease of access in each geographical area, and the removal of other barriers to access (Whitehead 1992). Viewing this through an equity lens, the existing health insurance scheme in Sudan has the potential to widen the gap between the insured and the non-insured. Worse still, if we accept the validity of the hypothesis that healthcare improves health outcomes, the insured will have better access to the healthcare and better health.

Based on this study, the current NHIF will lead to disparity in healthcare use and health outcomes, and this is supported by a WHO report from 2000 on equity (WHO 2000).

In general, this study recommends an expansion of the current NHIF scheme to other groups within Sudanese society. Moreover, it identifies the enrolment predictors to foster this expansion by characterising groups and regions that require specific interventions to become enrolled. Among these interventions are subsidies that target the poor and marginalised groups. Globally, there are many countries that have followed this path, including China and Thailand, as examples, with promising field results (Capuno, Kraft et al. 2014). This pathway, though seemingly logical and easy, is full of obstacles for many developing countries (Tangcharoensathien, Patcharanarumol et al. 2011). Two key barriers are important to note: 1) the identification of groups that need government and non-government subsidy; and 2) how to raise funds for these targeted subsidies.

The work presented here estimated the NHIF insurance coverage and explored predictors of insurance enrolment. In particular, it estimated coverage to be approximately 20% of the total population. As this study relied on a national representative survey, it is arguable that its estimation would better approximate real insurance coverage in Sudan in 2009. This may be used as a baseline for insurance coverage and help further monitoring of enrolment.

Regarding the predictors of the enrolment, analysis revealed that, generally, enrolment was more common in the wealthy and affluent regions. These findings necessitate urgent government action in term of policy to enrol the non-insured groups. One proposed solution from this work is a targeted subsidy. The same predictors of enrolment can be used as guidance for a NHIF insurance expansion project that could cover more people.

Based on these findings, this work is timely and provides evidence for expansion of the NHIF in Sudan.

REFERENCES

Abeku, T. A., M. E. H. Helinski, et al. (2015). "Monitoring changes in malaria epidemiology and effectiveness of interventions in Ethiopia and Uganda: Beyond Garki Project baseline survey." Malaria Journal **14**: 337.

Acharya, A., S. Vellakkal, et al. (2012). "Impact of national health insurance for the poor and the informal sector in low-and middle-income countries." EPPI-Centre Systematic Review. EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Aday, L. A. and R. Andersen (1974). "A framework for the study of access to medical care." Health services research **9**(3): 208.

Adhikari, S. R. (2012). "A methodological review of demand analysis: An example of health care services." Economic Journal of Development Issues **13**: 119-130.

Agha, S. and T. W. Carton (2011). "Determinants of institutional delivery in rural Jhang, Pakistan." International Journal for Equity in Health **10**(1): 1-12.

Ahn, Y. H. E. S. O. K. S. H. S. S. S. H. N. Y. J. Y. (2011). "Factors Associated With the Overuse or Underuse of Health Care Services Among Medical Aid Beneficiaries in Korea." Journal of Community Health Nursing **28**(4): 190-203.

Ali, A. A., D. Rayis, et al. (2011). "Use of family planning methods in Kassala, Eastern Sudan." BMC research notes **4**(1): 43.

Ali, G. K. M. (2009). "Accessibility of medicines and primary health care: The impact of the revolving drug fund in Khartoum State." African Journal of Pharmacy and Pharmacology **3**(3): 070-077.

Andersen, R. (1968). "A behavioral model of families' use of health services." Research Ser.(25).

Andersen, R., A. McCutcheon, et al. (1983). "Exploring dimensions of access to medical care." Health services research **18**(1): 49.

Andersen, R. and J. F. Newman (1973). "Societal and individual determinants of medical care utilization in the United States." The Milbank Memorial Fund Quarterly. Health and Society: 95-124.

Andersen, R. and J. F. Newman (1973). "Societal and individual determinants of medical care utilization in the United States." Milbank Mem Fund Q Health Soc **51**(1): 95-124.

Andersen, R. M. (1995). "Revisiting the Behavioral Model and Access to Medical Care: Does it Matter?" Journal of Health and Social Behavior **36**(1): 1-10.

Babitsch, B., D. Gohl, et al. (2012). "Re-revisiting Andersen's Behavioral Model of Health Services Use: a systematic review of studies from 1998-2011." Psychosoc Med **9**: Doc11.

Babitsch, B., D. Gohl, et al. (2012). "Re-revisiting Andersen's Behavioral Model of Health Services Use: a systematic review of studies from 1998–2011." GMS Psycho-Social-Medicine **9**.

Barber, K. (1998). The Canadian oxford dictionary, Oxford University Press Canada.

Basaza, R., B. Criel, et al. (2008). "Community health insurance in Uganda: Why does enrolment remain low? A view from beneath." Health policy **87**(2): 172-184.

Becker, S., D. H. Peters, et al. (1993). "The determinants of use of maternal and child health services in Metro Cebu, the Philippines." Health transition review: 77-89.

Bedri, N. M. A. K. (2002). Health Seeking Behaviour for Vaginal Discharge: Pathways, Factors and Processes Influencing Early Modern Care Use for Abnormal Vaginal Discharge in the Sudan, University of Manchester.

Belay Mohammed (2013). Determinants of Demand for Health Care Services in Mekelle City.Thesis:. Mekelle, Mekelle,MU. **PhD**.

Bird, C. E. and P. P. Rieker (1999). "Gender matters: an integrated model for understanding men's and women's health." Social Science & Medicine **48**(6): 745-755.

Buchmueller, T. C., K. Grumbach, et al. (2005). "Book Review: The Effect of Health Insurance on Medical Care Utilization and Implications for Insurance Expansion: A Review of the Literature." Medical Care Research and Review **62**(1): 3-30.

Buor, D. (2004). "Gender and the utilisation of health services in the Ashanti Region, Ghana." Health policy **69**(3): 375-388.

Capuno, J. J., A. D. Kraft, et al. (2014). "Effects of interventions to raise voluntary enrollment in a social health insurance scheme: a cluster randomized trial." World Bank Policy Research Working Paper(6893).

CBoS (2009). Sudan Census 2008 Report.

Chankova, S., S. Sulzbach, et al. (2008). "Impact of mutual health organizations: evidence from West Africa." Health Policy and Planning **23**(4): 264-276.

Chowdhury, H. R., S. C. Thompson, et al. (2011). "Care seeking for fatal illness episodes in neonates: a population-based study in rural Bangladesh." BMC Pediatrics **11**: 88-88.

Cleland, J. G. and J. K. Van Ginneken (1988). "Maternal education and child survival in developing countries: the search for pathways of influence." Social Science & Medicine **27**(12): 1357-1368.

DE LA HOZ, K. F. and D. A. Leon (1996). "Self-perceived health status and inequalities in use of health services in Spain." International Journal of Epidemiology **25**(3): 593-603.

Dobrow, M. J., V. Goel, et al. (2004). "Evidence-based health policy: context and utilisation." Social science & medicine **58**(1): 207-217.

Ekman, B. (2004). "Community-based health insurance in low-income countries: a systematic review of the evidence." Health Policy and Planning **19**(5): 249-270.

Ekman, B. (2007). "The impact of health insurance on outpatient utilization and expenditure: evidence from one middle-income country using national household survey data." Health Research Policy and Systems **5**(6).

Ensor, T. and S. Cooper (2004). "Overcoming barriers to health service access: influencing the demand side." Health Policy and Planning **19**(2): 69-79.

Finkelstein, A., S. Taubman, et al. (2012). "The Oregon Health Insurance Experiment: Evidence from the First Year*." The Quarterly Journal of Economics **127**(3): 1057-1106.

FMOH (2006). Sudan Household Survey 2006. Khartoum, FMOH.

FMOH (2006). "Sudan Household Survey 2006". Khartoum, Minstry of Health.

FMOH (2007). National Health Policy Health. Khartoum, FMOH.

FMOH (2010). "Sudan National Health Account 2008". Khartoum.

FMOH (2011). "Sudan National Health Account 2008". Khartoum, FMOH.

Folland, S. and A. Goodman (2004). M. STANO (2004),"The Economics of Health and Health Care," Pearson/Prentice Hall, Upper Saddle River, NJ.

Folland, S., A. C. Goodman, et al. (2007). The economics of health and health care, Pearson Prentice Hall New Jersey.

Gertler, P. and J. Molyneaux (1997). "Experimental evidence on the effect of raising user fees for publicly delivered health care services: utilization, health outcomes, and private provider response." Santa Monica, CA, Rand Corporation.

Gnawali, D. P., S. Pokhrel, et al. (2009). "The effect of community-based health insurance on the utilization of modern health care services: Evidence from Burkina Faso." Health policy **90**(2): 214-222.

Gottret, P. and G. Schieber (2005). Health financing revisited: a practitioner's guide. Washington DC: World Bank, 2006. Scott Burris and Leo Beletsky, OSI Seminar on Global Governance of Health (Conference Report, Open Society Institute: Schloss Arenberg.

Govindasamy, P. and B. Ramesh (1997). "Maternal education and the utilization of maternal and child health services in India."

Grosh, M. and P. Glewwe (2000). Designing Household Survey Questionnaires for Developing Countries: Lessons from 15 Years of the Living Standards Measurement Study, Volume 3, Washington, DC: World Bank.

Grossman, M. (1972). "On the concept of health capital and the demand for health." The Journal of Political Economy **80**(2): 223-255.

Gulliford, M., J. Figueroa-Munoz, et al. (2002). "What does' access to health care'mean?" Journal of health services research & policy **7**(3): 186-188.

Gulliford, M., J. Figueroa-Munoz, et al. (2002). "What does 'access to health care' mean?" Journal of health services research & policy **7**(3): 186-188.

Habicht, J. and A. E. Kunst (2005). "Social inequalities in health care services utilisation after eight years of health care reforms: a cross-sectional study of Estonia, 1999." Social Science & Medicine **60**(4): 777-787.

Halldórsson, M., A. E. Kunst, et al. (2002). "Socioeconomic differences in children's use of physician services in the Nordic countries." Journal of epidemiology and community health **56**(3): 200-204.

Hidayat, B., H. Thabrany, et al. (2004). "The effects of mandatory health insurance on equity in access to outpatient care in Indonesia." Health Policy and Planning **19**(5): 322-335.

Hjortsberg, C. (2003). "Why do the sick not utilise health care? The case of Zambia." Health economics **12**(9): 755-770.

Hunter, D. (2009). "Relationship between evidence and policy: a case of evidence-based policy or policy-based evidence?" Public health **123**(9): 583-586.

Ibnouf, A., H. Van den Borne, et al. (2007). "Utilization of family planning services by married Sudanese women of reproductive age." East Mediterr Health J **13**(6): 1372-1381.

Jacobson, L. (2000). "The family as producer of health—an extended Grossman model." Journal of Health Economics **19**(5): 611-637.

Jehu-Appiah, C., G. Aryeetey, et al. (2011). "Equity aspects of the National Health Insurance Scheme in Ghana: Who is enrolling, who is not and why?" Social Science & Medicine **72**(2): 157-165.

Jowett, M. (2004). Theoretical insights into the development of health insurance in low-income countries.

Kesterton, A., J. Cleland, et al. (2010). "Institutional delivery in rural India: the relative importance of accessibility and economic status." BMC Pregnancy and Childbirth **10**(1): 30.

Kesterton, A. J., J. Cleland, et al. (2010). "Institutional delivery in rural India: the relative importance of accessibility and economic status." BMC Pregnancy and Childbirth **10**(1): 30.

Knaul, F. M., H. Arreola-Ornelas, et al. (2007). "Evidence is good for your health system: policy reform to remedy catastrophic and impoverishing health spending in Mexico." salud pública de méxico **49**: s70-s87.

Lagarde, M. and N. Palmer (2008). "The impact of user fees on health service utilization in low- and middle-income countries: how strong is the evidence?" Bull World Health Organ **86**(11): 839-848.

Levesque, J.-F., M. F. Harris, et al. (2013). "Patient-centred access to health care: conceptualising access at the interface of health systems and populations." Int J Equity Health **12**(1): 18.

Levine, D., R. Polimeni, et al. (2016). "Insuring Health or Insuring Wealth? An experimental evaluation of health insurance in rural Cambodia." Journal of Development Economics **119**: 1-15.

Lopez-Cevallos, D. F. and C. Chi (2010). "Health care utilization in Ecuador: a multilevel analysis of socio-economic determinants and inequality issues." Health Policy Plan **25**(3): 209-218.

López-Cevallos, D. F. and C. Chi (2009). "Health care utilization in Ecuador: a multilevel analysis of socio-economic determinants and inequality issues." Health Policy and Planning: czp052.

Manning, W. G., J. P. Newhouse, et al. (1987). "Health insurance and the demand for medical care: evidence from a randomized experiment." The American economic review: 251-277.

Marmot, M., S. Friel, et al. (2008). "Closing the gap in a generation: health equity through action on the social determinants of health." The Lancet **372**(9650): 1661-1669.

McColl, M. A. S. M. L. (2011). "Disentangling the effects of disability and age on health service utilisation." Disability & Rehabilitation **33**(13/14): 1253-1261.

Mensah, J., J. R. Oppong, et al. (2010). "Ghana's National Health Insurance Scheme in the context of the health MDGs: An empirical evaluation using propensity score matching." Health economics **19**(S1): 95-106.

MOH Sudan (2011). Sudan Households Health Utilization & Expenditure Survey in Northern States 2009, Country Report. Khartoum.

Mooney, G. H. (1983). "Equity in health care: confronting the confusion." Effective health care **1**(4): 179-185.

Morris, S., M. Sutton, et al. (2005). "Inequity and inequality in the use of health care in England: an empirical investigation." Social Science and Medicine **60**(6): 1251-1266.

Mossialos, E., A. Dixon, et al. (2002). Funding health care: options for Europe, Open University Press Buckingham.

Mustafa, M. (2005). "Health system profile: Sudan." Division of Health System and Services Development, Eastern Mediterranean Regional Office, WHO.

Narayan, D. (2001). "Voices of the Poor." Faith in Development: Partnership between the World Bank and the Churches in Africa, Washington, DC: World Bank and Oxford: Regnum Books: 39-50.

NHIF (2009.). Annual Health Insurance report 2009,. Khartoum, National Health Insurance Fund.

NMOF (2012). Annual Report 2012. Khartoum, Ministry of Finance.

Nshisso, L. D., A. Reese, et al. (2012). "Prevalence of Hypertension and Diabetes among Ethiopian Adults." Diabetes & metabolic syndrome **6**(1): 36-41.

O'Donnell, O. (2007). "Access to health care in developing countries: breaking down demand side barriers." Cadernos de Saúde Pública **23**(12): 2820-2834.

Oliver, A. and E. Mossialos (2004). "Equity of access to health care: outlining the foundations for action." Journal of epidemiology and community health **58**(8): 655-658.

Palmer, L., S. S. Johnston, et al. (2012). "Agreement between Internet-Based Self- and Proxy-Reported Health Care Resource Utilization and Administrative Health Care Claims." Value in Health **15**(3): 458-465.

Penchansky, R. and J. W. Thomas (1981). "The concept of access: definition and relationship to consumer satisfaction." Medical care **19**(2): 127-140.

Peters, D. H., A. Garg, et al. (2008). "Poverty and access to health care in developing countries." Annals of the New York Academy of Sciences **1136**(1): 161-171.

Pokhrel, S. and R. Sauerborn (2004). "Household decision-making on child health care in developing countries: the case of Nepal." Health Policy and Planning **19**(4): 218-233.

Preker, A. S., G. Carrin, et al. (2002). "Effectiveness of community health financing in meeting the cost of illness." Bulletin of the World Health Organization **80**(2): 143-150.

Premaratne, R., A. Amarasinghe, et al. (2005). "Hospitalisation trends due to selected non-communicable diseases in Sri Lanka, 2005–2010." Ceylon Medical Journal **50**(2): 51-54.

Raghupathy, S. (1996). "Education and the use of maternal health care in Thailand." Social Science & Medicine **43**(4): 459-471.

Ritter, P. L., A. L. Stewart, et al. (2001). "Self-reports of health care utilization compared to provider records." Journal of clinical epidemiology **54**(2): 136-141.

Roberts, R. O., E. J. Bergstralh, et al. (1996). "Comparison of self-reported and medical record health care utilization measures." Journal of clinical epidemiology **49**(9): 989-995.

Ronald M. Andersen, P. L. D. IMPROVING ACCESS TO CARE IN AMERICA. Changing the U.S. Health Care System.

Rosenblatt, R. A. and I. S. Moscovice (1984). "The Physician as Gatekeeper: Determinants of Physicians' Hospitalization Rates." Medical care **22**(2): 150-159.

Rosenstock, I. M. (1974). "The health belief model and preventive health behavior." Health Education & Behavior **2**(4): 354-386.

Ruiz, M. T. and L. M. Verbrugge (1997). "A two way view of gender bias in medicine." Journal of epidemiology and community health **51**(2): 106.

Saksena, P., A. F. Antunes, et al. (2011). "Mutual health insurance in Rwanda: evidence on access to care and financial risk protection." Health policy **99**(3): 203-209.

Schneider, P. and F. Diop (2001). Synopsis of results on the impact of community-based health insurance on financial accessibility to health care in Rwanda, World Bank, Washington, DC.

Sekyi, S. and P. B. Domanban (2012). "The Effects of Health Insurance on Outpatient Utilization and Healthcareexpenditure in Ghana." International Journal of Humanities and Social Science, **Vol. 2**(No. 10).

Shaikh, B. T. and J. Hatcher (2005). "Health seeking behaviour and health service utilization in Pakistan: challenging the policy makers." Journal of Public Health **27**(1): 49-54.

Simkhada, B., E. R. v. Teijlingen, et al. (2008). "Factors affecting the utilization of antenatal care in developing countries: systematic review of the literature." Journal of advanced nursing **61**(3): 244-260.

Simon, J., S. Rosen, et al. (2001). "The family health cycle: from concept to implementation."

Skordis-Worrall, J., K. Hanson, et al. (2011). "Estimating the demand for health services in four poor districts of Cape Town, South Africa." International health **3**(1): 44-49.

Spaan, E., J. Mathijssen, et al. (2012). "The impact of health insurance in Africa and Asia: a systematic review." Bulletin of the World Health Organization **90**(9): 685-692.

Su, T. T., B. Kouyate, et al. (2006). "Catastrophic household expenditure for health care in a low-income society: a study from Nouna District, Burkina Faso." Bull World Health Organ **84**(1): 21-27.

Tangcharoensathien, V., W. Patcharanarumol, et al. (2011). "Health-financing reforms in southeast Asia: challenges in achieving universal coverage." The Lancet **377**(9768): 863-873.

Valencia-Mendoza, A. and S. M. Bertozzi (2008). "A predictive model for the utilization of curative ambulatory health services in Mexico." salud pública de méxico **50**(5): 397-407.

van den Heever, A. M. (2012). "The role of insurance in the achievement of universal coverage within a developing country context: South Africa as a case study." BMC public health **12**(1): S5.

van Doorslaer, E., O. O'Donnell, et al. (2006). "Effect of payments for health care on poverty estimates in 11 countries in Asia: an analysis of household survey data." The Lancet **368**(9544): 1357-1364.

Verbrugge, L. M. (1985). "Gender and health: an update on hypotheses and evidence." Journal of Health and Social Behavior: 156-182.

Veugelers, P. J. and A. M. Yip (2003). "Socioeconomic disparities in health care use: Does universal coverage reduce inequalities in health?" Journal of epidemiology and community health **57**(6): 424-428.

Vingilis, E., T. Wade, et al. (2007). "Predictors of adolescent health care utilization." Journal of adolescence **30**(5): 773-800.

Wagstaff, A. (2010). "Social health insurance reexamined." Health Econ **19**(5): 503-517.

Wang, H., K. Switlick, et al. (2012). Health insurance handbook: how to make it work, World Bank Publications.

Whitehead, M. (1992). "The concepts and principles of equity and health." International journal of health services **22**(3): 429-445.

Whiting, D. R., L. Guariguata, et al. (2011). "IDF Diabetes Atlas: Global estimates of the prevalence of diabetes for 2011 and 2030." Diabetes Research and Clinical Practice **94**(3): 311-321.

WHO (1985). Targets for health for all: targets in support of the European Regional Strategy for Health for All. Copenhagen., World Health Organization. Regional Office for Europe.

WHO (2000). "World Health Report 2000." Geneva: World Health Organization.

WHO (2000). The world health report 2000: health systems: improving performance, WHO.

WHO (2004). Ageing and Health Technical Report Professor Gary Andrews and Ms Debbie Faulkner, Centre for Health Development

WHO (2005). Sustainable health financing, universal coverage and social health insurance: World Health Assembly resolution WHA58.33. Geneva, World Health Organization.

WHO (2006). Regional Health Systems Observatory-Health System Profile Sudan. Cairo.

WHO (2010). World Health report 2010 "Health Sysytems financing: the path to universal coverage". Geneva, WHO.

WHO (2012). Country profile: Sudan, EMRO.

Witter, S. (2010). "Free health care for under-five children and pregnant women in Northern Sudan: progress so far and recommendations for the future. Report for Government of National Unity (MDTF funded)."

World Bank. (2013). "Sudan Country profile." from http://data.worldbank.org/country/sudan accessed 14th January 2013.

World Health Organization (2010). World Health report 2010 "Health Sysytems financing: the path to universal coverage". Geneva, WHO.

Xu, K., D. B. Evans, et al. (2003). "Household catastrophic health expenditure: a multicountry analysis." The Lancet **362**(9378): 111-117.

Xu, K., P. Saksena, et al. (2010). "Health financing and access to effective interventions." World health report.

Yip, W. and W. C. Hsiao (2008). "The Chinese health system at a crossroads." Health Aff (Millwood) **27**(2): 460-468.