FACTORS INFLUENCING MALARIA CARE SEEKING BEHAVIOUR IN TWO GHANAIAN COMMUNITIES: FORMAL VERSUS INFORMAL MALARIA CARE

DISSERTATION

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By

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DECLARATION

I would like to declare that this dissertation is my own original work, produced with normal supervisory assistance from my mentor. All the relevant sources of knowledge that I have used during the course of writing this dissertation have been fully credited and acknowledged.

I would like to declare that this dissertation has not been, and will not be presented to any other university for the purpose of receiving a degree.

_____ _____

Delfina Ângela Saweka Date

This dissertation paper has been submitted for examination with my approval as the university supervisor for the aforementioned student.

_____ _____

Marianela Castillo-Riquelme Date

DEDICATION

To my parents (Joaquim and Justina Saweka)

You have been a source of support, encouragement and inspiration

ACKNOWLEDGEMENTS

Firstly, I would like to give my greatest gratitude to God Almighty for the strength, courage and for this opportunity- *I would not make it without You.*

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ABSTRACT

Introduction: Seeking care for malaria through the informal healthcare sector has been proved to cause detrimental and even fatal outcomes. This has become a major concern for the government and policy-makers in Ghana. In 1998, it was estimated that more than 50% of the population in Ghana, regardless of the age group, sought malaria care outside the formal healthcare sector. The risks associated to high reliance on the informal sector could range from the possibility of getting wrong diagnostics and prescriptions to the possibility of getting ineffective drugs and incomplete dosages.

General objectives: The study primary objective was to investigate the determinants and extent of household's reliance on the informal malaria care sector in two Ghanaians communities. The secondary objective wass to inform policy-makers and planners, especially from the public healthcare sector, on supply side issues that are likely to influence the current malaria care seeking patterns.

Methodology: A cross-sectional study using household's surveys was conducted to obtain quantitative data (based on the last malaria event). Data was analysed using a logistic regression model. To address the second goal, qualitative research through direct interviews was conducted. The study was conducted in two Ghanaian communities of relatively similar socio-economic levels, although one is urban (Ga Mashie) and other is rural (Gomoa). A total of 290 household surveys in Ga Mashie and 179 in Gomoa were completed using a two-stage random sampling technique. Specific malaria related information was collected on 1,876 individuals (4 members per household).

Study Results: Most of the households in the two communities sought care with formal malaria care providers. In Gomoa, which has a slightly higher incidence of malaria (24.2%) than Ga Mashie (23.2%), a considerable number of households (36.8%) still relayed on informal malaria care providers (especially drug sellers). The reasons for the reliance on the informal care (as well as no care) differed considerably from one community to the other. In Ga Mashie, the households' perception of malaria as a non severe illness was the chief reason. In Gomoa on the other hand, the lack of financial resources (formal facilities were considered to be too expensive) was the main reason reported.

Based on the multinomial logistic regression analysis the choice of malaria care providers is influenced to different extents by five factors, including: religion, location of the household (among the 2 communities), socio-economic status, patient's age and household size. Additionally, the significance of the aforementioned factors varies from the comparison of *formal* versus *informal* care, to the comparison of *formal* versus *no care*. Likewise, it varies between the two communities. Religion, (Christianity) is positively associated with informal malaria care in Ga Mashie community. Socio-economic status of the households is negatively associated with informal malaria care in Gomoa. These results need to be treated with caution due to potential sampling weakness.

Conclusions and recommendations: From the study results it can be inferred that to improve malaria care seeking behaviour and thus malaria control for all, policies should be aimed to target households at district level. This is due to the differences on the predictors of malaria care seeking behaviour in the two communities. Based on other international experiences, joint efforts should be made between the different sectors in Ghana to create multi-sectorial approaches (such as mass Information, Education and Communication (IEC) campaigns particularly through radio and churches). At district level the use of formal malaria care providers should be encouraged (In Ga Mashie) while in areas with limited geographic access to healthcare facilities (like in Gomoa), training of informal malaria care providers should be prioritised.

ACRONYMS

ACT……..Artemisinin-based Combination Therapy
AIDS…….Acquired Immune Deficiency Syndrome
AMA…….Accra Metropolitan Area
AMEHI…….Accra Metropolis Health Initiative
AQ……....Amodiaquine
ASU...……Artesunate
CHPS……Community Based Health Planning and Services
CIA……...Central Intelligence Agency
CQ…….Chloroquine
DFID……Department of International Development
DOTS……Directly Observed Treatments
FES……...Focused Ethnographic Studies
GDHS……..Ghana's Demographic and Health Survey
GDP…….Gross Domestic Product
GHIS……Gomoa Health Insurance Scheme
GHS……..…...Ghana Health Service
GoG…….Government of Ghana
GSS……...Ghana Statistical Service
HBM…….Health Belief Model
HFR……..Hospital Fees Regulation
HH……Household Head
HIV……...Human Immunodeficiency Virus
HMM……Home-based Malaria Management
IPT……Intermittent Preventive Therapy
IEC……Information, Education and Communication
IMR……..Infant Mortality Rate
ITNs..……Insecticide-Treated Nets
JSS……Junior Secondary School
KAP……..Knowledge, Attitudes and Practices
MLE……..Maximum Likelihood Estimation

MoH…..…….. .Ministry of Health

MMR……Maternal Mortality Rate

MNLM…….Multinomial Logit Model

NGO…….Non-governmental Organisation

NHIL……....National Health Insurance Levy

NHIS……National Health Insurance Scheme

NMHMR……..Noguchi Memorial Institute for Medical Research

NPM……New Public Management

OLS…….Ordinary Least Square

OPD……Outpatient Department

OVC…….Over-the-Counter

PCA…….Principal Component Analysis

PPP……..Purchase Power Parity

PML…….Princess Marie Louise

RBM……....Roll Back Malaria

SHIS……....Social Health Insurance Scheme

SP ……...Sulphadoxine-Pyrimethamine

SSS……..Senior Secondary School

TB……Tuberculosis

TV……Television

UNICEF……...United Nations Children Fund

UNFPA……United Nations Population Fund

U5MR……..Under five Mortality Rate

WHO……World Health Organization

GLOSSARY OF TERMS

Formal malaria care: refers to the malaria care obtained from public hospitals and pharmacies, private hospitals and pharmacies, public and private clinics (including mobile clinics).

Formal sector for healthcare: refers to all the health facilities, clinics, health centres, doctors, nurses and pharmacies registered with the various decentralised regulating boards of the Ministry of Health (MoH). These include the pharmaceutical council, medical and dental council. These health facilities and providers can function either on the public or private sector.

Informal malaria care: refers to the malaria care obtained from unauthorised traditional healers, faith healers, drug sellers, drug peddlers and self-treatment (note that in Ghana, anti-malarial drugs can be bought over-the-counter).

Informal sector for healthcare: can be defined as all the facilities and providers who dispense medicines and provide care without the permission of the various decentralised regulating boards of Ministry of Health (MoH). Informal healthcare providers typically include faith healers, drug peddlers, drugs sellers (in the markets), unregistered traditional healers, and lastly home or self-treatment.

CHAPTER 1: INTRODUCTION TO THE STUDY TOPIC

Understanding malaria care seeking behaviour in endemic countries has been identified as a crucial precondition for sound decision-making and subsequently, for policy formulation and implementation of malaria control. This study aims to understand healthcare seeking behaviour for malaria care in two Ghanaian communities. This first chapter starts with the background information on malaria, followed by an overview on Ghana and its health profile, including a journey through the various health reforms implemented up to date. The final part of the chapter addresses the problem statement, as well as the study rationale and its objectives.

1.1 Background Information

In the midst of several illnesses in the world, malaria was and is still one of the health conditions of great public health relevance. It is endemic in 100 countries worldwide, most of which are low income countries (WHO/UNICEF, 2003).

Malaria is a preventable and treatable illness. It is caused by a *protozoan parasite* belonging to the genus *plasmodium* and is transmitted through the bite of the a*nopheles mosquito* (WHO, 2006). The World Health Organization (WHO) regards malaria as the most important parasitic disease, killing more than any other infectious disease and is the world´s biggest killer of women, except for tuberculosis (TB) (WHO, 2006). The disease is considered to impoverish a vast range of people in the world.

Despite the several strategies and reforms geared towards the eradication and control of malaria worldwide, the endemic still represents a threat to more than 40.0% of the world population (WHO, 2000; RBM, 2005). Moreover, it is emphasised that out of the 300 million acute malaria cases occurring each year, between 2.2 and 2.7 million people lose their lives. Approximately 90.0% of all malaria deaths in the world today occur in Africa, most specifically in the south of Sahara. In the aforementioned region, around one million people

die of malaria yearly, most of whom are children under 5 years' and pregnant women (WHO/UNICEF, 2003).

Unlikely many other diseases such as cardiovascular often regarded as the disease of the rich people and elderly, malaria indiscriminately affects people of all classes regardless of their socio-economic status, race, gender and lifestyle. However, the less privileged are at higher risk of both becoming infected with malaria and more frequently. This is due to the poor hygienic and sanitary conditions of the environment in which they often live in, and affordability of preventive and curative care.

As consequence of the endemic patterns of malaria in several African countries, some households perceive malaria as a minor illness. Yet, health deterioration is a common feature of malaria victims, which often progress to severe illness and lead to premature deaths (Amin et al., 2003). Despite the perception concerning the severity of malaria, in some African countries, its management and the choice of malaria care provider are greatly influenced by behavioural factors, perceived quality of service provision and socio-economic factors. These factors include cultural beliefs, attitudes, characteristics of health facilities (such as physical access, convenience of service hours and fee policies), as well as household's disposable income, among many other factors.

High malaria prevalence constitutes a significant drain on economic progress and subsequently on human and economic development (Sachs and Malaney, 2002; Agyarko and Okorosobo, 2006). For this reason it is often said that "*where malaria prospers most, human societies prospered least*" (Sachs and Malaney, 2002: 680). Several studies have revealed that in developing countries malaria costs have greater magnitude than the budget many households are living on (US$ 1 per day) - see for example: Ettling and Shepard (1991); Sauerborn et al. (1991); Asenso-Okyere and Dzator (1996); Dzator and Asafu-Adjaye (2004); Agyarko and Okorosobo (2006).

As result of the combination of all the above mentioned factors, including the potential costs, many households in developing countries delay malaria treatment. In most cases, they seek care at an advanced phase of the disease or rely on unqualified and inefficient healthcare providers, so putting their lives at great risk (Asenso-Okyere et al., 1997).

1.1.1 Overview on Ghana

Ghana has a total land area of 238,537 square kilometres and lies in the West Coast of Africa. It shares borders with Cote d'Ivore, Togo and Burkina Faso, which are predominantly French speaking countries, and has the Gulf of Guinea in the South. For administrative purposes, Ghana is divided into ten regions, namely: Ashanti, Brong-Ahafo, Central, Eastern, Greater Accra, Northern, Upper-East, Upper-West, Volta and Western Region. Accra, the country's capital city is located in the Greater Accra Region.

Ghana was a British colony and was the first African country to gain independence on the 6th of March 1957. Subsequently, it enjoyed a period of political stability followed by a long history of coups. Currently, Ghana experiences political stability and has engaged into a constitutional democracy and a multi-party democratic presidential system of government.

The population in July 2006 was estimated to be approximately 22,409,572 inhabitants, which included a vast range of ethnic groups. The more predominant ethnic group are the Akans, reaching about 49.0% of the total population (GSS, NMHMR and ORC, 2004). According to the 2003 Ghana's Demographic and Health Survey (GDHS) more than half of the Ghanaians (58.5%) resided in the rural areas and there were slightly more women (53.0%) than men in the overall population. The GDHS also showed that the age structure of the country's population was typical of a young population characterised by high fertility and thus a heavy burden on both economic and social assets of the country. Approximately 44.0% of the population was under 15 years, 51.0% had ages ranging between 16 years to 64 years and only a very small proportion of the population (5.0%) was 65 years and above.

Concerning the educational level in the country, a marked urban-rural difference is also apparent. More individuals in urban areas (38.1%) have attained at least some secondary school level (SSS), whereas in rural areas only 19.5% have done so. Likewise, it is more common to find illiterate individuals in rural areas (46.8%) than in urban areas (25.9%).

The economic structure of Ghana is typical of a developing country, although significantly better than many countries in the region. Like many other African countries, Ghana is

substantially rich in natural resources. The most prevailing natural resources are: gold, timber, industrial diamonds, bauxite, manganese, fish, rubber, hydropower, petroleum, silver, salt and limestone (CIA, 2006). Gold, timber and cocoa production are the country's main source of income. The agricultural sector, apart from being one of the main sources of income, also provides employment for a great proportion of Ghanaians. It accounts for 34.0% of the gross domestic product (GDP), and employs 60.0% of the country's workforce (CIA, 2006). In 2005 the country's GDP per capita purchasing power parity (PPP), was estimated at US$2,130, and 44.8% of the country's population was living below the poverty line of less than US$1 per capita per day (UNFPA and Population Reference Bureau, 2005).

1.1.1.1 Ghanaian Health Profile

In the past, the Government of Ghana (GoG) was the sole provider and deliverer of healthcare. Currently, the Ministry of Health (MoH) has been strongly involved in the new public management reform, known as the public-private mix. Although, the government is still the main provider and deliverer of healthcare, the involvement of missions (NGO's) and the private sector is already apparent. The private sector in Ghana also includes traditional healers (Obuobi et al., 1999). However, presently a very restricted number of traditional healers are regulated and legislated by MoH.

Besides the government attempts to engage in the public-private mix, an effort has also been made to move towards the decentralization of the health system. To attain this goal the government has created the Ghana Health Service (GHS). The GHS is a Government independent entity that has the flexibility to allocate resources according to their priorities (Obuobi et al., 1999). However, the setting of priorities and the general policy guidelines of the country are defined by the MoH.

The Ghanaian national healthcare system is structured as follow: at regional level, healthcare is provided at hospitals. At district level on the other hand, the healthcare system is divided into three levels, namely: district hospitals, sub-district health centres or policlinics and community based health planning and services (CHPS) (Heyen-Perschon, 2005).

Since the attainment of the independence in Ghana, the government has put most effort to implement policies geared toward the population's health improvement and fair financing (Adams, 2002). For several years, tax revenue and user-fees system have been the main sources of healthcare financing, however, user-fees had to be abolished after the country's independence in 1957, when the government moved to a socialist ideology (Adams, 2002). This resulted in free provision of service to almost all the social sectors in the country, including health and education. Healthcare financing through tax revenue alone became a questionable source, thus resulting in reduction of the quality of service delivered by the public sector. In an attempt to reverse the above mentioned situation a range of new regulations were introduced including the Hospital Fee Decree in 1969, which reintroduced user-fees, followed by the Hospital Fees Act in 1971, with its legislative instruments (the Hospital Fees Regulation/HFR) in 1985. The latter opened a way for a nationwide fee for service policy (Adams, 2002) that was aimed at the promotion of cost-sharing amongst the users of the public facilities (Asenso-Okyere, 1995; Asenso-Okyere et al., 1997) and to improve the quality of service. Within the HFR, fees were charged on the basis of the service levels, treatment, facility location and age. Although the end goal of the HFR was primarily to promote fair financing in the country, it failed to attain this goal. Asenso-Okyere et al. (1997) asserted that the reform brought detrimental effects both on the Ministry of Health (MoH) and consumers of public health facilities (drop in the attendance at health facilities), particularly in rural areas. Many consumers of the public facilities started to delay treatment and changed healthcare providers from formal to informal providers, including consultation at drug stores, partial purchasing of prescribed drugs and sharing of prescribed drugs with other household members (Asenso-Okyere et al., 1997).

In the face of these challenges, the Government of Ghana (GoG) set a target to improve healthcare by the end of the year 2000. This goal would be attained by promoting inter-sectorial action for the health sector, increasing equity of access to health services, and ensuring improved quality and increased efficiency of service delivery. Moreover, the introduction of universal coverage through a social health insurance, the National Health Insurance Scheme (NHIS), was also pursued by the GoG, with the primary objective of attaining financial protection to all Ghanaians, through risk pooling and resource sharing. The accomplishment of the latter goal has been slowly achieved, since the implementation of health insurance is a gradual process. Thus, the year 2004 was the starting point of this long

journey into social health insurance. In the year 2005 approximately 15.8% of the Ghanaian population, including formal and informal sector employees and pensioners were already registered with this scheme (GHS, 2006). However, despite all these significant efforts, and some gains which are illustrated in table 1, the health situation in the country is still precarious. This is characterised by inadequate access to quality care, unfair financing, disparities of health facilities (in terms of availability and quality) and irregularities in the health system. Most of these health problems are mainly encountered in the worse-off areas, such as rural areas which accommodate 60.0% of the country's total population (Heyen-Perschon, 2005). Table 1.1 provides information on the vital health indicators for the year 1990 and 2005.

Table 1.1 - Selected Vital Health Statistics, Ghana, 2005

Health Indicators	1990	2005
Infant mortality rate (IMR) per 1000 live births	81.8	57.8
Maternal mortality rate (MMR) per 100000 live births	740	540
Under five mortality rate (U5MR) per 1000 live births	N/A	93
Total expenditure on health as % of GDP (2004)*	N/A	4.9
Overall life expectancy, years	55.4	57.9
Total fertility rate	6.0	4.11

N/A = not available

Source: UNFPA and Population Reference Bureau (2005),* WHO (2006).

According to Heyen-Perschon (2005) the healthcare facilities in Ghana are unevenly distributed, thus, often leaving the most underserved groups with very little options to seek healthcare. Additionally, in some worse-off areas, mainly rural areas, where few health facilities are available, these often lack maintenance, equipment, staff and some are in inaccessible geographical areas. As a result, the utilisation of these facilities often implies direct and indirect costs for the households. The direct costs include transportation, consultation fees and drug costs. The indirect costs on the other hand include the time spent seeking care and the cost of absenteeism from work or school. For instance, evidence from a study conducted in the Northern Region of Ghana revealed that in relation to their income availability the cost of malaria care for poor households was 20 times higher than for rich households (Akazili, 2002). This often worsens households demand for healthcare and in

many cases it even forces them to rely on other coping mechanisms such as demanding service from the informal sector for healthcare.

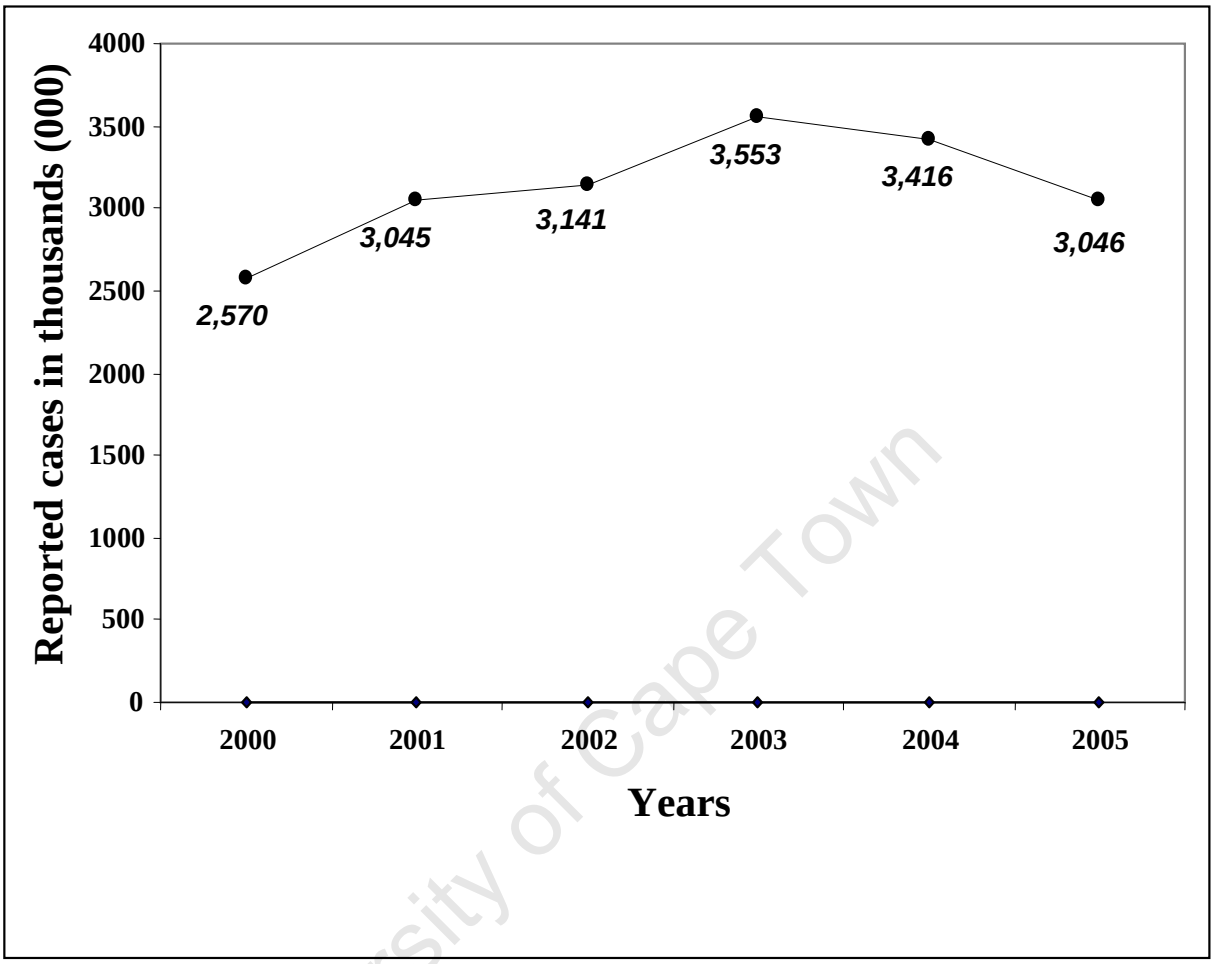
1.1.1.2 Malaria in Ghana

Some of the top morbidity conditions in Ghana are malaria, TB, HIV/AIDS, Guinea worm and poliomyelitis (MoH, 2004). Of these, malaria is still the leading cause of morbidity and mortality (GHS, 2006). The malaria incidence in Ghana is subject to seasonality patterns, occurring with higher frequency during the rainy seasons (low rain season "April – July") and (high rain season "September – November") (Afari et al., 1995; Koram et al., 2000; Koram et al., 2003; Kobbe[1] et al., 2006). Roll Back Malaria partners in Ghana asserted that the malaria reported cases, accounts for more than 40.0% of the total outpatients' visits and it is estimated that 22.0% of under five mortality (U5M) in Ghana is due to the disease (WHO, 2006).

Figure 1.1 gives an indication of the increased malaria trends in Ghana from 2000 to 2005.

[1] For instance, the results of a study conducted by Kobbe and colleagues (2006) indicated that the malaria infection prevalence was 88% higher in the rainy than in the dry season (22.7% vs. 13.5%, OR 1.9, CI: 1.4–2.6, P < 0.001).

Figure 1.1 – Annual Reported Malaria Cases in Ghana from 2000-2005, Ghana,2006



Data source: Ghana 2006 Annual Malaria Report

On average the reported malaria cases increased from 2.5 million in 2000 to 3.0 millions in 2005. However, from the highest pick of 3.5 millions observed in 2003 there has been a decline on the reported cases. This decline might be due to the effort by the government and other interested stakeholders to control malaria through specific interventions, like for instance change of malaria control approach from eradicative to preventive strategies (such as the use of insecticide-treated nets/ ITNs) (WHO/ UNICEF, 2003).

The Roll Back Malaria (RBM) initiative is one of the key strategies in the fight against the malaria endemic worldwide, including Ghana (RBM, 2005). The RBM initiative poses an emphasis on efficacious and cost-effective control strategies other than eradicative strategies

that were previously used. It also claims the promotion and use of local capacities and health systems of the countries under consideration (Dzator and Asafu-Adjaye, 2004). Although Ghana failed to achieve the Abuja Declaration primary goal in 2005, evidence has shown signs of progress. For example, Bart-Plange and Owusu-Antwi (2006) reported improved access to prompt and effective supply of ITN's to 35.5% of women and under-five children and the increased use of Intermittent Preventive Therapy (IPT) with Sulphadoxine-pyrimethamine (SP) by pregnant women to 40.0% in the country.

For several decades, Chloroquine (CQ) was regarded as one of the most effective and affordable anti-malarial drugs in most endemic countries. It was often recommended by WHO as the first line drug for the treatment of uncomplicated malaria. However, CQ become less effective due to the rapidly increasing parasite resistance. Ghana was one of the countries using CQ as first line anti-malarial drug. Nevertheless, an urgent, drastic and effective change had to be implemented in the country, where its first line anti-malarial drug was changed from chloroquine (CQ) to the combination of Artesunate and Amodiaquine (ASU + AQ) for the treatment of uncomplicated malaria (MoH, 2004; RBM, 2005). Although, evidence has proved that combination therapies are more effective ways to treat malaria in most endemic countries, in the year 2003 it was estimated that combination therapies were not yet widely available and affordable to all (WHO/ UNICEF, 2003; Surtherland et al., 2005; Orton and Garner, 2006).

1.2 Problem Statement

Healthcare seeking for malaria through the informal sector has shown to cause detrimental and even fatal outcomes (Mills et al., 2002; WHO/UNICEF, 2003). This does not refer only to the health outcome of the individuals treated, but also to the impact on disease transmission and to the development of drug resistance (WHO/UNICEF, 2003; Omaswa, 2006). One of the main reasons of the widespread resistance of the malaria parasite to CQ in Ghana and other endemic countries is attributed to CQ dispensing by informal health workers (WHO, 2000). As a result, this became a major worry to government and to policy-makers in Ghana. Various strategies have been put in place to improve access to formal malaria care in Ghana; amongst these strategies the Malaria control Action Plan (MAP) and Roll Back

Malaria (RBM) partnership were created. The Malaria control Action Plan (MAP) was aimed to improve prompt diagnosis and adequate treatment in Primary Health Care (PHC). Roll Back Malaria (RBM) partnership was launched to strength health services in general and to promote effective prevention and treatment strategies widely and promptly available. Progress has been made in improving access to prompt and effective treatment, supply of insecticide-treated nets (ITNs) and using intermittent preventive treatment with sulphadoxine-pyrimethamine (SP) in pregnancy (IPT) (Ahorlu et al., 1998; Owusu-Agyei et al., 2007). Despite these efforts, in 1998 it was estimated that more than 50.0% of the population in Ghana sought malaria care outside the formal sector and this was regardless the age group (Asenso-Okyere et al., 1998). In addition, evidence indicated that only 52.0% of the informal drug and chemical sellers in Ghana knew correctly how to treat malaria, and only 42.0% were selling full dosages (Baffoe-Wilmot, 2002). The risks associated to high reliance on the informal sector could range from the possibility of getting wrong diagnostics and prescriptions, to the possibility of getting ineffective drugs and incomplete dosages.

Henceforth, an updated assessment of care seeking behaviour for malaria in Ghana could provide a better understanding of the determinants for the reliance on the informal sector for malaria care.

In the context of this study, formal and informal sectors for healthcare are defined as follow:

- ***Formal sector for healthcare*** - refers to all the health facilities and providers, including hospitals, clinics, health centres doctors, nurses and pharmacies, registered with the various decentralised health regulating boards of the Ministry of Health (MoH), including the pharmaceutical and medical and dental council. These healthcare providers and facilities can function either on the public or the private sector.

- ***Informal sector for healthcare*** - is defined as all the health facilities and providers that dispense medicines and provide health care without the permission of any of the aforementioned MoH regulating boards. These typically include faith healers, drug peddlers, drugs sellers (in the markets), unregistered traditional healers, and lastly home or self-treatment.

Thus, considering the deficiencies associated with the informal sector, in this study the formal sector for healthcare is assumed to be the optimal choice to seek malaria care.

1.3 Justification for the study

In Ghana, malaria policies have shifted from eradication to control strategies. This shift of strategy opened doors for more research aimed at understanding any behavioural factor or condition associated with the malaria endemic.

So far, some studies have been conducted on malaria care seeking behaviour in Ghana (Biritwum et al., 2000; Agyepong and Kangeya-Kayonda, 2004; Dzator and Asafu-Adjaye, 2004; Tolhurst and Nyonator, 2006). These studies have provided some empirical evidence on the most preferable provider for the Ghanaian household members when sick with malaria. Additionally, these also provided indications on the socio-economic and demographic factors to consider when designing and implementing strategies to control malaria. However, as pointed out in the first paragraph of this section, Ghana is a country that has been pioneering several health reforms in order to restore and maintain the health system particularly the malaria control.

Thus, an investigation is needed to assess the impact of all these healthcare reforms on the current malaria care seeking behaviour in Ghana. As most previous studies were conducted long before some of these reforms were implemented, the available literature may not reflect accurately the country´s current malaria care seeking behaviour (See chapter on literature review for a deeper discussion of these studies).

It is also worth mentioning that most of these reforms can influence considerably an individual's malaria care seeking behaviour. For instance, evidences have shown that health insurance is a significant factor in the choice of healthcare providers (Yip et al., 1998; Visser and Booysen, 2004). Hence, it serves as an encouragement to utilise the available formal healthcare facilities. In addition health education on malaria can also significantly influence the individual malaria care seeking behaviour. Furthermore, in spite of the available literature on the topic, very few studies conducted in Ghana had enquired directly from households about the motives for the demand of malaria care in the informal sector. In addition, most of

these studies were undertaken in well-resourced regions, such as Greater Accra Region (Biritwum et al., 2000; Dzator and Asafu-Adjaye, 2004) and Volta Region (Dzator and Asafu-Adjaye, 2004; Tolhurst and Nyonator, 2006). However, no assessment of household's malaria care seeking behaviour had been previously conducted in one of the selected regions of the study, the Central Region. This region is regarded as one of the poorest in Ghana and has one of the lowest levels of health provision and consequently it has great public health problems. Therefore, it is expected that the use of this region and a sub-metropolitan township of Greater Accra Region in this study can provide a more realistic proxy of the malaria care seeking behaviour countrywide and particularly in poor settings of Ghana.

Hence, the results of this study can be of great help for policy-makers and planners in Ghana and other malaria endemic countries, whenever designing and implementing control and management strategies, especially if the focus is to increase the coverage of malaria care delivery in the formal sector. This study also provides an indication on whether to discourage the informal sector for healthcare or to encourage it by regulating and training its personnel in order to improve their clinical outcomes.

Finally, the comparison of the results from this study and the findings of previous studies conducted in Greater Accra Region will allow the assessment of the impact of various malaria interventions on the health seeking patterns overtime.

1.4 Study Objectives

The primary objective of this study is to investigate the determinants and extent of the reliance on the informal sector for malaria care in Ghana. The study particularly focuses in Ga Mashie Sub-metropolitan Township, located in the Accra metropolitan, Greater Accra Region, and Gomoa District, a more rural area located in the Central Region.

The secondary objective is to report on the issues of the supply side that may influence malaria care seeking patterns in the public healthcare sector. This is relevant when designing appropriate policies to control and manage malaria in the communities.

Therefore, the specific objectives are:

- To report household demand for malaria care in informal and formal sectors for healthcare;
- To determine and compare the impact of specific socio-economic and demographic variables on malaria care seeking patterns for households in an urban and rural area of Ghana;
- To enquire on household reported reasons for reliance on the informal sector for malaria care in Ghana;
- To gather district level quantitative and qualitative information through the mapping of the available healthcare facilities on supply side factors that might influence provider choice;
- To provide general and specific recommendations of strategies for future policies regarding malaria care management both in formal and informal sectors, particularly regarding whether to encourage or discourage the informal malaria care. For example through home-based management of malaria - this, in line with the findings of the quantitative and qualitative assessment of the demand and supply sides factors affecting care seeking patterns.

CHAPTER 2: LITERATURE REVIEW

In this chapter a review of the available literature on healthcare seeking behaviour is presented. The first issue to be addressed here is the theoretical aspects of healthcare seeking behaviour. Subsequently, an illustration of some of the numerous conceptual models on healthcare seeking behaviour is provided. Additionally, the chapter provides an overview of some of the existing empirical evidence on healthcare seeking behaviour in Ghana and in different countries in Africa and other continents. Finally, it outlines some empirical evidences of the methodological approached used in the study.

2.1 Theoretical aspects of healthcare seeking behaviour

Seeking behaviour refers to the actions that a person would take in order to accomplish or attain a desired objective. Hence, healthcare seeking behaviour could be defined as the specific action that an individual would take when faced with a physical or mental disease or injury. In other words, it involves an individual's decision on whether and where to look for care to alleviate his/her health condition.

However, the decision on whether to seek care or not is influenced by a vast range of factors (including access conditions). For instance, when a person decides to seek care in a certain place he/she has to take into consideration the various costs (direct, indirect and intangible costs) that it entails, and the availability and quality of services. Most of these factors are directly linked with access conditions. Thus, the decision on where to seek healthcare does not merely recline on an individual, but it also encompasses what the health system and the society as a whole offers. Hence, in the presence of enabling factors (for instance favourable access conditions) healthcare seeking behaviour could be translated into higher utilisation of healthcare facilities.

The Longman Business English Dictionary (2000) defines utilisation as the ability to use something effectively. In this study's context utilisation is defined as the ability to use the available healthcare facilities effectively. Access to healthcare on the other hand, might not

involve explicit actions (both physical and financial) that has a decisive impact on the decision to obtain healthcare (healthcare seeking behaviour) and to use effectively what is available (utilisation) .This is due to the fact that if an individual does not have good access conditions to the available healthcare facilities he or she has less chance to decide to seek medical care.

2.2 Conceptual Models of Healthcare Seeking Behaviour

Various conceptual models of healthcare seeking behaviour have been developed for different fields of study. These include models developed in social, medical sociology, anthropology and economics sciences. Many of them have been recognised as suitable tools to be used in Knowledge, Attitudes and Practices (KAP) studies and focused ethnographic studies (FES). KAP and FES studies are some of the most frequently used approaches in social studies of healthcare seeking behaviour, including public health. Hausmann-Muela et al. (2003) emphasised that in public health three models are more likely to be used. These include the Health Belief Model (a social psychology model), the Healthcare Utilisation Model (a medical sociology model) and the Decision-Making Model (a medical anthropology model). Apart from these models, other healthcare seeking behaviour models worth noting, are the one developed by Grossman, which focus on the demand for the commodity "good health" and the four A's model which focus on various possible barriers for adequate treatment. The following section provides a brief overview of the five models.

- *The Health Belief Model (HBM)*

According to Hausmann-Muela et al. (2003) the Health Belief Model (HBM) is probably one of the oldest and best known models in public health. It was developed in 1950s and later modified by Janz and Becker in 1984. The model's main purpose was to provide a useful conceptual framework to assist on the explanation of the household's choice of healthcare providers. This model takes into account the households reactions to symptoms of a specific illness, behavioural elements such as risk exposure to certain activities, perception, knowledge about the health consequences and the feedback by the households' members concerning the types of services needed. In 1995, Sheeran and Abrahan developed a new version of the model. In this version, the actions in the HBM were guided by threat

perception, which depends on: perceived susceptibility and perceived severity of illness and its consequences. Additionally, the action would also be guided by the motivation about one's health, beliefs about the consequences of health practices and the possibilities and effort to put them into practice. The latter depends on the perceived benefits of preventive health practices and perceived barriers such as the material and psychological barriers. HBM also emphasises that healthcare seeking behaviour is influenced by various internal and external factors (cues to action). These include media influence, family and friends influence, symptoms and intensity of the illness. This ground breaking model has been used to guide several health promotion campaigns like campaigns for tuberculosis, AIDS and malaria (specifically mosquitoes-net campaigns). However, evidence has shown that the model fails to consider some crucial behavioural factors such as previous experiences, perceived behavioural control[2] and behavioural intention[3] (Hausmann-Muela et al., 2003). Nevertheless, HBM can still be regarded as a great constituent of the vast literature on healthcare seeking behaviour.

- *The Healthcare Utilisation Model*

The Healthcare Utilisation Model also known as socio-behavioural or Andersen model was developed by Andersen and Neuman in 1975. It was developed primarily to investigate the use of biomedical health services. The model groups in logic sequence three clusters of factors constituted by *predisposing, enabling and need factors,* which predict healthcare seeking behaviour.

In the year 1983 the Andersen's model was further developed by Kroeger (1983). He proposed that a perceived morbidity could affect various interrelated independent variables and the interaction of these variables guide the choice of the dependent variable, healthcare resources in this case. Nevertheless, based on the aforementioned argument the direction of effects from perceived morbidity towards the various independent variables is difficult to conceive, as in most cases the perceived morbidity is affected by various independent variables. These variables include an individual's traits such as age, gender, marital status, status in the household, household size, ethnic group, degree of cultural adaptation, formal

[2] Perceived behavioural control is the people's perceptions of their ability to perform a given behaviour (Trafimow et al., 2002)
[3] Behaviour intention is the attitude towards a specific behaviour.

education, occupation, possessions (including assets and income) and social network interactions. Furthermore, it also included characteristics of the disorder, their perception and service characteristics like accessibility, attitudes towards traditional and modern healers, acceptability, quality, communication and costs.

Another variant of the Andersen's model was undertaken by Weller and colleagues (1997). In this variant other healthcare sectors were incorporated into the model, namely traditional medicine and domestic treatment. In the Weller and colleagues' application of the Andersen's model, the factors were organised as follows:

- *Predisposing factors* included both socio-economic and demographic factors, such as age, gender, formal education level, religion, global health assessment, previous experiences with illness, general attitudes towards health services and knowledge about the illness;

- *Enabling factors* included conditions that facilitated household's utilisation of the available services such as distance to the health provider, household's time availability, dependency rate, and availability of services, social network support and household's disposable income;

- *Need factors* reflected the illness severity, mental well-being, new illness conditions, which included total number of days in bed, days missed from school or work (indirect costs) and outside help for care.

Additionally, the model also took into account the treatment actions undertaken by individuals, including home remedies (herbal and pharmaceutical remedies), pharmacy, over-the-counter (OVC) drugs from shops, injections, traditional healers, private and public health facilities.

Divergent to other healthcare seeking behaviour models such as HBM, the Andersen's model places great emphasis on behavioural factors. Thus, this serves as a great advantage for the model, particularly when considering behavioural studies such as the one under consideration.

According to the review of Hausmann-Muela and colleagues (2003), the Healthcare Utilisation Model has been put into practice in various African countries, thus, making it relevant to this study context. Furthermore, this model addresses a vast variety of issues most of which are important predictors of healthcare seeking behaviour in the latter countries. These issues include perception, beliefs, education and income among others. Households in low income countries, particularly in the African countries, often have many beliefs due to the vast variety of cultures, low formal education, and low income among others. Therefore, by using the Andersen's model a picture of the factors to consider when dealing with healthcare seeking behaviour can be drawn.

- *Ethnographic Decision-making Model*

The *Ethnographic decision-making mode* was developed in the medical anthropology field of study with the main aim of predicting healthcare seeking behaviour by applying several steps. According to Hausmann-Muela et al. (2003) in the first step various key factors are enquired from the community. In the second step the researcher combines the different key factors pointed out by the community and in the third step the investigator creates various hypothetical scenarios. These hypothetical scenarios are then presented to the interviewees and their answers are expressed in percentages. Lastly, a series of rules are elaborated to predict healthcare seeking behaviour and subsequently, the model predictability is tested by comparing the results of the assessment with the actual cases.

Evidences from studies conducted using the decision-making model, like for example Young (1981); Garro (1998) and Weller et al. (1997) showed that the most relevant key criteria for treatment choice mentioned by communities are:

1. Severity of illness;
2. Appropriateness and knowledge of home remedy for the illness;
3. Faith in the effectiveness of home remedy for a given illness;
4. Treatment costs and financial resources availability;
5. Prior experiences with an illness.

The decision-making model has been found to be very advantageous due to the series of rules elaborated which allow a logical inference about the therapeutic choice (Hausmann-Muela et

al., 2003). However, the model provides less accurate data for predicting behavioural factors compared to the Andersen's model (Hausmann-Muela et al., 2003).

- *Grossman model*

The model developed by Michael Grossman (1972) aimed at studying individuals' demand for the commodity *good health*. In this model, Grossman proposed that health was determined by many factors among which medical care was only one. These factors which are mainly derived from investments in human capital include: social class, work environment, employment status, income, housing conditions, heating, education, diet and lifestyle. Furthermore, he pointed out that the relative importance of the inequalities in these types of resources could not be determined unless there was an understanding of the links between resources, behaviour and health. Essentially, this means that whenever individuals demand healthcare there is a trade-off between consumption of healthcare and the consumption of other goods. In other words, there is an *opportunity cost* when consuming healthcare. In 1999 Michael Grossman proposed a new model, aimed at distinguishing the demand for health and the demand for healthcare. He asserted that individuals invest in health production through the use of medical care and their own time until the additional cost of health production equalled the additional benefits of improved health status. Accordingly, health status was assumed to affect utility directly by the value that an individual place on *good health* per se and indirectly through increasing healthy time and labour income.

Like in the first model the demand for health increases with income, since as income increases the value of the labour time also increases. The model also predicts that education increases the demand for health, for the simple fact that the more educated the person is, the more productive the health inputs will be. Any factor that depreciate the commodity health like for example age and cost of health among other factors, will decrease the demand for health, as the additional benefits of investments into health will decrease. In brief, this model puts great emphasis on the price of the healthcare as the price will directly decrease the demand for health, since the investments on health becomes more costly.

- *The four A's model*

The four A's model is not as popular as the previous models, but it has been increasingly used by medical geographers, anthropologists and epidemiologists (Good, 1987). The model focus is on grouping different key factors for healthcare seeking behaviour, which make-up the four A's (Hausmann-Muela et al., 2003). These include:

- *Availability:* it looks at the geographic distribution of health facilities and the availability of all the necessary components for it to function effectively and efficiently. These components include staff and drug availability, among other components;

- *Accessibility:* includes various enabling factors that facilitate the access to healthcare, such as the access to finance to pay for any expense (medical expenses) when needed, access to transport and roads.

- *Affordability:* looks at the various costs (direct, indirect and opportunity costs) involved in the process of seeking healthcare. For instance, it looks at the time waited by the patient to receive healthcare (indirect cost) or at the consultation cost (direct cost).

- *Acceptability*: it looks primarily at the characteristics of the healthcare providers, which includes the behaviour of the healthcare providers, gender aspects, which also influences significantly the decision to choose one provider instead of another. For instance, some women refuse to be treated by providers of the opposite sex.

The main advantage of this model is that it places a focus on the possible barrier to adequate treatment. Evidence from studies that used this approach emphasised that the distance (geographical and social distance) and the economic factors are the key predictors for accessing treatment (Good, 1987).

The four A's model and all the aforementioned models just emphasize the multifaceted nature of healthcare seeking behaviour. All these models enrich the vast literature on healthcare seeking behaviour by providing a clear picture of the numerous predictors of an

individual's seeking behaviour. Thus, this facilitates a deep understanding of care seeking behaviour and subsequently the utilisation patterns.

In this study, the model developed by Andersen and Neuman (1975) and later modified by Kroeger (1983) was selected to illustrate the predictor's of malaria care seeking behaviour in Ghana. The Andersen model encompasses a vast variety of dependent variables that are pertinent to this study context. Besides, it has also been used in diverse studies in countries with similar socio-demographic, socio-economic and epidemiological context.

2.3 Empirical Evidences

2.3.1 Overview of International experiences

Healthcare seeking behaviour is a topic of great public health relevance and thus, has been analysed from various perspectives. In most of the studies conducted (Develay et al., 1996; Yip et al., 1998; Bós and Bós, 2004; Mugisha et al., 2004), the focus has been either to conceptualise healthcare seeking behaviour and utilisation or, when based on empirical research, to predict the factors that influence household's choice to seek or not to seek treatment and where to seek the treatment.

Bós and Bós (2004) assessed elders' healthcare seeking behaviour between private and public healthcare providers in Brazil. The study considered variables such as socio-economic, demographic and epidemiological conditions to assess the impact of elders' gender, age, educational level, individual income and health assessment when choosing private or public healthcare providers. Using logistic regression the results indicated that income, age, being female, having some education and small dependency rate were positively associated with the choice to seek care in private healthcare providers. The study presented relevant evidence for policy-makers. However, the fact that it was directed to a specific age group exposed the study to limitations for generalisation to other age groups.

Develay et al. (1996) and Yip et al. (1998) on the other hand approached the topic in a different manner. They took a geographic approach and compared different healthcare

options within that specific geographic area. Develay et al. (1996) assessed healthcare seeking behaviour from the urban side in Burkina Faso, whereas Yip et al. (1998) assessed it in the rural areas in China. The variables considered in the China study to determine the demand for healthcare were insurance status, income and disease patterns, concluding that all of them had significant impact on patient's choice of provider. In the Burkina Faso study, age, socio-economic level, illness characteristics and both direct and indirect costs of care were considered. In order to collect the desired information both studies conducted household surveys, and the main target for interviews were the heads of the household. Both studies agreed that socio-economic factors such as level of income and disease severity were positively associated with demand for care in the formal sector for healthcare. The China study also revealed that health insurance membership leads to high demand for high level hospital care.

Similarly to Develay et al. (1996) and Yip et al. (1998), Mugisha and colleagues (2004) took a geographic approach to explore the predictors of the choice of different healthcare providers. Their (Mugisha et al., 2004) study was conducted in a rural community of Burkina Faso and it was aimed to understand the two faces of enhancing healthcare seeking behaviour and subsequently utilisation of healthcare service. The study was also aimed to explore the key factors that determine whether a patient will continue to use the chosen healthcare provider. Mugisha et al. (2004) claimed that the utilisation of healthcare services had two faces. The first face would be the increasing initiation of patients to appropriate treatment and the second face would be ensuring their subsequent retention. Initiation refers to the choice of seeking treatment for the first time at a given healthcare provider. Therefore, one can assume that within the initiation process two actions are taken by the patient seeking care: firstly, he/she has to decide whether to seek care and secondly to select where to seek care. Retention, on the other hand, refers to the follow-up visit to the same healthcare provider in order to complete the treatment for that same episode illness.

The data used in the study was collected through a round of household surveys and the information was obtained from 800 households using a two stage sampling technique. A Multinomial Logit Model (MNLM) was used to explore the key predictors of patient's initiation to systems of modern, traditional and home treatment. In addition, to explore the predictors of patient's retention within the chosen healthcare provider a binary logit model was used. Mugisha et al. (2004) found that the factors influencing initiation and retention are

different. For instance household's income, education, urban residence and expected competency of the healthcare providers positively affect initiation to systems of modern treatment, yet these have no impact in the patient's retention. According to them, retention to systems of modern treatment is only determined by the perceived quality of healthcare provider.

These studies, like the one conducted in Brazil, show only partially the factors that determine care seeking behaviour. This is due to the focus on the demand side conditions only (e.g: impact of medical coverage on healthcare seeking behaviour) in a specific area, either rural or urban. These do not report on the supply side conditions (such as availability of healthcare facilities, quality of service provided, fees policies, among others), thus a better interpretation of care seeking in a broader context cannot be done.

Besides the available literature on households seeking behaviour in general, there are several authors that have approached the topic looking at specific conditions such as a specific disease. In South Africa a study was conducted to determine the care seeking behaviour of individuals infected with HIV/AIDS (Visser and Booysen, 2004). Like other studies, the main data collection instrument used were household surveys, while a logistic regression model was employed to find the association between the different determinants and choice of healthcare facility. The results of this study showed some consistency with the results of the studies conducted in Brazil, China and Burkina Faso (rural and urban communities). The consistency was identified on the income variable, which proved to be a significant predictor of healthcare seeking behaviour. It revealed that individuals from the lowest income quintile (measured by income) on average are less likely to switch to private healthcare than those in the highest income quintile.

Another disease specific study on households' seeking behaviour is the one conducted in Tanzania by Matovu et al. (undated). The study aimed at determining the factors that influence households' choice of malaria care providers; household surveys were conducted. The study key findings indicated that proximity to a healthcare provider; availability of anti-malarial drugs and availability of blood test in the facility, inexpensive drugs or services and, qualification of staff were the key factors influencing choice of malaria care provider. It also revealed that the cost of treatment was less and less important with severity of malaria, while

the importance of quality of care and good personal experience with a facility became more significant with the severity of illness. With respect to the proximity to a healthcare provider, its significance reduced slightly with the severity of the malaria episode, reflecting the tendency for households to by-pass lower-level facilities in search of better quality of care at higher-level distant facilities.

Accordingly, Amin and colleagues (2003) have gone deeper in the assessment of households' malaria care seeking behaviour and decided to look at the demand of malaria care in the formal and informal sector for healthcare in Kenya. Unlike the study by Matovu et al. (undated), Amin and colleagues (2003) took children as the main unit of analysis and analysed the source of treatments for fever, otherwise called malaria in the study. Variables such as the costs associated with malaria, timing and the types of treatment for fever were considered. The data was collected using a semi-structured questionnaire in four districts in Kenya. The study findings revealed that a substantial number of fevers remained untreated across all districts. In addition, the informal retail sector had no transport costs associated and charged less for drugs than all the other sectors, thus favouring informal care.

2.3.2 Overview of Ghana Experiences

Some research on malaria healthcare seeking behaviour has already been conducted in Ghana. Studies have been conducted in Greater Accra and Volta Regions. For instance, Dzator and Asafu-Adjaye (2004) analysed malaria care seeking behaviour by taking both a disease specific and geographic approach. The study was conducted in two districts in Ghana. One district is located in the Greater Accra Region while the other is in the Volta Region. The study main goal was to examine the factors that affected household's choice of malaria treatment options in Ghana. The treatment options considered were choice of a public malaria care provider, a private malaria care provider, purchase of drugs from drug store, or self-medication. Household surveys through face to face interviews were conducted from the period of July to November 1997. In order to collect the desired information a sample size of 228 households was estimated. However, the analysis was finally performed only on 182 households. To assess the association between the various variables, a multinomial logit model was used. The results of this study indicated that treatment cost and

time had a significant negative effect on the choice of malaria care provider relative to self-treatment. Households were more likely to utilise the services provided by less expensive providers than those relatively expensive. In addition, households were also more likely to avoid the use of providers that required long distance travelling and long queues. Education and household size played a significant role in malaria care seeking behaviour. More educated households were more likely to seek healthcare at a private healthcare facility compared to self-treatment. Moreover, households with children were more likely to select private providers over self-care, but more likely to select self-treatment over public care. Lastly, the study showed that the demand for malaria care was inelastic with respect to costs, and that the magnitude of the elasticity[4] suggested that malaria care was a necessity.

However, it is difficult to ascertain to what extent these results represent the general care seeking behaviour in Ghana given the study site selection, the relatively small sample size and the old data used (from 1997). As indicated in the Introduction, since the year 2000 Ghana has implemented several health reforms and specific initiatives aimed to improve malaria control. These included increasing the number of people, particularly children and pregnant women, with access to ITN's, the change in the first line anti-malarial drug from mono-therapies to combination therapies and the introduction of universal coverage through social health insurance. All the aforementioned factors can influence substantially on an individual's decision to healthcare.

Another study undertaken in Ghana on households' seeking behaviour was reported by Biritwum et al. (2000). The study looked at healthcare seeking behaviour with a focus on childhood malaria management. The researcher looked at two Ghanaian communities of different socioeconomic levels and assessed their patterns of malaria care seeking behaviour between the formal and informal healthcare facilities. Both communities were located in the Greater Accra Region. To obtain the information on the predictors of households' seeking behaviour, each study community was divided into three sections and 20 households. Each household with at least one child under the age of 5 years was selected. Households were interviewed three times between May 1998 and January 1999 in order to obtain malaria

[4] **Demand elasticity:** is the most commonly used measure of the responsiveness of the quantity demanded to changes in any of the variables that influence the demand function (eg. the price of any commodity). In other words, it can be defined as the ratio of the percentage change in one quantity to the change in another, ceteris paribus (Kumar and Mittal, 2002:64).

related information about the youngest child in the household. This follow-up process was done to identify any malaria history in the children.

The results of this study were consistent with the other studies in stating that socio-economic variables play a crucial role on the demand for malaria care. Education was positively associated with the demand for malaria care in formal healthcare facilities. Caregivers in low-income settings were more likely to use left-over or purchase drugs without prescription. Children in the poor communities were less likely to have been taken to a clinic or hospital to be treated for malaria than children in the better-off communities. However, the relatively small sample size as well as the site selected for this study (Greater Accra districts) could undermine external validity.

Tolhurst and Nyonator (2006) focused on the influence of gender in malaria treatment seeking behaviour for children. The study was conducted in three districts of the Volta Region and used mainly qualitative data collection instruments. These included: focus group discussions, in-depth individual interviews and ranking exercises. The key findings were that women who lacked either short or long-term economic support from male relatives, or disagreed with their husbands or family elders about the appropriate treatment-seeking behaviour, faced difficulties in accessing healthcare for children with malaria. Disagreements between women and their husbands or family elders could be due to religious differences or difference in the interpretations of the illness. For instance a woman who participated in the study stated that: ‘‘*At times husbands and in-laws refuse to allow a mother to take a child with convulsion to a hospital because they believe either the child has been bewitched or spell has been cast on the child"* (p. 324). The majority of respondents in all three communities stated that herbal or traditional treatment and drugs such as paracetamol, chloroquine and antibiotics bought from local sellers were the first step taken when sick with malaria. They also agreed that when children had convulsions, the first action taken was to take the children to the ‘elders’[5] for traditional treatment. A wide range of traditional treatments for convulsions were described, including scarification[6], inducing vomiting, shaking the child and traditional religious rituals.

[5] Tolhurst and Nyonator defined ‘Elders’ as older women or men who have some special knowledge of herbal and traditional treatment.
[6] Scarification refers to a ritual used during some traditional treatments where the patient is scratched or cut slightly all over his/her body.

2.4 Theoretical Considerations for Data Analysis

Multinomial logit response model (MNLM)

The MNLM is an advanced form of multiple regression that deals with multiple categorical dependent variables. It is so regarded because unlikely the binary response models (also known as dichotomous models), the MNLM has the capacity to analyse more than two dependent variables simultaneously. Both binary and MNLM models deal with qualitative and quantitative independent variables. In the same way, both models aim to find the likelihood of something occurring. As consequence, MNLM is deemed as an extension of the binary response model (Gujarati, 1995).

MNLM is frequently applied when the subject involves nominal outcomes, especially those with non-ordered multiple responses. The model is suitable for estimating the probability or odds of any of the dependent variables (in this case the choice of malaria care provider), given the values of a set of independent variables. Basically, it permits the effect of the independent variables to differ for each of the alternative outcomes under study and subsequently the features of the outcomes serve as a predictor for the desired choice. Hence, the regression model can be described as a simultaneous estimation of the binary logit model for all possible comparisons among the outcome categories (Gujarati, 2003). One of the key features of the MNLM is that it uses the maximum likelihood estimation (MLE) model. In this case, the MLE model facilitates the establishment of the probability that an individual will seek care in a given healthcare provider if he/she falls ill with malaria or any other disease.

Despite the enriched nature of the MNLM and its great utility in the research world, it also entails some limitations. Multiple response models or polychotomous models are complex and time-intensive as they analyse multiple dependent and independent variables simultaneously.

Estimation of the MNLM

Given that the MNLM involves polychomotous regressand or dependent variables this cannot merely be presented by a linear regression of the kind:

$$Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 \ldots\ldots\ldots\ldots\ldots\ldots + \beta_n X_n + u$$

Linear regression demonstrates the linear relationship between the dependent variable (Y) and the independent variables (X_i). In MNLM the various regressand are not a linear function of the different explanatory variables as it occurs with regression models with quantitative regressand and with the linear probability models (Gujarati, 2003). MNLM is a probability model and as such it is concerned to find the probability of something happening owing to a discrete change in the explanatory variables.

Despite the vast range of literature on MNLM, Gujarati (1995) and Gujarati (2003) textbooks have been used as guideline to build this study model. Gujarati's textbooks were selected due to the academic approach (which provides a clear presentation and explanation of the regression models) and the familiarity of the investigator with his work. Gujarati suggests that the MNLM should be represented as follows:

$$Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 \ldots\ldots\ldots\ldots + \beta_n X_n + u \qquad \textbf{A}$$

Equation A depicts a normal multiple regression equation which shows a linear relationship, where **Y** is the dependent variable and **X** is the independent variable. Since MNLM is a non-linear model it is written as:

$$P_i = E(Y = 1 | X_i) = \frac{1}{1 + e^{-(\alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots + \beta_n X_n u)}} \qquad \textbf{B}$$

Equation B represents the non-linear relationship between the dependent variable ***Y*** *(Y=1* represents success) and the independent variables (**X**). The β coefficient measures the influence of the independent variables on the dependent variables. In this study context

(using the MNLM) it measures the change in the log of odds ratio for a unit change in the independent variable. The coefficient α represents the constant. The term *e* in the equation is the base of natural logarithm. To simplify things, lets us substitute - $(\alpha + \beta_1 X_1 + \beta_2 X_2 ..... + \beta_n X_n + u)$ by $-Z_i$. Hence:

$$P_i = E(Y = 1 | X_i) = \frac{1}{1+e^{-Z_i}} = \frac{e^Z}{1+e^Z} \qquad \textbf{C}$$

Equation C represents the **logistic distribution function.** According to this equation, Z_i ranges from negative infinite to positive infinite, P_i ranges between 0 and 1 while *e* is the base of natural logarithm. P_i is non-linearly related to Z_i (X or the explanatory variable). Despite this, the equation C also illustrates that P_i is non-linear to the coefficients (β). This implies that the frequently used Ordinary Least Square[7] (OLS) procedure cannot be used. However, to solve the problem of non-linearity and hence the inability to use OLS, it is suggested that the model should be linearized (Gujarati, 2003) and it is expressed as:

$$1 - P_i = \frac{1}{1+e^{Z_i}} \qquad \textbf{D}$$

In equation C, P_i shows the probability of a success, then in equation D, $1 - P_i$ illustrates the probability of a failure. In the context of this study the probability of a success implies that an individual chose to seek malaria care in the formal care provider, while probability of a failure means that the individual seeks care in the informal malaria care provider. A more detailed explanation of the dependent variables is provided later in the next chapter. Hence, Gujarati proposes that the above equation can be re-written as:

$$\frac{P_i}{1-P_i} = \frac{1+e^{Z_i}}{1-e^{-Z_i}} = e^{z_i} \qquad \textbf{E}$$

[7] OLS refers to the standard linear regression procedure used to estimate the regression function coefficients (α and β).

Now $\frac{P_i}{1-P_i}$ represents the **odds ratio** in favour of a success (Y=1). The Odds ratio refers to the ratio of the probability of a success to the probability of a failure. The natural log allows the relationship of the dependent variables to be linear not only with the independent variable X, but also linear with the coefficients. If the natural log of the equation E is taken, one can obtain the **Logit model**. Hence it is illustrated as:

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i = \alpha + \beta_1 X_2 + \beta_2 X_2 ..... + \beta_n X_n + u \qquad \mathbf{F}$$

So far different statistical models were introduced ranging from the simple statistical models to the more complex ones (MNLM).

2.5 Chapter Summary

The literature reviewed clearly provides an indication of the various aspects linked to the term healthcare seeking behaviour, including the different theoretical models, the different studies conducted on the topic, as well as the gaps not addressed by previous studies. As depicted above, different studies can take difference perspectives, different units of analysis, sample sizes, data collection instruments and data analysis tools. In most healthcare seeking behaviour studies, individuals or groups such as households and children were the main units of analysis. The sample size also varied significantly from study to study, this might be due to the fact that it is a very sensitive and subjective research component. It is sensitive in the sense that it determines whether the results are reliable and valid or not. Subjective because it depends on diverse factors (including time and resources constraints such as budget and staff availability and statistical issues) some of which lie outside the study design.

Household surveys were the main data collection mechanism in most of the studies cited previously (Develay et al., 1996; Yip et al., 1998; Visser and Booysen, 2004; Matovu et al., undated; Dzator and Asafu-Adjaye, 2004). Household surveys, also known as family surveys, are regarded as a generic term for a broad category of surveys (United Nations, 2005) and are often employed in cross-sectional study designs. Accordingly, these have become a dominant form of data collection supplementing and sometimes even replacing other data collection programmes and civil registration system (United Nations, 2005).

In the studies reviewed data analysis was also approached in different ways; some used more descriptive statistics, see for example Matovu et al. (undated), while others used more inferential statistics, particularly logistic regression model (example: Develay et al., 1996; Bós and Bós, 2004; Visser and Booysen, 2004) or multinomial regression model (MNLM) (Yip et al., 1998; Dzator and Asafu-Adjaye, 2004). All the mentioned models and studies have enriched considerably the vast literature on healthcare seeking behaviour by providing a picture of the various elements affecting the individual seeking behaviour patterns. This facilitates an understanding of the subsequent utilisation patterns. In addition, the literature reviewed highlights the need to better understand the motive for the high reliance on the informal sector for malaria care. Moreover, it is relevant to explore where Ghana stands after the introduction and implementation of the various health reforms mentioned in the Chapter 1.

CHAPTER 3: METHODOLOGY

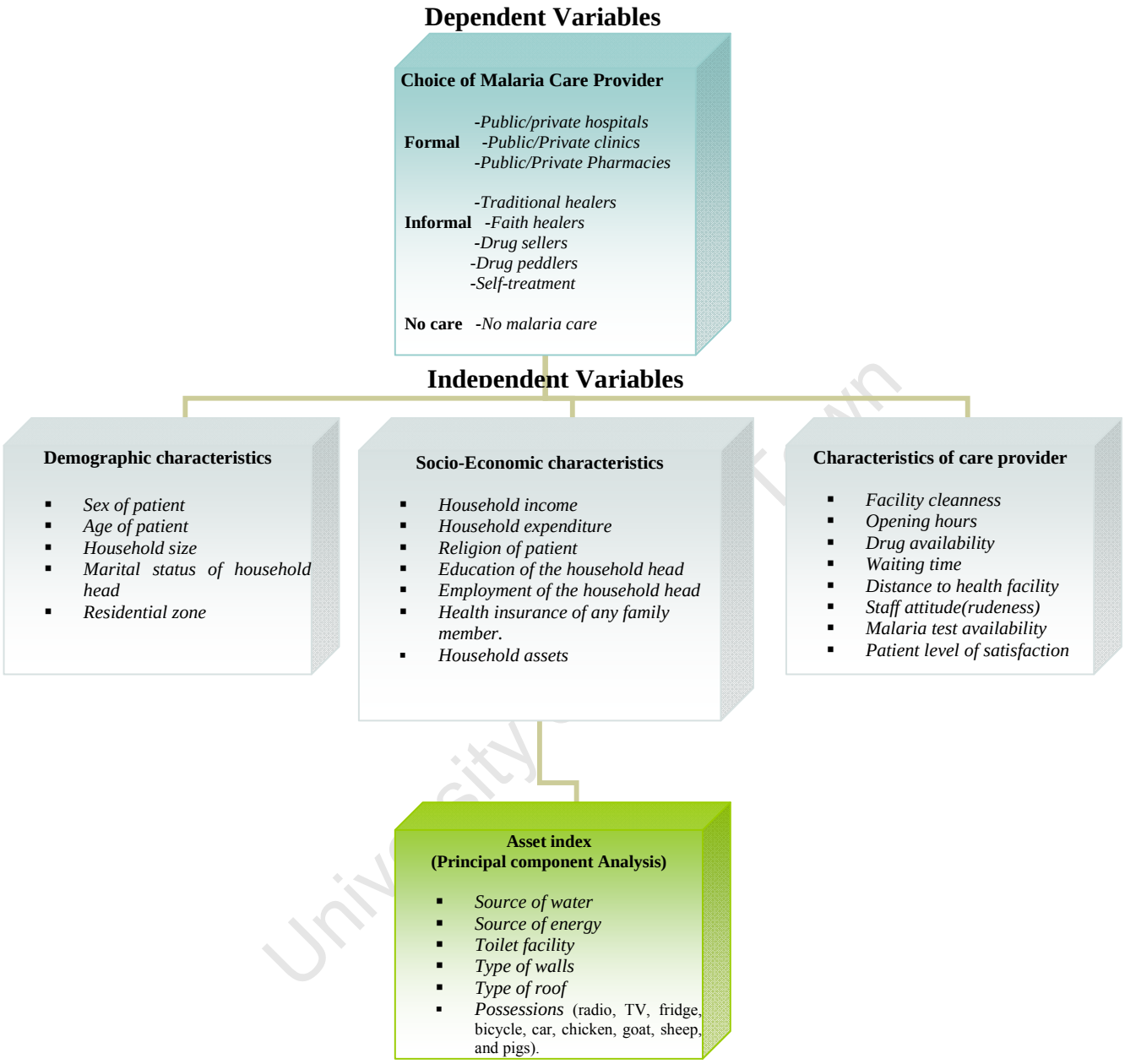
In Chapter 2 a detailed review of some of the components of the extensive literature the healthcare seeking behaviour and the methodological aspects of the regression model were provided. The current chapter aims to conceptualise the term healthcare seeking behaviour and its components in the context of this study and to present the methodological procedures undertaken to collect all the information required to achieve the study final goal. The chapter starts with an outline of the conceptual framework of malaria care seeking behaviour, followed by a description of the selected study sites. Then the chapter provides information on the approach used for data collection. The study unit of analysis were the households. This chapter gives information on the sample size and how the units of analysis were sampled. It also provides an overview on the study regression model, the criteria used for the selection of both the dependent and independent variables and explains the data analysis process, starting from the data entry to the final analysis. The last section of this chapter discusses the possible limitations to the study validity.

3.1 The Conceptual Framework

As depicted in the literature review, healthcare seeking behaviour is a very complex and rich concept. It is not an issue dealt with by those demanding healthcare alone, but it requires an interaction with those who supply it. Therefore, the capacity to seek healthcare to improve the stock of health and the ability of the provider to provide the desired quantity and quality are both costly (in terms of money) and resource intensive.

Figure 3.1 illustrates the conceptual framework proposed by Andersen and Neuman and later modified by Kroeger. It portrays both the dependent and independent variables, which were postulated from the original model and from a similar study conducted in Ghana on the choice of malaria care provider (Dzator and Asafu-Adjaye, 2004).

Figure 3.1 Conceptual Framework



Source: Framework adapted from the Kroeger model (1983).

The main variation of this study conceptual framework compared to Kroeger's framework is primarily with respect to the characteristics of the malaria care provider. Kroeger was mainly concerned with the prediction of the factors influencing healthcare seeking behaviour by looking at those demanding healthcare alone. However, since this study is interested in both demand and supply factor affecting household healthcare seeking behaviour, variables such

as facility cleanness, opening hours, drug availability, waiting time among others, were also captured in. Another variation is with respect to the socio-economic characteristics of the households. For instance, in the Kroeger's framework, income, represented by the variable financial resources to purchase health services (enabling factor) was included. Similar to Kroeger (1983), Dzator and Asafu-Adjaye, (2004) also used income as a possible direct enabling factor for the choice of malaria care provider. In this study, despite the fact that income is also captured to explain the choice of malaria care providers, an asset index was also included in the model as a proxy of the household's wealth.

The explanatory variables comprise demographic characteristics of the household members, such as age and gender of the patient, household size (hh_size), marital status of the household head (HH) and residential zone. In addition, they also include the socio-economic characteristics of the households. These consist of household monthly income (including their additional sources of income), their monthly expenditure, education and employment of the HH, religion, health insurance coverage (of any household member) and the family's assets (or wealth). The latter is captured through an asset index constructed using different households' possessions and dwelling characteristics, including: possessions of livestock, electrical appliances, own transport and type of wall, roof, toilet facility and sources of water and energy.

Finally, the framework also contains variables that reflect the characteristics of the care providers, namely: health facility cleanness, opening hours, drugs availability, waiting time, distance to facility, staff rudeness and the patient level of satisfaction with the service.

The dependent variable considered in the framework is the choice of malaria care provider. The various alternatives were collapsed into a polychotomous variable containing three outcomes, namely: formal malaria care, informal malaria care and no care. A more detailed explanation of the combination of these variables is provided in the next chapter.

All the variables illustrated in the framework, were considered in the construction of the data collection tool. Moreover, this framework served as an indicator that assisted on the selection of the data analysis model. Since the study dependent variable comprises three responses, a multiple response model was used to analyse the relationship between the study dependent

and independent variables. Additional information on the regression model used in the study analysis process is provided in the next section.

3. 2 Study Design

The study design comprises an observational study, particularly a cross-sectional study[8]. The choice of this design, also called prevalence study, seeks to find the possible predictors for the choice of malaria care provider, within a specific place and during a given point in time. This option was also less resource intensive in terms of time and finance. Mann (2003) asserted that the most important advantage of cross-sectional studies is that in general they are quick and cheap as they do not require follow up. Therefore, fewer resources are required to run the study. This makes this design even more optimal in the context of conducting an investigation for the fulfilment of a master thesis where time and resource constraints are always an issue.

Cross-sectional studies also have some weaknesses and it is imperative to mention them. One of the main weaknesses of this design is the problem of temporality as it fails to accurately state whether the exposure preceded the cause or vice-versa. In other words, it cannot differentiate the cause and effect of simple association (Mann, 2003). Nevertheless, given that this study attempts to understand causality from the qualitative (health systems quality of care) research, this weakness will not affect the study outcomes. Cross-sectional study designs are also often associated with the problem of recall bias as explained ahead in Section 3.11.

Household surveys, also known as family surveys (United Nations, 2005), were conducted to obtain the information on the following combined explanatory variables:

1. Socio-demographic characteristics;
2. Socio-economic characteristics;
3. Malaria care seeking patterns (based on the last malaria event, if occurred within 6 months prior the survey);
4. Service quality perceptions.

[8] Cross-sectional study designs are aimed to investigate or collect information at a specific place and point in time.

To address the second goal of the study (i.e. to evaluate supply side access characteristics), qualitative research was conducted; this consisted on interviews with regional and district levels authorities and stakeholders. This was done with the primary objective of gathering information on the characteristics of the healthcare suppliers in the two study sites. The focus was to map the distribution of healthcare facilities (formal and informal) with special attention to the characteristics of the specific services provided.

3.3 The Survey Sites

The study sites are two Ghanaian communities of relatively similar socio-economic levels, although one is urban and the other is rural. The first community is Ga Mashie (also known as Ga Mantse by the natives) and is situated in the capital city of Ghana (the Greater Accra Region). Ga Mashie is located within Ashiedu Keteke Sub-Metropolitan Area, which represents one of the six sub-metropolitan areas of the Accra Metropolitan Area (AMA).

The second community is a rural district, located in the Central Region of the country, namely Gomoa District. While the Central region is regarded as one of the poorest regions in the country, Accra as the capital of the country is one of the better resourced regions (Heyen-Perschon, 2005). The Greater Accra Region is located in the south-central part of the country while the Central Region is approximately 350 kilometres west of Accra. Thus, the selection of these two districts was purposively done to capture the various aspects that are likely to affect malaria care seeking behaviour. For example, it was expected that there would be a considerable disparity of healthcare facilities between the two communities. High prevalence rate of malaria is observed in both communities. It was also expected to capture the heterogeneity in the composition of the households in the two study sites in terms of the size, the educational levels of the households' members, the type of occupation and the coverage by health insurance, among others. Thus, prior to the study it was assumed that despite the similarity in the socio-economic levels of the two communities, households in Ga Mashie would have better opportunities to seek care for malaria and to find employment, than the counterparts in Gomoa. Finally both regions are relevant for policy-making since very few studies have included the Central Region of Ghana.

3.3.1. Ga Mashie Area

Ashiedu Keteke Sub-Metropolitan Area, (where Ga Mashie community is located) is regarded as the oldest part of the country's capital city, Greater Accra. The Ashiedu Keteke sub-metropolitan accommodates approximately 88,717 inhabitants, where 41,766 are male and 46,951 are female (GSS, 2005). Its population constitutes approximately 3.1% of the total Accra Metropolitan Area population of about 1,658,937 inhabitants. The Ashiedu Keteke Sub-Metropolitan Area is composed by a diverse range of traditional settlements and encompasses a vast variety of ethnic groups, involving those originated in Ghana and other with foreign origins, mainly from the neighbour countries like Liberia, Togo and Ivory Coast.

The Ga Mashie community has one of the highest population densities in the capital, with an average of 6 to 20 people living within one compound (Ardayfio, undated). Although regarded as an urban settlement, Ga Mashie has most features of a rural settlement. It is predominantly inhabited by the low socio-economic classes of the region; yet, it falls under the Accra central business district. The Accra central business district covers an extensive area which comprises government administrative blocks, markets, residences and commercial centres. The main occupations of its inhabitants are fishing (performed mainly by men) and trading (performed mainly by women). The sanitary and hygienic conditions of the area are precarious, which makes the population prone to many diseases, including malaria.

The epidemiological profile of the area is quite similar to other parts of the country. Malaria is still one of the primary causes of death, victimising primarily children and women. According to the records of the Princess Marie Louise (PML) Children's Hospital which is located in the Ga Mashie, in 2006 the total number of malaria cases was 29,720 (including both inpatient and outpatient), amongst which 20,920 cases (70.4%) were in under 5 years children (inpatient and outpatient).

In Ga Mashie the age structure of the population is a youthful one, which can be noted from the large number of inhabitants below the age of 15 years old (44.0%) in the area (GSS, 2005). The population is characterised by extremely high fertility rates. Education is also deficient amongst the Ga Mashie inhabitants. Most of the people are semi-literate that have

dropped out of the school or are illiterate. Alcoholism and drug consumption is another serious problem affecting the Ga Mashie community.

Due to the old structure of the area the access to clean water and to toilets is scarce. Thus, the inhabitants of Ga Mashie have to rely on purchased water and to pay to use public toilets. The Accra Metropolitan Assembly (AMA), which is the local government body responsible to ensure basic sanitation in the area, has been unable to cope with the poor sanitary situation (hygienic services provision) (Ardayfio, undated). Attempts have been made by AMA to enforce on-the-spot payment for sanitary services. However, it was unsuccessful due to people inability to make the necessary payment (Ardayfio, undated).

To alleviate this situation, in 1999 the UK Department for International Development (DFID) funded a body known as the Accra Metropolis Health Initiative (AMEHI) to support the AMA and its partners. The main aim of the initiative was to improve the promotion and protection of the environment and health in Accra (Ardayfio, undated). Currently, a renewal programme is under place to assist on the reconstruction of some of the dilapidated households and historical buildings in Ga Mashie. This is done with the primary intention of transforming the area into a self-sustainable area through the tourism industry.

3.3.2 Gomoa district

The Gomoa district is one of the 12 districts within the Central Region of Ghana. The district covers an area of approximately 1,022.0 square km and a total population of 194,792 (88,414 male and 106,378 female), thus constituting 12.2% of the region's population (GSS, 2005). The district has the second highest population of the Central Region and its capital city is Apam.

The age structure of the population in the district is typical of a growing population with a great proportion of children younger than 15 years (43.0%) and decreasing at each successive higher age (GSS, 2005). Thus, indicating that high fertility rate is a typical feature of the district. Concerning the educational levels, just like in Ga Mashie district illiteracy is also a

deficiency amongst the Gomoa inhabitants, where nearly half of its inhabitants have never been to school.

People from the Gomoa community just like people from the Ga Mashie community have great cultural and traditional background. The district has two very important areas, also known as paramountcies by the local population, namely Gomoa Akyempim and Gomoa Ajumako. It is predominantly inhabited by the Fante-speaking (Akan), Guan and Ewe people. Unemployment (8.8%) in Gomoa is relatively low compared to the other regions in the country. Ghana's average unemployment rate is 10.4% (GSS, 2005). The main economic activities performed in the region are agriculture and related work, including fishing, animal husbandry, forestry and hunting. Agriculture is regarded as one of the primary sources of employment in Ghana, nevertheless, the Central Region is still considered as one of the most socially deprived regions of the country. According to the Ghana Poverty Reduction Strategy 2003-2005 the Central Region was the 4th most deprived region in terms of geographical deprivation in health. (Ministry of Finance and Development Planning, 2003).

The sanitary and hygienic conditions of the district are not bad, however, access to pipe borne water and toilet facility in the dwelling is still very limited. Thus a great majority of the population in the district is still reliant on public pipe water (60.9%) or tanker (17.5%) and public toilets (36.4%) or no toilet facilities (28.9%) (GSS, 2005).

3.4 The Survey Instrument

Household surveys were undertaken within the period December 2006 - February 2007. Semi-structured questionnaires were constructed and pre-tested first in 13 individuals not involved in the study, but that would have been eligible for inclusion in the study. These individuals, selected by means of convenience, were randomly approached while passing in the street in one of the Accra suburbs (East Legon Area). This piloting process was done in order to identify any ambiguity in the questionnaire design and to give the researcher a better idea of the time required per interview. Thus, the necessary corrections to the questionnaire were made before administering it to the selected participants in the two communities. The main unit of analysis were household members (including male and female, children and adults). The head of the household was the member selected to answer the interview. *Head of*

the household was defined as a person who spent at least 8 months of the last 12 months together with his/her family and is responsible for the house finances and general management. The household heads provided information about themselves as well as about three other members of the household. The information provided consisted of the family socio-demographic and socio-economic characteristics as well as their malaria history. The other three household members were selected haphazardly by the head of the household. However, these were encouraged to include a child, an adolescent and an elderly person, wherever possible.

The questionnaire was designed to elicit information on the household composition (number of household members and their ages), including other socio-demographic and socio-economic characteristics. More importantly, it was also used to get information on household's seeking behaviour for malaria and the perceived quality of malaria care received for cases reported one year prior to the survey. However, only malaria cases that occurred 6 months before the interview were considered in the data analysis (more information on the recall period is provided later in this chapter).

The survey instrument was adapted from a household questionnaire designed to measure household's burden of malaria in Kwazulu-Natal, South Africa. It was then modified in order to be appropriate to this study context. Therefore, the survey consisted mainly of close-ended questions with few open-ended questions. A copy of the survey is included as appendix A.

According to Thiede (2002:12, unpublished) there seems to be no ideal solution for the choice of a recall period for household survey questionnaires. He suggests that there is a trade-off between meeting statistical requirements for recording events within the household survey's reporting period and the qualitative properties including frequency of the reported event. However, different studies (Develay et al., 1996; Dzator and Asafu-Adjaye, 2004; McIntyre et al., 2006) have used a recall period of two to four weeks in order to avoid recall bias. Nevertheless, Thiede (2002, unpublished) proposes that the decision of the length of the recall period has to take into consideration the purpose of the survey. This argument was congruent with various surveys conducted in Europe on different topics using recall periods ranging from 1 week to 12 months (see for example: Deaton, 1997; Keller et al., 1997; Mock et al., 1999).

In this study, initially a recall period of four weeks was stipulated to be used, however during the questionnaire piloting, only few of the interviewees had experienced malaria or fever within exactly this period. Therefore, taking into consideration recall bias and the fact that malaria is seasonal in Ghana, a longer recall period of malaria events experienced by households was used. However, in order to reduce the chance of recall bias only cases of malaria that occurred 6 months (which covered the last rainy season "September - November") prior the interviews were included in the study analysis.

Sixteen (16) research assistants were recruited to assist on the data collection process. A two (2) days training was provided to them, and these, subsequently piloted the questionnaires. Thus, the research assistants were familiarized with the questionnaire and had the chance to expose their concerns before the actual data collection process. Ten of these research assistants collected data in Ga Mashie, while six operated in Gomoa district. Since the study was conducted in two deprived communities, where English was not the first language for many households, a criterion in the recruitment of the assistants was their competence on the languages spoken in the study sites. Interviews were conducted mainly in English, Ga or Twi.

In order to obtain the required information, the households surveyed were randomly selected by means of a two-stage sampling strategy (a more detailed explanation of the sampling strategy is provided in section 3.6). The heads of the household were required to answer the questionnaire, however, in absence of the head of the household at the time of the interview, the next senior member (if this was 18 years or older) was asked to respond the survey. During the interview the heads of household or the acting head of household were allowed to consult the other family members in order to ensure accuracy in the responses.

3.5 Sample Size

Given that a regression analysis approach (categorical multiple regression) was used, the total sample size calculation was based on the minimum number of observations necessary for each independent variable. Accordingly, evidence indicates that the ratio of observations to the independent variables should not fall below 5 observations. In addition, it is proposed that

10 observations for each independent variable are optimal (Miller and Kunce, 1973). However to be on the safe side, a minimum number of 15 observations for each independent variable were used. Concerning the number of independent variables, 10 variables were used in the total sample size calculation. These variables consisted of: age, gender, marital status, religion, household-size (hh_size), education, occupation, health-insurance, residential location and socio-economic status (SES).

For statistical analysis, most of the variables under study (e.g. gender, marital status, education, etc.) are specified as dummy or binary variables. As consequence, Bartlett (2001) asserted that for each independent variable there are multiple observations, hence, in this study sample, the effect of the binary variables is represented by the multiplication by two. Therefore, the total sample size in terms of the minimum number of household members that had malaria 6 months prior the survey is:

Sample size calculation = Minimum number of observations × number of dummy variables × number of independent variables

$= 15 \times 2 \times 10$

= 300 household members (that had malaria within the recall period)

To obtain the number of households to be surveyed (from where a minimum of 300 members had malaria during the last 6 months) the country annual prevalence and a mean of 4 household members per house as specified in the section 3.4 were used. According to the Ghana Health Service (GHS) (2006) report on the health sector in Ghana the malaria prevalence rate in the year 2004 was 16.0%. However, providing that the two communities under study are highly endemic this rate was doubled making the malaria prevalence at 32.0%. To estimate the prevalence rate for a 6 months period a steady malaria prevalence rate of 2.7% per month was used. This is because of the lack of information on the monthly malaria prevalence in Ghana. Therefore, the sample size in terms of the minimum number of households to be surveyed is expressed as:

$$\text{Minimum number of households} = \frac{\text{Minimum numbers of household members}}{(\text{Malaria prevalence rate} \times \text{Mean household members per house})}$$

$$= \frac{300}{(0.16 \times 4)}$$

$$= 469 \text{ households}$$

The above calculated sample size represents the minimum number of households to be visited (469) in the two study sites combined. The sample size was split between the two study sites in relation to the total population in the two study sites (AMA 1,658,937 and Gomoa district 194,792). Thus, it was predefined that more households should be visited in Ga Mashie than in Gomoa (although no strictly proportional as this had reduced the Gomoa sample too much). Hence, the predetermined minimum number of households to be visited (469 households), were split in 290 households in Ga Mashie and 179 households in Gomoa.

3.6 The Sampling Strategy

In order to attain the desired sample size, the researcher used a two-stage sampling technique:

Stage 1: In the initial stage, a cluster sampling technique was used to select residential blocks (in Ga Mashie) and villages (in Gomoa). On one hand, in Ga Mashie community (the urban area), where blocks and houses are well demarked, landmarks such as roads were used to separate the different clusters. On the other hand, due to the high dispersion of the houses in some parts of Gomoa community (the rural area) clusters of villages were selected, where the large villages (those with more than 50 houses) were further subdivided into sub-clusters. In both Ga Mashie and Gomoa communities the clusters (the residential blocks and villages) were selected based on a list of the different areas, provided by the Accra metro health district directorate and the Gomoa health district directorate, respectively. Both communities had six sub-communities or areas. Therefore, within each community three sub-communities were randomly selected. In Ga Mashie community the following sub-communities were randomly selected: Bukom area, Adedenkpo area and Agbogbloshie area and in Gomoa community the following sub-communities were randomly selected: Apam, Obuasi and Buduatta. Since no aerial photos or map of these communities were available to select the clusters, these were

selected by writing the name of each sub-community in a small piece of paper. Subsequently, the small pieces of paper were placed into a small bag and from there each of the aforementioned sub-communities (3 in each community) was randomly selected.

Stage 2: In this stage, a systematic sampling technique was employed. Within the Ga Mashie community, houses were selected by randomly selecting the starting point or the first house within each sub-community (cluster). From there, each third house within the cluster of residential blocks was selected until the desired sample size was reached. In Gomoa district, where the clusters had small and large villages with either disperse or concentrated houses, two approaches were used. In the small villages with highly dispersed houses all households were select. In the large villages with concentrated houses households were selected using the same procedures as the one applied in Ga Mashie community (systematic sampling technique).

3.7 Specification of the Model

Based on the conceptual framework illustrated in the section 3.2, the model used to determine the main predictors of malaria care provider can be expressed as:

Choice of malaria care provider = ***f*** (Age of the patient, hh_size, gender of the patient, marital status of the HH, religion of the patient, education of the HH, employment of the HH, residential zone, coverage of health insurance, socio-economic status).

The left side of the equation corresponds to the dependent variable represented by the choice of malaria care provider. As illustrated in the conceptual framework the latter variable was collapsed into three responses, namely: formal (i=1), informal (i=2) and no malaria care (i=3). In the right side of the equation the various hypothetic predictors of malaria seeking behaviour are portrayed. These were derived both from the conceptual framework and combined evidences from preceding studies conducted on the related topics or even in the same topic such as the one conducted by Dzator and Asafu-Adjaye (2004).

One of the strong assumptions of multiple regression models such as MNLM is that no linear relationship should exist between the various independent variables (Gujarati, 2003). In other words, multicollinearity or high correlation between these variables should be ruled-out. The main reason being; that highly correlated independent variables can hide one another's effect on the dependent variables. Moreover, since MNLM deals with partial coefficients (meaning that each independent variable is held constant when interpreting the impact of the other variable), exact collinearity disables the partial effect. Hence, when the problem of exact collinearity is present, for example in two independent variables, at least one of these should be dropped from the analysis. In our study context the two possible variables that could give rise to the aforementioned problem are household income and household expenditure. However, these variables were not used in the study given the vast evidence showing that individuals rarely provide valid and reliable information concerning their income and expenditures. This is because people may be unwilling to disclose their financial data and what they do disclose may be biased (Worrall et al., 2003:8). In addition, collecting detailed income or expenditure information may also be prohibitively time consuming and costly, and results may be influenced by seasonality in income flows (Worrall et al., 2003).

A correlation matrix of the selected independent variables, some of which are often regarded as highly correlated (such as education and employment) was run to identify any possible problem of multicollinearity (see appendix C). The outcomes from the correlation matrix show that there is no perfect correlation between any of the different independent variables, that is, none of the scores was equal to one (1) or minus one (-1). There was a slightly high correlation (0.59) between the household socio-economic status (SES) and the location (urban or rural), when the correlation was calculated across the two study sites. However, when the effect of the residential location (urban or rural) was taken by calculating different correlation matrixes for each study communities, there was very low correlation between the independent variables (see appendix C). Therefore, this suggests that if there is any correlation between the selected independent variables, it is very weak. Henceforth, one can rule out any problem of multicollinearity in this study.

3.8 Selection of the Independent Variables

The study independent variables (i.e. those that can influence formal, informal and no malaria care) were derived from empirical studies undertaken in countries with analogous perspectives, suggesting its appropriateness for this study context. Most of these studies aimed to understand healthcare seeking behaviour in African or other countries with similar socio-economic context as Ghana (see Develay et al., 1996; Dzator and Asafu-Adjaye, 2004; Nkosi, 2005: unpublished). The independent variables were also imported from theoretical frameworks, including the one developed by Andersen (see section 3.1 above). One of the key advantages of this model is that it places great emphasis on behavioural factors[9] (Hausmann-Muela et al., 2003). These are crucial factors when investigating the predictors of healthcare seeking behaviour.

Table 3.1 depicts the different hypothetical predictors of the choice of malaria care provider. The categorical variables illustrated in the table were dichotomised into dummy variables, *Yes* or *1* and *No* or *0*. *Yes* or *1*(the success option) would represent the presence of a characteristic that lead to a probability of something happening whereas *No* or *0* (the failure option) would represent the absence of a characteristic, thus annulling the probability of something happening (Gujarati, 1995). The expected signs depicted in the table have been postulated from previous studies conducted on healthcare seeking behaviour. Coefficients with positive signs indicate that, keeping other things constant, an increase in the value of any of the continuous variables increases the probability of seeking formal malaria care, as the reference choice. In case of categorical variables, a positive sign implies that the household members' are more likely to seek formal malaria care if the value is 1 (the success option). For instance, if any household member is covered by health insurance he/she is more likely to seek formal malaria care than either informal or no care.

[9] Some of the behavioural factors considered by the Andersen model are perception, beliefs, education and income (Hausmann-Muela and colleagues, 2003)

Table 3.1 - Hypothesized relationship between the dependent variable (choice of malaria care provider - formal care is the reference choice) and the various explanatory variables

Independent variable	*Variable coefficient*	*Type of Variable*	*Expected Signs*
Age of the patient	B1	Continuous	Positive
Household size	B2	Continuous	Negative
Gender of the patient	B3	Categorical: ▪ Male = 0 ▪ Female=1	Positive
Marital Status of household head	B4	Categorical: ▪ Not married=0 ▪ Married=1	Positive
Religion of the patient	B5	Categorical: ▪ Not Christian = 0 ▪ Christian =1	Negative
Education of household head	B6	Categorical: ▪ No schooling= 0 ▪ Schooling (any grade)=1	Positive
Employment of household head	B7	Categorical: ▪ No any employment = 0 ▪ Any employment =1	Positive
Residential zone	B8	Categorical: ▪ Rural= 0 ▪ Urban=1	Positive
Health Insurance of any household member	B9 B10	Categorical: ▪ No health insurance = 0 ▪ Health insurance=1	Positive
Asset index (SES)		Continuous	Positive

The variable *age* has been regarded by Grossman (1972) as a great predictor of the extent of health stock (the quantity of health) that an individual is likely to demand. The main reason for this is that elderly people tend to be more cautious about their health and thus, invest more on it. However, evidence from various studies in Africa and Asia has indicated that age is not a significant predictor of healthcare seeking behaviour (Yip et al., 1998 and Dzator and

Asafu-Adjaye, 2004). However, with foundation on the evidence by Grossman (1972) age is here postulated with a positive sign for the choice of formal care provider, implying that as an individual's age increases the likelihood to use formal healthcare providers is higher.

The *size of the household* can either have a positive or a negative impact on the choice of formal malaria care provider. For instance large families can have more active members contributing to the family income, hence more income to pay for the family expenditures. Conversely, large families can also have a negative impact on individual's healthcare seeking behaviour for the choice of formal care provider, since the greater the number of family members, the greater the living expenses, leaving less resources for health expenditure. Dzator and Asafu-Adjaye (2004) found that household size in Ghana was a significant predictor of the choice of healthcare provider. Here households with large families were more likely to seek care with the informal providers or not to seek care, than households with fewer members. Based on the above argument and evidence, in this study it is postulated that large household size will negatively affect the choice of formal malaria care provider.

Gender and marital status are expected to have an impact on malaria care seeking patterns. According to the existing literature (see Yip et al, 1998 and Dzator and Asafu-Adjaye, 2004) female are more likely to seek care with formal healthcare provider than not to seek care. Furthermore, households where the head is married are more prone to seek care in the formal healthcare providers rather than self-treatment or no care. The main reason could be that married couples are more concerned about their health, especially if they have children. Also, they have the possibility to make jointly decisions on the actions to be undertaken. In addition, they can easily influence one another's perceptions, believes and decisions.

Regarding *religion*, very little attention has been given to it when investigating clinical issues (Olive, 2004) and healthcare seeking behaviour. Despite the limited evidence on the relationship between religion and healthcare seeking behaviour, Reindl and Brown (2004) and Nkosi (2005: unpublished) who looked at the impact of various religions on healthcare seeking behaviour found that religion has a significant effect on healthcare seeking behaviour and utilisation patterns in Africa. More specifically, Nkosi (2005: unpublished) found that being part of a Christian religious affiliation in Africa, particularly in Zambia, negatively impacts the choice of formal care. Hence, in our study it is expected that households headed

by a Christian head of household are more prone not to seek formal healthcare than otherwise. For this reason, the variable religion of the patient postulates a negative sign for formal care in the table.

The *place of residence* of the household (either in urban or rural area) has been considered as an insignificant predictor of the choice of healthcare provider in African countries by some authors (Nkosi, 2005 and Develay et al., 1996). Nevertheless, based on the fact that households living in urban areas have greater geographic access to healthcare facilities, we predicted a positive coefficient on variable residential location for formal care if the household is located in an urban area.

With regard to *health insurance coverage*, given that health insurance does not cover the expenses of individuals who seek care in informal settlements, the coefficient representing health insurance is expected to disclose a positive sign for formal care for covered household members. Evidence also confirmed that household members living in a house headed by a covered household member are less likely to seek informal or no care than otherwise (Yip et al., 1998 and Visser and Booysen, 2004).

Having some *level of education*, an employment and having some *household assets* (measured by the asset index as a proxy for wealth) are expected to have a positive effect on seeking formal care for malaria. Evidence shows that these three variables are highly correlated; as household with higher educational attainment tend to get good employments which are followed by a good salary or income and thus more wealth or assets. Thus, ceteris paribus, a relatively high income level reduces slightly the financial barriers to access healthcare. This argument has been consistent with the findings of Visser and Booysen, (2004); Yip et al. (1998) and Dzator and Asafu-Adjaye (2004) where households lead by household heads with some level of formal education, employed and earning a steady income are more likely to seek formal care than no care.

In this study an asset index was constructed as indicator of living standards, which can be considered as a proxy for income. This asset index was derived from the possession of certain household appliances (eg. radio, TV, fridge and bicycle), livestock (e.g. chicken and goat) as well as dwelling characteristics (including type of toilet, sources of water and energy

and type of roof and walls). Wealth or asset indexes, normally calculated using principal component analysis (PCA), are frequently recommended for developing countries where reliable income data is difficult to obtain (see for example Filmer and Pritchett, 1998 and Worrall et al., 2003).

Principal components analysis (PCA) seeks to describe the variation of a set of multivariate data in terms of a sub-set of uncorrelated linear combinations of the original variables, where each consecutive linear combination is derived so as to explain as much as possible the variation in the original data, while being uncorrelated with the other linear combinations (World Bank, 2007). One of the greatest strengths of the PCA technique is that it allows the compression of various variables without much loss of information (Smith, 2002). Under the PCA, the asset index is typically assumed to be the first principal component—i.e. the first linear combination. According to the World Bank (2007), the principal components analysis suffers from an underlying lack of theory to motivate either the choice of variables or the appropriateness of the weights. Regardless of this limitation PCA is still regarded as the most reliable estimator of living standard (Worrall et al., 2003) and it has also been used in many studies with different contexts (see for example: Schellenberg, 2003; Zere et al., 2007).

The asset index results are expressed in a numerical score for each household, which ranges from negative (representing lower SES) to positive values (representing higher SES). An asset index was generated for each community separately in order to rule out any problem of collinearity in the study and to account for the socio-economic differences in the two communities (see appendix D).

Besides the above mentioned explanatory variables, healthcare seeking behaviour is also highly influenced by "perceived" quality of care, particularly the perceived service quality. However, since households find out about the service quality characteristics only after deciding to seek care, these were included only on the descriptive statistical analysis and not in the inferential statistical analysis. The characteristics of service quality analysed include distance to health facility, waiting time, anti-malarial drug availability, malaria test availability, facility cleanness and staff rudeness.

3.9 Selection and Explanation of the Dependent Variables

The study is concerned to investigate where individuals seek care when ill with malaria. This care can be obtained through diverse sources, ranging from those acknowledged by the numerous regulatory bodies of the government to those that are completely unknown to them, for instance most of the informal healthcare providers. Dzator and Asafu-Adjaye (2004) identified a large range of healthcare providers in Ghana. These included: public hospitals and pharmacies, private hospitals and pharmacies, public and private clinics, traditional healers, faith healers, drug sellers, drug peddlers and self-treatment or no treatment.

In this study, the following malaria care providers were identified: public and private hospitals, public and private pharmacies, public and private clinics, traditional healers, faith healers, drug sellers, drug peddlers, self-treatment and no malaria treatment. The classification of these providers into formal and informal malaria care follows the current healthcare provider classification in Ghana, which was presented in the operational definition of formal and informal malaria care described previously. Furthermore, the selected classification of providers was also compared with the classification presented in the study by Dzator and Asafu-Adjaye (2004), which also make use of the Greater Accra Region as one of the research sites.

Henceforth, the different providers and *no care* were collapsed into three polychotomous variables to illustrate the dependent variables, namely:

- ***Formal malaria care providers*** - care obtained from public hospitals and pharmacies, private hospitals and pharmacies, public and private clinics; including mobile clinics;
- ***Informal malaria care providers*** - care obtained from unauthorised traditional healers, faith healers, drug sellers, drug peddlers and self-treatment (based on the Ghanaian context, anti-malarial drugs can be bought over the counter);
- ***No malaria care*** - this includes no treatment at all.

3.10 Data Analysis Process

The questionnaires were coded prior the data collection process. These were divided into four parts. Part 1 included questions on the socio-demographic and general socio-economic characteristics (such as age, size of the household, gender, religion, education and occupation) of the head of the household and the three other members. Part 2 included questions on the household more specific socio-economic characteristics such as household income and expenditure, households' possessions (including radio, livestock, television, refrigerator and means of transport) and dwelling characteristics. The households' possessions and dwelling characteristics outcomes served to create an asset index or score for each household which then permitted the classification of the sampled households into socio-economic quintiles (1 to 5). Households in the first quintile were at the lowest socio-economic status and households in the fifth quintile corresponded to those at the highest one. In the Part 3 of the questionnaire, questions related to household malaria care seeking behaviour during one year before the interview were asked, including last malaria episode, symptoms, severity, seeking care decision and the malaria care provider used by each household member. Lastly, Part 4 included perceived service quality questions such as facility cleanness, facility staff treatment (rudeness), waiting time, drug availability, the convenience of the facility opening hours and the general level of satisfaction. This part of the questionnaire was only answered by households who sought care in the formal care providers.

After the data collection the information was inputted in Epidata® software and processed using the EpiInfo software version 3.3.2. Afterward, data cleaning was done through SPSS software version 11.0. Finally, the analysis (both descriptive and statistical) was done using Stata® version 8.0 software.

3.11 Possible Limitations of the Study

The study used a cross-sectional study design. This type of design does not require a comparison group like most of experimental designs, but it is questionable when it comes to issues of validity. Cross-sectional studies are known to be good designs when undertaking studies using a large sample of people. However, since it is not feasible and possible to

collect information from the whole population from a certain place, a representative sample of this population has to be used. Sampling in most cases introduces various types of error, which in statistical terms are often referred to as *bias*. Bias should be minimised as much as possible. Evidence has shown that the most common type of bias encountered in cross-sectional study designs are *selection bias* and *recall bias*.

Selection bias

In this study, selection bias, particularly sampling bias was relatively controlled, since a random sampling technique was used. Furthermore, supervision of the assistants on data collection ensured that the household selection was strictly done according to the stipulated sampling techniques. Despite resources and time constraints, it was ensured that at least the minimum number of 300 household members required for the analysis was interviewed. However, as the household head selected the other "three household members" this might have introduced a "member" selection bias. To reduce the chance of "member" selection bias households were encouraged to include at least one child, one adolescent and one elder. This was done to ensure a good representation of different age groups in the sample in order to observe if the age of the patient influences household seeking behaviour. Nevertheless, there is always a possibility of sample bias that should be taken into consideration when generalizing the results of this study.

Recall bias

Recall bias, often referred to as a measurement error, was quite inevitable in this study. This was due to the seasonal patterns of malaria in Ghana. As referred previously (section 1.1.1.1) malaria in Ghana occurs with greater intensity during the high rainy season (September-November) than during other seasons. A recall period of at least 6 months was used in the analysis. This recall period may lead to recall bias since households might have problems to recall accurately their malaria treatment seeking behaviour (if this was sought).

However, since the malaria incidence is high (when taken a recall period of six months) and as the questionnaire was done in such a way to include at least four family members (including the household head), the problem of no response due to no malaria incidence in the family was minimised.

Hawthorne effect

Hawthorne effect refers to a phenomenon where the behaviour of a study participant and the study outcomes are altered as a result of the participant's awareness of being under observation (Mangione-Smith et al., 2002). This type of bias is unavoidable despite of how well the research assistants are trained, since no one can know whether the respondents are saying the truth or not. Households responses can seek to give a good impression to the interviewer, a good example in this study can be the question about whether they sought malaria care. The household can simply say yes, when in fact it is not true, therefore caution must be taken. In an effort to rule out this problem some control questions were introduced in the questionnaire, which served to cross-check the consistency of the answers provided in previous questions. For example: households were first asked where they sought malaria care and where did they get the anti-malarial drugs from. Then the cross-checking question was to find out whether they received anti-malarial drugs in the facility where they sought care. These questions were supposed to be answered by households who sought formal care only. For instance, if the household says that he/she sought malaria care in a public hospital and got drugs from the public hospital and later reports that no anti-malarial drugs were given to him/her in the facility, there would be ambiguity in the response.

Although, during the selection of the interviewers the researcher ensured that the interviewer were fluent in Ga and Twi, the two most frequently spoken languages in the two study sites, a bias could still have been introduced since the questionnaires were not translated. Interviewers had to translate the questions in the spot, thus, with potential bias of a no controlled or centralised translation.

The occurrence of this potential problem was addressed during the training of the research assistants. The research assistants also clarified to the interviewee about the confidentiality of the information provided, while encouraging the interviewee to be as open as possible in their responses. Nevertheless, caution must still be taken when extrapolating the study results externally.

CHAPTER 4: STUDY RESULTS

This chapter first presents the descriptive statistical analysis results that encompass the socio-demographic and socio-economic characteristics of the study participants in both communities, as well as their healthcare seeking behaviour patterns. In addition, it also presents the results of the healthcare service quality characteristics. The second part of the chapter depicts the inferential statistical analysis results, particularly the MNLM. Under this section an illustration of the relationship between choice of malaria care providers and the various independent variables is presented.

4.1 Descriptive Statistics of the Combined Sample

4.1.1 Socio-Demographic Characteristics of the Households

A total of 290 households in Ga Mashie community and 179 in Gomoa community were completed and included in the analysis. The survey covered a total of 2,533 individuals; among them 469 (18.5%) were the heads of the households. Specific malaria related information was collected on 1,876 (74.1%) individuals (4 members per household), of these 442 (23.6%) members had malaria within the accepted study recall period (the last 6 months). Thus, the study covered more than the previously expected 300 members with malaria in the sample and within the study recall period.

The average household size (hh_size) in the combined sample was 5.4 individuals (being 5.6 in Ga Mashie and 5.1 in Gomoa) with a standard deviation (STD) of 2.7, while the number of people per dwelling ranged from 1 to 26 individuals. It was in the Ga Mashie community were the largest household size (26 individuals) was registered. The study's average household size is very close to the country's average, of approximately 5.1 individuals per household (GSS, 2005).

The average age of households' heads was 46 years (STD=14.9) in the combined sample. The youngest household head interviewed was 18 years and the oldest 90 years old, both from the

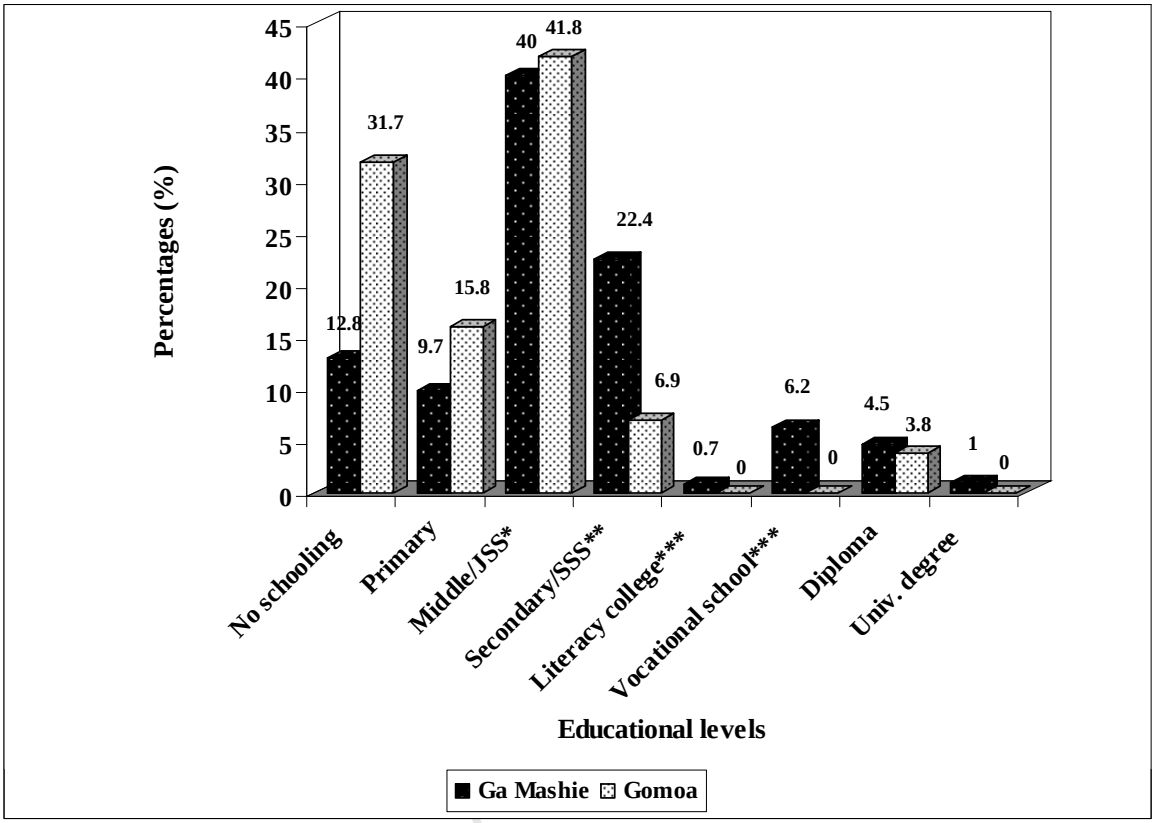
Ga Mashie community. On average, in Ga Mashie household heads' age was relatively higher (47 years old) than in the Gomoa community (44 years old). Surprisingly, most of the survey respondents were male (52.9%), however in the overall household sample more female were represented. In Ga Mashie (urban community) 58.3% of the respondents were male while in Gomoa (rural community) the majority (56.9 %) of respondents were female.

The trends in both communities and in the overall household sample was consistent with the last results of the Ghana population and housing census, which showed that in Gomoa community the female population constituted 54.6% of the total population. However, in Ga Mashie it was inconsistent, since 52.9% of the population were reported to be females (GSS, 2005). In Ghana the female population is greater than the male population. These observed household gender patterns suggest that these two communities may have different gender related cultures, which could also impact on the roles of household heads and on care seeking behaviour.

Concerning the marital status of the respondents, the majority of the household heads was married (64.2 %), followed by 12.2% that was divorced, 11.1% were widows, 10.7% were single and 1.3% of them were living together. The number of married heads of household in the Ga Mashie community (61.7%) was relatively less than in the Gomoa community (68.8%).

Although most of the household heads had some form of formal education, household heads in Ga Mashie were relatively more educated than their counterparts in Gomoa. Figure 4.1, which shows the higher level of education attained by household heads, indicates that there is a considerable difference on the educational level between the two communities. The higher educational level of the household heads in both communities tends to decrease with each subsequent education level, yet this trend is worse in Gomoa than in Ga Mashie. . No schooling is still high amongst individuals in the two communities, but it is much higher (31.7%) amongst Gomoa household heads than in Ga Mashie (12.8%) household heads. Beyond these dissimilarities middle or junior secondary school (JSS) constituted the most predominant educational level achieved by the household heads in both communities (Ga Mashie: 40.0% and Gomoa: 41.8%).

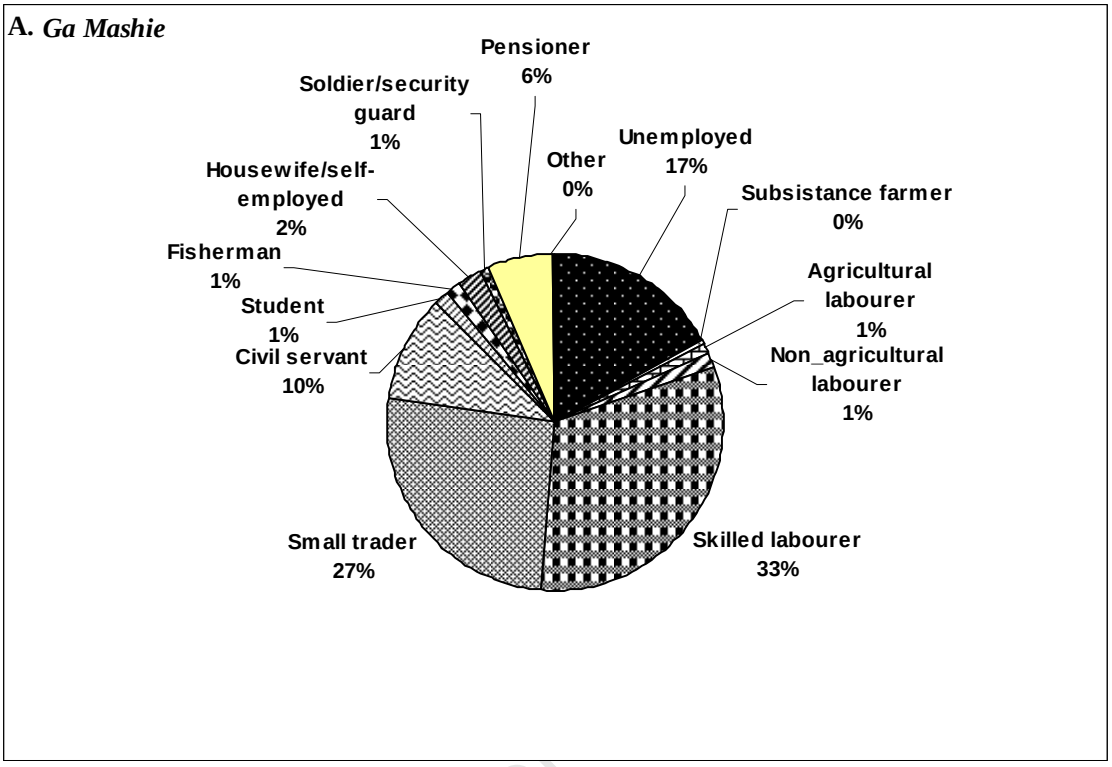
Figure 4.1 - Highest Educational Level of Household Heads, Ga Mashie and Gomoa District, 2007

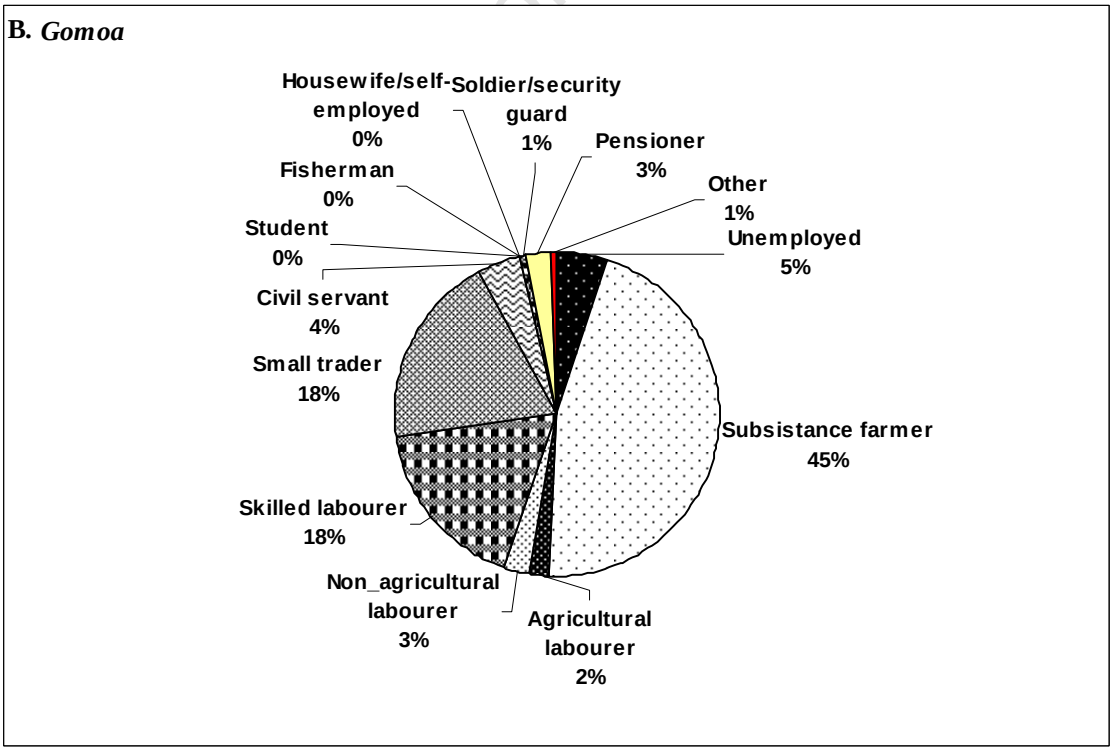


* ***JSS*** (Junior Secondary School)
** ***SSS*** (Senior Secondary School)
*** These are done after the completion of SSS.

Figure 4.2 **A.** and **B.** illustrate the diverse economic activities performed by the heads of household in Ga Mashie **(A)** and Gomoa **(B)** communities.

Figure 4.2 - Occupation of the Heads of Household, Ga Mashie and Gomoa District, 2007





The main occupation reported in Ga Mashie was skilled labourer (33.0%) while in Gomoa it was subsistence farming (45.0%). More unemployed household heads were found in Ga Mashie (17.0%) than in Gomoa (5.0%).

In relation to the religion pertaining of the participants, Christianity is still the largest religious affiliation in the two communities reaching 91.5% in Ga Mashie and 93.6% in Gomoa. The number of Muslim followers was similar in both communities (5.7%). However, more followers of other African religions were found in Ga Mashie (2.2%) than in Gomoa (0.6%).

Ghana is under the implementation of the National Health Insurance Scheme (NHIS). The process was initiated in the year 2004 and so far people from the various points of the country have been joining the scheme. In Ga Mashie community the scheme is called the National Health Insurance Levy (NHIL), whereas in Gomoa community the Scheme is referred to as the Gomoa Health Insurance Scheme (GHIS). Despite the different names used, both NHIL and GHIS are part of the universal coverage initiative also known as the NHIS. Table 4.1 shows the health insurance coverage for the total household. For the purpose of this study a household was considered covered by health insurance if at least one person in the household was insured.

Table 4.1 - Total Households with Health Insurance Coverage, Ga Mashie and Gomoa District, 2007

Communities	**Health Insurance**			
	Yes	**No**	**Total**	**Percentage covered (%)**
Ga Mashie	100	187	287	34.8
Gomoa	29	131	160	18.1
Total	**129**	**318**	**447**	**28.9**

As illustrated above few households in both communities (28.9%) had members covered by the Scheme. In Ga Mashie community 34.8% of the households visited had at least one member covered by the scheme and in Gomoa only 18.1%. This finding just emphasises the significant disparity between the two communities.

4.1.2 Socio-Economic Characteristics Outcomes

With respect to the socio-economic characteristics of the dwellings the following data was collected and analysed: sources of water and energy, the type of toilet facilities, roof and walls and the ownership of certain possessions. The main findings were as follows:

Table 4.2 - Sources of Water (%) for the Households, Ga Mashie and Gomoa District, 2007

Source of Water	Households (%) in the Communities	
	Ga Mashie	Gomoa
Piped tap	60.8	17.6
Public tap	38.4	46.4
Water carrier or tank	0.4	16.1
Borehole in the compound	0.4	0.6
River	0.0	2.8
Well/spring	0.0	9.7
Dam/pool	0.0	6.8
Total	**100.0**	**100.0**

Only 17.6% of the families in the Gomoa community had access to piped water as compared to 60.8% households in the Ga Mashie community. A great majority of households in both communities still rely on public taps. The latter is more common in Gomoa community (46.4%) than in Ga Mashie community (38.4%). It is worth pointing out that very few of the households in Ga Mashie community (0.8%) consume unsafe water[10], yet in Gomoa community altogether 36.0% of the families interviewed do not have access to safe water.

The main source of energy for cooking reported by the families in the Ga Mashie community was the charcoal, which was used by approximately 71.1% of the households. In the Gomoa community the main source of energy for cooking was the firewood, used by about 68.4% of the households. Energy sources such as electricity and gas were more commonly used in the Ga Mashie community (2.0% and 24.6% respectively) than in the Gomoa community (0.6% and 5.7%).

[10] Unsafe water refers to water from sources such as water carrier, borehole, river, dam or pool or stagnate water and well or springs.

Table 4.3 depicts the main types of toilet used in the Ga Mashie and Gomoa community. Just like access to clean water, access to flush toilet (WC) is also a benefit enjoyed by few families in the two communities (Ga Mashie-18.8% and Gomoa-3.6%).

Table 4.3 - Households Type of Toilet (%), Ga Mashie and Gomoa District, 2007

Type of toilet	Households (%) in the Communities	
	Ga Mashie	Gomoa
Flush toilet (WC)	18.8	3.6
Public toilet	69.8	46.4
Bucket toilet	1.6	0.6
Pit latrine with ventilation (K-VIP)	8.6	21.6
Other pit latrine	0.8	22.9
No toilet	0.4	4.9
Total	**100.0**	**100.0**

The main type of toilet used in both communities are public toilets; for instance in the Ga Mashie community it is used by nearly 69.8% of the household members, whereas in the Gomoa community it is used by 46.4% of the household members. Table 4.3 also shows that more people in the Gomoa community (4.9%) do not have access to any type of toilet compared to the Ga Mashie community (0.4%). As reported by some of them, they rely either on rivers or bushes as a sort of toilet facility.

Pertaining to the characteristic of dwellings, it was found that the majority of the houses' in both communities were constructed either with cement blocks (Ga Mashie 91.5% and Gomoa 55.1%) or mud bricks (Ga Mashie 3.9% and Gomoa 43.0). Once again, these findings demonstrate the dissimilarities in the two communities. The Ga Mashie community, although a very old town is primarily built of cement blocks and Gomoa a rural community have relatively more houses built with mud bricks. With regards to the type of roof of the houses, corrugated iron sheet is the main choice amongst the households in both communities. Houses with corrugated iron sheet roofs were approximately 95.7% in the Ga Mashie community and approximately 91.7% in the Gomoa community.

Inquiries on the households' income and expenditure were also done to further explore their socio-economic characteristics. Therefore, information on income of the four selected family members (including the household head) and the household expenditure were reported by the household head. The average income per household member was obtained based on their

monthly income (provided that he/she was employed) and any additional source of income of each employed household member. To estimate the household average expenditure, inquiries were made on all the household relevant monthly living expenditures including food, transport, electricity (or any other source of energy used to cook), water and rent. Based on their responses an average monthly expenditure was calculated. The outcomes on the household members' income and expenditures in the two communities were also considerably different. In Ga Mashie community, the average income reported was about ¢6,454,792 while in Gomoa community the average income reported was about ¢ 1,405,758 which is equivalent to US$717[11] and US$156 respectively. Concerning the average household expenditure, in the Ga Mashie community this reached ¢1,713,432 (about US$190) per month, which was 2.5 times more than this in Gomoa community (¢690,014 or about US$77). This expenditure disparity can be explained in part by the fact that households in Ga Mashie, an urban community, rely less on food grown at home (only 9.0% grows food at home) as opposed to Gomoa, a rural community, where households grow almost all (41.3%) or about half (23.1%) of the food at home. On the other hand, in relation to income Gomoa (49.1%) spent almost double than Ga Mashie (26.5%).

Illustrated in the table 4.4 are the households' patterns of ownership of assets for the two study sites. The patterns in the ownership of assets were not different from the dwelling characteristics.

Table 4.4 - Households (%) with Ownership of assets, Ga Mashie and Gomoa District, 2007

Assets	Households (%) in the Communities	
	Ga Mashie	Gomoa
Radio	85.7	69.7
Television	80.6	24.8
Fridge	61.8	15.9
Chicken	17.0	58.0
Car	8.9	5.9
Bicycle	7.8	6.8
Goat	5.1	40.3
Sheep	1.6	4.0

Household members in Ga Mashie were more likely to possess assets such as radio (85.7%), TV (80.6%), fridge (61.8%), whereas their counterparts in Gomoa were more likely to

[11] US$1=¢9000 (observed on the 19th February 2007)

possess assets such as chickens (58.0%), goats (40.3%) and sheep (4.0%). These differences in the patterns of asset ownership were very influential on the estimations of the asset (wealth) index using the PCA (principal component analysis).

4.1.2.1 Socio-Economic Status Measured with the Construction of the Asset Index

Due to the observed differences in the socio-economic characteristics of the household members in the two communities, asset indexes were generated separately for the two communities. Moreover, there was also high correlation between the variables residential location (urban or rural) and asset index when the latter was calculated across the two communities (see appendix B). The PCA for both communities was performed using 17 variables, including: housing characteristics (type of toilet, wall and roof materials, and source of water and energy), the presence of selected assets in the house (radio, television, refrigerator, bicycle and car) and the ownership of certain livestock (chickens and goats). In addition, when performing the PCA only components with the highest Eigenvalues (higher than 1) were retained to generate the correlation matrix - in both communities 7 components were retained (see appendices C).

In Ga Mashie community the variability explained by the first component was 19.7%; the second component explained 13.1%, while the third component explained 11.4%. The PCA results for the Gomoa community illustrated that the variability explained by the first three components was 20.8%, 18.1% and 11.1% respectively. Therefore, in total the variability explained by the first three components reached 44.2% in Ga Mashie and 50.0% in Gomoa.

The asset index for each community was obtained using unrotated principal components. The highest and lowest scoring coefficients in the construction of the asset index in both communities were mainly associated with housing characteristics. For instance, in Ga Mashie community having electricity or gas as the main source of cooking energy was associated with a positive score (0.755), while having a house without flush toilet was associated with a negative score (-0.683). Similar to Ga Mashie, in Gomoa community having electricity or gas as the main source of cooking energy also positively impacted the asset index (0.695) whereas having a house with thatch or other type of roof negatively impacted the asset index (-0.261). The ownership of livestock such as chicken also had different impacts in the two

study sites; whereas in Ga Mashie possessing chicken negatively impacted the asset index, in Gomoa this positively impacted the asset index. These dissimilarities just emphasize the socio-economic differences between the two communities and thus the importance to have generated different asset indexes for each community. Additionally, based on the above results it is also essential to bear in mind that possessing certain assets (such as chicken) that have negative impact on the urban areas is not necessarily bad in rural areas, but it depends considerably on the different livelihood contexts.

4.1.3 Malaria Care Seeking Behaviour Outcomes

Table 4.5 summarises malaria incidence among the study participants in the two communities. The study findings suggest that malaria still affects many households in the two communities, although many of the study participants did not experience any malaria episodes in the last year. Nevertheless, Table 4.5 shows that malaria incidence is slightly higher in Gomoa than in Ga Mashie; altogether 173 out of 716 household members in Gomoa (24.2%) and 269 out of 1,160 household members in Ga Mashie (23.2%) experienced malaria episodes within the study recall period (last 6 months). Surprisingly, more malaria episodes occurred within a month prior to the interview. This pattern seems to contradict slightly the argument raised in the Section 3.3 on the malaria seasonality in Ghana, or might even be an indication of recall bias. However, it can be explained by the fact that household members who had malaria during the last high malaria season could also have had malaria one month before the interview. Since the study question was probed in a way to capture the last malaria episode, it is more likely that they reported about the most recent malaria cases.

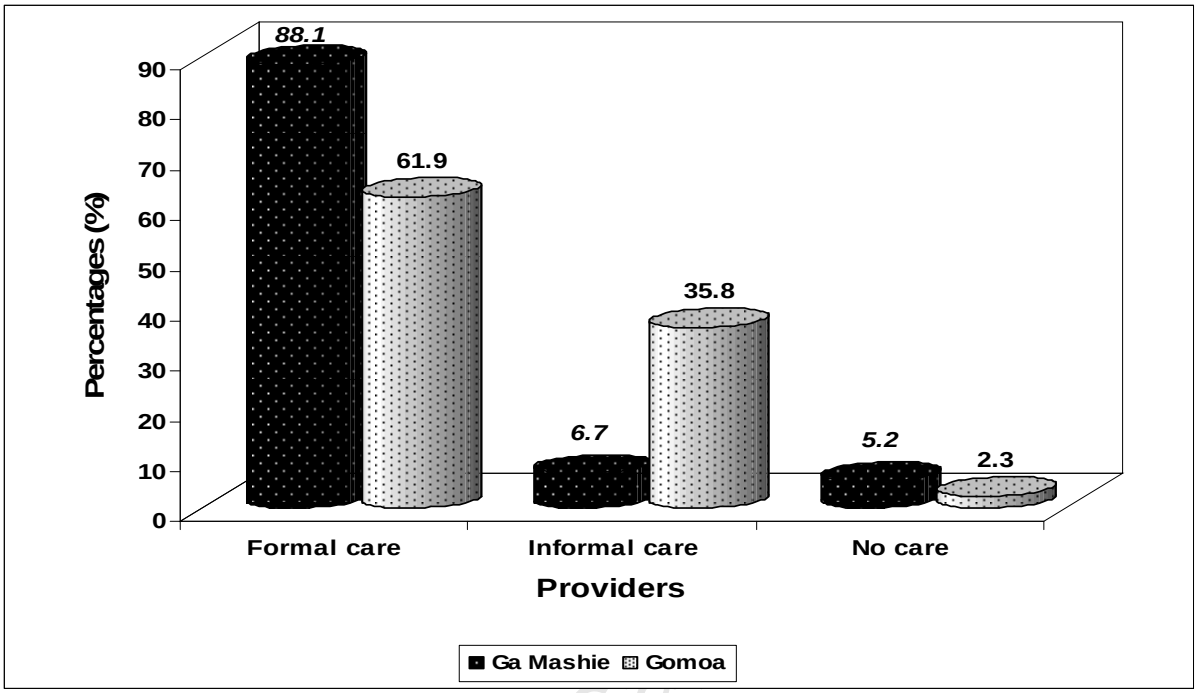
Table 4.5 - Summary of Malaria Incidence among the Study Participants in the Two Communities, Ga Mashie and Gomoa District, 2007

Summary Description	Households (%) in the Communities	
	Ga Mashie	Gomoa
Total population surveyed	1,624	913
Study sample (members that answered malaria related questions)	1,160	716
Number of household members that had malaria one month prior the survey	152	91
Number of household members that had malaria less than 6 months prior the survey (except for those that had malaria one month prior the survey)	117	82
Total number of household members that had malaria within 6 months to the survey	269	173
% of household members that had malaria one month prior the survey	13.1	12.7
% of household members that had malaria in the last 6 months prior the survey (except for those that had malaria one month prior the survey)	10.1	11.5
Total % of household members that had malaria within 6 months to the survey (incidence rate)	23.2	24.2

Out of those who had malaria in the 6 month recall period, most household members in both communities sought care in the presence of malaria symptoms (95.9%). These symptoms ranged from headache, body ache, fever, vomiting (yellowish), yellow eyes and urine, weakness, fatigue, dizziness, chills, high blood pressure among others.

The malaria care seeking behaviour of the household members who reported having malaria within the 6 month recall period varied significantly in the two communities. Figure 4.3 presented below depict the choice of malaria care provider in Ga Mashie and Gomoa.

Figure 4.3 - Household Members Choice (%) of Malaria Care Provider, Ga Mashie and Gomoa District, 2007



Note: *Average formal malaria care; 77.8%; Average informal malaria care: 18.10%; Average no malaria care: 4.1%.*

The leading choice of malaria care provider was formal care, as 88.1% of the individuals in Ga Mashie and 61.9% in Gomoa have reported using formal care providers when sick with malaria. However, more individuals in Gomoa (35.8%) used informal care providers when sick with malaria than their counterparts in Ga Mashie (6.7%).

Table 4.6 – Household Members Choice by type of Malaria Care Provider (%), Ga Mashie and Gomoa District, 2007

Malaria care providers	Households (%) in the Communities	
	Ga Mashie (n=269)	Gomoa (n=173)
1 - Formal care provider:	**88.1**	**61.9**
Public hospital	49.0	16.6
Public clinic	16.9	18.3
Private hospital/clinic	13.3	24.9
Public/private pharmacy	8.9	2.1
2 - Informal care provider:	**6.7**	**35.8**
Drug seller	4.7	29.0
Self-treatment	2.0	2.0
Traditional healer	0.0	3.0
Drug peddler	0.0	1.8
3 - No care	**5.2**	**2.3**

As it is illustrated in table 4.6, the majority of household members in Ga Mashie who sought formal care used either public hospital (49.0%) or public clinic (16.9%) whereas in Gomoa household members who sought formal care used either private hospital or clinic (24.9%) or public clinic (18.3%).

Pertaining to the household members seeking behaviour within the informal care provider, Table 4.6 indicates that very few study participants in Ga Mashie opted for informal malaria care provider, however, among those that used informal care the primary choice was drug seller (4.7%). Unlikely Ga Mashie, a great majority of household members' in Gomoa who sought informal malaria care, opted for drug seller (29.0%). However, the percentage of household members who sought informal care was much higher in Gomoa (35.8%) than in Ga Mashie (6.7 %). In both communities a very restricted number of individuals have reported not seeking any form of care when sick with malaria.

4.1.3.1 Socio-Demographic and Economic Characteristics of the Household Members and their Choice of Malaria Care Provider.

The choice of malaria care providers in this study was also contrasted with the different socio-demographic and socio-economic characteristics of the household members who had malaria during the study recall period of 6 months. These variables, namely: age, gender, marital status, religion, education, employment, asset index (proxy for SES) and health insurance were used in the regression analysis, presented in the next section. Table 4.7 illustrates the choice of malaria care provider of the household members in Ga Mashie and Gomoa (respectively) by their socio-demographic and economic characteristics.

Table 4.7 - The choice of malaria care provider (in %) and the socio-demographic and economic characteristics of the household members, Ga Mashie and Gomoa District, 2007

Malaria care provider	Ga Mashie (n=269)			Gomoa (n=173)		
	Formal care	Informal Care	No care	Formal care	Informal care	No care
Age of the patient						
Children Under 5	96.8	0.0	3.2	70.0	30.0	0.0
From 5 to 55 years	88.8	7.9	3.3	61.6	36.2	2.2
Elder (more than 55 years)	92.9	7.1	0.0	57.1	42.9	0.0
Gender of the patient						
Male	86.8	7.9	5.3	60.9	36.2	2.9
Female	89.0	5.8	5.2	62.5	35.6	1.9
Marital status of the household head						
Not married	82.5	9.3	8.3	53.5	41.9	4.7
Married	91.3	5.2	3.5	64.6	33.9	1.5
Education of the household head						
No schooling	83.7	11.6	4.7	58.0	42.0	0.0
Schooling	88.9	5.8	5.3	63.4	33.3	3.3
Employment status of the household head						
Unemployed	87.0	7.4	5.6	77.8	22.2	0.0
Employed	88.4	6.5	5.1	61.0	36.6	2.4
Religion of the patient						
No Christian	95.7	0.0	4.4	81.8	18.2	0.0
Christian	87.4	7.3	5.3	60.5	37.0	2.5
Health insurance of any member						
No insurance	87.2	6.6	6.1	58.7	38.4	2.9
Insurance	89.8	6.8	3.4	74.3	25.7	0.0
SES quintiles						
1st the most poor	85.9	8.8	5.3	52.6	47.4	0.0
2nd	86.9	10.1	2.9	56.3	40.6	3.1
3rd the average	93.6	4.3	2.1	57.1	40.0	2.9
4th	81.8	4.6	13.6	52.9	44.1	2.9
5th the least poor	92.3	3.9	3.9	91.2	5.9	2.9

In Ga Mashie the choice of malaria care provider shows that the youngest (under 5 years old) and the elder (more than 56 years) opted relatively more than the rest of the population to seek formal care for malaria (96.8% and 92.9% respectively). In Gomoa the youngest age

group sought relative more care (70.0%) in formal providers. The elders, on the other hand sought relatively more informal malaria care (42.9%) than the other age groups in Gomoa. As shown in Table 4.7 it is worthy pointing out that no elder in the two communities opted for no malaria care.

Regarding gender and choice of malaria care provider the key findings were that males and females in the two communities have very similar malaria care seeking behaviours. Thus, suggesting that gender is not a strong predictor of the choice of malaria care provider in the two communities. Marital status in both communities showed that the married opted to use relatively more formal malaria care providers, while from the individuals who opted to use the informal malaria care providers, a higher proportion were unmarried. This pattern proposes that the individual marital status might somehow play a role on the choice of malaria care provider.

The choice of malaria care provider by the patient's religion in the two communities indicated that non Christian patients opted more for formal malaria care (Ga Mashie 95.7% and Gomoa 81.8%) than Christian (87.4% and 60.5% respectively).

Relatively more participants with some form of education sought malaria care in formal care providers. However, the number of uneducated household members who sought care in the formal malaria care providers in the two communities was also relatively high. In addition, most of the household members who used informal malaria care providers (Ga Mashie 11.6% and Gomoa 42.0%) were uneducated.

Regarding employment status and choice of malaria care provider, mixed patterns were found in the two communities. In Ga Mashie slightly more employed (88.4%) household members used formal care providers than the unemployed (87.0%). In Gomoa more unemployed (77.8%) household members used the formal care providers than the employed (61.0%). Mixed patterns were also found for the choice of informal care providers; in Ga Mashie a higher proportion of unemployed individuals (7.4%) than employed (6.5%) opted for informal malaria care providers, whereas in Gomoa it was the opposite with more employed individuals (36.6%) using the informal care provider than the unemployed ones (22.2%).

There was no big difference between the healthcare seeking behaviour of respondents who are covered and those who are not covered by health insurance in both communities. In Ga Mashie and Gomoa for instance, the number of non-insured members who sought formal malaria care was higher than 50.0% (Ga Mashie 87.2% and Gomoa 58.7%). Nevertheless, very few of the insured members in the two communities opted for informal or no malaria care. This pattern was more common in the Gomoa community, where none of the insured member opted for no malaria care.

Finally, when the choice of malaria care provider is analysed by looking at the socio-economic status of the household members (SES quintiles) the outcomes in the two communities are quite similar. In Ga Mashie for instance, most of the average SES groups (3rd quintile) and least poor (5th quintile) household members sought formal malaria care (93.6% and 92.3% respectively). The choice of informal malaria care was mainly opted by the household members from the lowest quintiles (1st quintile- 8.8% and 2nd quintile- 10.1%) while no malaria care was mainly opted by members from the high quintiles (4th quintile- 13.6%) In Gomoa markedly the least poor (5th quintile) household members opted primarily for formal malaria care (91.2%) like in Ga Mashie. Amongst the poorest household members (1st quintile) in Gomoa, 47.4% opted to seek informal malaria care while only 5.9% of those in the highest quintile (5th) opted to seek informal care. Dissimilar to Ga Mashie, the choice of no malaria care was mainly opted by household members from the 2nd quintile and above. In Gomoa no member from the lowest quintile stayed without seeking any form of malaria care.

All above mentioned outcomes of the descriptive statistics shall be confirmed later in this chapter through the use of inferential statistic (MNLM).

4.1.3.2 Household Members Seeking Behaviour and Severity of the Malaria Episode

Table 4.8 shows the malaria seeking patterns in the two communities based on the malaria episode severity.

Table 4.8 - Malaria Seeking Behaviour in the Two Communities (%) and the Severity of the Episode, Ga Mashie and Gomoa District, 2007

Malaria episode severity	N	Ga Mashie Sought care		N	Gomoa Sought care	
		Yes	No		Yes	No
Minor	62	91.9	8.1	62	96.8	3.2
Moderate	101	96.0	4.0	78	97.4	2.6
Severe	82	93.9	6.1	30	100.0	0.0
Critical	24	100.0	0.0	3	100.0	0.0

Most household members in both communities who had malaria within the 6 months recall period reported having a moderate episode. Nevertheless, some severe and critical malaria episodes were also reported, mainly by household members in the Ga Mashie community. All the household members in the Ga Mashie and Gomoa who reported having critical malaria episode sought malaria care. In addition, all the household members in Gomoa who reported having severe malaria episodes also sought some form of care. This proposes that the severity of the malaria care does impacts on the households' seeking behaviour patterns.

The reasons reported by the household members who opted to seek informal care or no care rather than the formal care in the two communities are presented in Table 5.9. These reasons differed considerably from community to community.

Table 4.9 - Main reasons reported by household members (%) for the choice of informal malaria care providers, Ga Mashie and Gomoa District, 2007.

Reasons for not seeking formal care	Communities	
	Ga Mashie (n=32)	Gomoa (n=66)
Malaria episode was not severe or malaria not considered a severe illness	50.0	25.8
Formal facilities are too expensive	22.2	56.5
I had anti-malaria drugs at home	16.7	0.0
I do not like hospitals	5.6	1.6
I do not know why	5.6	4.8
Formal facilities are too far	0.0	8.1
I think herbs/prayers are more effective	0.0	3.2
Total	**100.0**	**100.0**

Most of the respondents from Ga Mashie reported reasons linked mainly to attitudes, believes and practices. For example, more household members have reported that the specific malaria

episode was not severe or that malaria is not a severe illness (50.0%) and more respondents decided to use the available anti-malarial drugs that they had at home (16.7%).

Respondents from the Gomoa community on the other hand, reported more the presence of financial barriers (formal providers too expensive 56.5%) and lack of geographic access to health facilities (formal facilities too far 8.1%) as the primary issues leading them to rely more on the informal care for malaria. These outcomes were of no surprise, as evidence shows that Gomoa is considered one of the most deprived region in terms of geographical deprivation in health (Ministry of finance and development planning, 2003). For instance, household members in Gomoa reported that on average they take 34 minutes to get to the nearest public healthcare facility whereas in Ga Mashie it would take household members 28 minutes to get to the nearest public healthcare facility. Besides the fact that more respondents from Ga Mashie community showed less concern to the malaria severity, in Gomoa (25.8%) community some respondents also showed that malaria is not a severe illness.

4.2 Quality of service of formal malaria care providers

Given the fact that the study is concerned with the factors that influence households' malaria seeking behaviour, it is crucial to understand the supply side factors that might influence malaria care seeking behaviour in these two communities. Therefore, to address this issue one of the study specific objectives was to map the healthcare facilities available in the two study sites and their characteristics. Hence, this section provides information on the quality of malaria care provided by formal facilities as reported by the providers and based on the observations of the researcher and the perception of the household members in the two communities. The main findings in respect to the quality of service of formal malaria care providers are presented below:

4.2.1 Characteristics of Malaria Care Service Providers in Ga Mashie

The geographic access to healthcare facilities in Ga Mashie is plausible. Different types of healthcare providers can be encountered there, ranging from public hospitals and clinics, private hospitals and clinics to chemical sellers or pharmacies. Some of the various and most frequently used healthcare facilities in the community are:

1. James Town Maternity clinic
2. Ussher Town clinic (which has also mobile clinics)
3. Princess Marie Louise (PML) Children's Hospital
4. Barte Plange Memorial private clinic
5. Saaka private clinic
6. Cathedral private clinic

The range of healthcare services provided in these facilities include: medical and clinic care, reproductive and child health, dental health, mental health, laboratory services, preventive service including malaria, HIV among others (public health) and environmental health. Different fees policies apply in the different healthcare facilities. For instance, with the introduction of the NHIL, covered members are exempt from almost all the fees, excluding most drugs (including Artisiminisin-Amodiaquine combined therapy/ACT) and malaria tests. With regard to uncovered individuals a fee is paid for the consultation (this fee is known by locals as the "card fee"), drugs and malaria tests. Exemptions are also granted in most of the public healthcare facilities, especially for poor households, pregnant women, elders, children under 5 years and for specific diseases. At the moment of the data collection, most of the facilities visited reported to be using ACT as the first line anti-malaria drug prescribed.

4.2.2 Characteristics of Malaria Care Service Providers in Gomoa

Contrasting with the Ga Mashie community, Gomoa lacks healthcare facilities and staff. According to the Gomoa Health District Director, in the current year (2007) the district has a grand total of thirteen facilities; most of them are primary healthcare facilities. These include:

1. One hospital - which belongs to the Catholic Church,
2. Four health centres,
3. Five clinics, and
4. Three community based health planning and services (CHPS).

Furthermore, the staff establishment (in the public sector only) in 2003 was also very limited with a total of 76 health personnel (GSS, 2005). These included 2 medical assistant grade, 2 dispensary assistant/technician, 49 nurses and 17 other health workers. There were no

medical specialists, dental staff, pharmacists or allied health technician/professional (X-ray/lab).

At the moment of the research there was no a single doctor in the district (public sector only) However based on the 2000 Ghanaian housing and population census the average doctor/patient ratio for the whole region were Gomoa is situated (Central Region) was 1:36223 (GSS, 2005). As consequence, the doctors in the Central Region are overloaded with work and patients have to stand long queues in order to receive healthcare. The fees and exemption policies as well as the first line anti-malaria drug prescribed in Gomoa are similar to those in Ga Mashie.

4.2.3 Perceived Quality of Service as Reported by the Household Members in Ga Mashie and Gomoa

Household members from the two communities were also enquired on the perceived quality of services for the four main formal providers of malaria care. About half of the household members who sought care with formal providers (64.3% in Ga Mashie, and 72.9%Gomoa,) were satisfied with the overall quality of service[12]. Table 5.10 depicted next page presents the household members' perceived quality of services for the four main formal malaria care providers.

[12] When households were interviewed on their perceived quality of the formal malaria care services a question was directed to find out the overall level of satisfaction.

Table 4.10 - Number and % of selected indicators of quality of service perceived by households who sought malaria care in formal providers, Ga Mashie and Gomoa District, 2007

Perceived quality variables	*N=237* *n=total yes answers*	*Ga Mashie*				*N=107* *n=total yes answers*	*Gomoa*			
		Public hospital	Public clinic	Private hospital /clinic	Public/ private pharmacy		Public hospital	Public clinic	Private hospital /clinic	Public/ private pharmacy
The facility was clean	222	94.4	95.4	97.1	85.7	107	100.0	100.0	100.0	100.0
The facility open hours were convenient	211	88.8	97.7	88.2	80.0	106	96.4	100.0	100.0	100.0
Staff were not rude	208	86.4	79.1	97.1	94.3	101	89.3	93.6	97.6	100.0
Malaria drug were available	230	96.8	93.0	100.0	100.0	91	82.1	93.6	78.6	100.0
I did not have to wait long time	112	37.6	39.5	47.1	91.4	88	67.9	87.1	85.7	100.0
Malaria test were available	143	87.1	65.8	90.6	N/A	30	36.2	27.1	55.4	N/A
Staff told me the diagnosis	131	57.6	69.8	64.7	N/A	69	64.3	67.7	71.4	N/A

N/A= not applicable

Facility cleanness and open hours where well evaluated in both sites. However, in Gomoa these aspects were remarkable better evaluated than in Ga Mashie. With respect to the staff rudeness, relatively more households in Gomoa were happy with the way they were treated by the facility staff members. In Ga Mashie on the other hand, more participants reported rude treatment by the facility staff members. However, this behaviour was much frequent amongst those who sought care in public clinics- 20.9% (100%-79.1%) as well as public hospitals- 13.6% (100%-86.4%).

The availability of malaria drug was well evaluated in both communities, although a small deficiency was apparent in private facilities (78.6%) and public hospitals (85.7%) in Gomoa.

One of the most apparent differences on the service quality between the two communities was on the availability of malaria tests in the facility. Availability of malaria test was reported to be poor, especially amongst households who sought care in public hospitals (36.2%) and

public clinics (27.1%) in Gomoa community. In Ga Mashie approximately 60% of the household members who sought formal malaria care had access to malaria test.

Concerning the facilities waiting time, public facilities were worse evaluated in both communities. Yet, overall, in Ga Mashie community more household members (including those that visited private sector facilities) reported waiting long hours to receive care as apposing to Gomoa. In both sites only households that visited pharmacies did not complain about waiting times. On average households had to wait 90 minutes (about a 1 hour and 30 minutes) to receive care; where the minimum time waited was 1 minute and the maximum time waited was 300 minutes.

Table 4.11 illustrates the summary of the type of payments done by the household members to formal malaria care providers.

Table 4.11 - Type of payment (%) done by Household members to formal malaria care services, Ga Mashie and Gomoa District, 2007

Type of Payment	Communities	
	Ga Mashie	Gomoa
Average household members who reported paying for malaria care service	86.9	84.3
Household members that paid consultation fees	61.8	74.4
Household members that paid drug fees	96.8	96.2
Household members that paid malaria test fees	39.0	53.5
Household members covered by health insurance who still paid for consultation, drugs or malaria test	65.1	34.9

Most of the household members in the two communities have reported to have paid to receive malaria care (Ga Mashie 86.9% and Gomoa 84.3%). These payments included consultation, drugs and malaria test fee. For instance, 96.8% of the participants from the Ga Mashie community and 96.2% from the Gomoa community have reported having to pay for drug costs. In addition, a considerable number of household members covered by health insurance still had to pay for malaria care in the health facilities, especially in the public hospitals.

4.3 Regression Analysis

In the preceding sections, the results of the descriptive statistics of the various socio-demographic and socio-economic factors as well as quality of care aspects were presented. In the current section the analysis and results of the MNLM are depicted. This analysis is aimed to investigate the impact that the abovementioned factors had on households' seeking behaviour in Ga Mashie and Gomoa communities. The empirical results of the MNLM are reported in Table 4.12.

Illustrated in table 4.12 are the independent variables and its impact on the households' choice of malaria care provider in Ga Mashie and Gomoa community as well as in both communities combined. The baseline category or comparison category is formal malaria care. Given that formal providers are assumed to be the optimal choice of malaria care, the baseline category (formal care) is compared with both informal providers and no care for malaria. The interpretation of the coefficient of each independent variable for any outcome is with reference to the odds or likelihood of that specific outcome occurring (either informal care or no care) against the baseline category (formal care).

A total of 269 observations were used in the Ga Mashie dataset analysis. The likelihood ratio chi-square was 59.07 with a Prob>chi2 or p-value of 0.0794, which indicates that the model as a whole is statistically significant at a 10% confidence level. The pseudo-R-squared[13] also known as the pseudo coefficient of correlation (R-squared) was used to assess the fit of the model. The pseudo-R-squared is relatively low in the model (0.1763); yet, Bishop (1975) explains that analyses based on large samples (above 100) as the one under study tend to reduce the pseudo-R-squared value by an unknown amount.

The Gomoa regression model outcomes, using 173 observations indicates that the model as a whole is statistically significant at a 1% confidence level (LR chi2= 83.62 and p-value= 0.0034) and the pseudo-R-squared (0.1869) is once more low. For the combined dataset a

[13] The MNLM make use of the pseudo-R-squared, because there is no direct equivalent of R-squared in the non-linear models (from the OLS regression). The pseudo-R is basically the change in terms of log-likelihood from the intercept-only model to the current model. It does not convey the same information as the R-squared for the linear model. However, the same rules of the R-squared still applies, meaning that the higher the R-squared the better the fit of the model.

total of 442 observations were used in the analysis. The likelihood ratio chi-square was 101.45% with a p-value of 0.0000 and pseudo-R-squared of 0.1808 (statistically significant at a 1% significance level). The coefficients and p>z values are also depicted in the table 4.12. See appendix E for the full MNML output.

Table 4.12 - MULTINOMIAL LOGIT MODEL: Formal care is the comparison group, Ga Mashie and Gomoa District

	Ga Mashie		***Gomao***		***Combined Sample***	
	Coefficient	**P>z**	**Coefficient**	**P>z**	**Coefficient**	**P>z**
Informal care						
hh_size	0.109	0.099*	-0.035	0.658	0.039	0.468
Age	0.011	0.394	0.016	0.060*	0.018	0.010***
Location(Urban)	-.---	-.---	-.---	-.---	-1.575	0.000***
Gender (Female)	-0.611	0.247	-0.066	0.852	-0.272	0.344
Insurance (Insured)	0.003	0.996	-0.239	0.647	-0.199	0.590
Marital status (Married)	-0.785	0.163	-0.024	0.954	-0.276	0.397
Religion (Christian)	18.735	0.000***	1.112	0.246	1.668	0.056*
Education (Schooling)	-0.300	0.639	0.102	0.797	-0.092	0.780
Employment (Employed)	0.212	0.747	0.378	0.667	0.238	0.629
SES	-0.137	0.405	-0.360	0.003***	-0.265	0.006***
Constant	-21.437	0.000***	-2.283	0.108	-3.013	0.008***
No care						
hh_size	-0.176	0.231	-1.029	0.064*	-0.230	0.101
Age	0.022	0.134	0.015	0.696	0.023	0.079*
Location (Urban)	-.---	-.---	-.---	-.---	-0.054	0.940
Gender (Female)	-0.205	0.731	0.169	0.899	-0.236	0.651
Insurance (Insured)	-0.772	0.279	-33.646	1.000	-0.982	0.150
Marital status (Married)	-0.624	0.331	-1.741	0.170	-0.725	0.200
Religion (Christian)	0.321	0.772	14.716	0.999	0.523	0.628
Education (Schooling)	0.107	0.903	20.097	0.998	0.604	0.467
Employment (Employed)	-0.031	0.967	19.500	0.998	´0.004	0.995
SES	0.115	0.460	0.435	0.212	0.159	0.301
Constant	-2.476	0.129	-52.716	0.000***	-2.929	0.076*
Number of observation	**269**		**173**		**442**	
LR chi2(20)	59.07		83.62		101.45	
Prob > chi2	0.0794*		0.0034***		0.0000***	
Pseudo R2	0.1763		0.1869		0.1808	

Note: ***1% significance level; ** 5% significance level; *10% significance level
(**Outcome Malaria care provider==** formal care is the comparison group)

4.3.1 Comparison between formal malaria care versus informal malaria care

Overall, the MNLM outcomes show that in this study five variables significantly influence seeking care with informal malaria care providers as opposed to formal care providers. These include: religion, location, socioeconomic status (SES) (all at a 1% level of significance) and age and household size (hh_size) (all at a 10% level of significance). Religion has a positive statistically significant effect (at a 1% significance level) on the choice of malaria care provider between informal care and formal care for households in Ga Mashie, but not for households in Gomoa, but is significant for the combined sample. This suggests that Christian individuals in Ga Mashie are more likely to seek care with informal malaria care providers rather than with formal malaria care providers as opposing to non-Christians. The location of the household also significantly influences (1% significance level) the choice of malaria care provider between informal care and formal care, but only for the combined sample. However, this can be explained by the fact that in the combined sample socio-economic effect (high correlation between socio-economic status and the location variable) is still present. The location of the household as expected as a negative sign, implying that individuals from Gomoa (rural) are more likely to seek malaria care with informal care providers other than with formal care providers as opposing to their counterparts in Ga Mashie (urban), ceteris paribus.

There is a clear decrease in the odds of choosing a formal over informal malaria care provider with decreasing socio-economic status. In Gomoa, individuals with low socio-economic status are more likely to seek care with informal malaria care providers as opposing to those with better socio-economic status who will opt for formal malaria care providers.

As expected, age has a positive statistically significant effect (at 10% significant level) on the choice of malaria care provider for the households in Gomoa and the combined sample, but not for households in Ga Mashie. This implies that the older an individual is the more likely to seek care with informal care providers as opposing to formal care providers than a younger individual.

Another factor that significantly affects (at a 10% significance level) the choice of informal malaria care provider for individuals in Ga Mashie and on the combined sample, but not in Gomoa is the household size. The odds of choosing a formal over informal malaria care provider decreases with the increasing number of household members in Ga Mashie. Thus, individuals from large households in Ga Mashie are more likely to opt for informal care rather than formal care for malaria as opposing to individuals from smaller households, ceteris paribus.

Interestingly, the rest of the variables (gender, marital status, education, employment and health insurance) were all statistically insignificant at 1%, 5% and 10% significance levels. Therefore, so far, these do not seem to influence the choice of malaria care providers between formal and informal malaria care providers in the two study communities.

4.3.2 Comparison between Formal Malaria Care and No Malaria Care

The choice of malaria care provider in the two study sites was also analysed by comparing the choice of malaria care providers between formal malaria care and no malaria care. Surprisingly, very few variables turned out as statistically significant predictors for the choice of malaria care providers between formal care and no malaria care. However, this outcome can be explained by the fact that only few households reported not seeking any form of malaria care. Nevertheless, the size of the family (hh_size) has a negative statistically significant effect (at a 10% significance level) on the choice of malaria care provider for households residing in Gomoa, but is not significant for households residing in Ga Mashie or for the combined sample. This indicates that the odds of choosing a formal malaria care provider over no malaria care decreases as the numbers of household members decreases in Gomoa. Individuals from smaller households in Gomoa are more likely to opt for no malaria care rather than individuals from larger households, ceteris paribus.

The age of the person once more turned out as a positive and statistically significant factor affecting the choice between formal malaria care provider no care, but only for the combined sample. This implies that the older an individual is the higher the probability of opting for no malaria care as opposed to younger people seeking formal malaria care, ceteris paribus.

The results reported above might highlight dissimilarities in the two communities. For instance, in Ga Mashie only the variables religion and household size (hh_size) turned out to be statistically significant factors affecting the choice of malaria care provider. In Gomoa on the other hand only socio-economic status (SES) and age were significant at influencing this choice. The study limitations are presented in the next chapter.

CHAPTER 5: DISCUSSION AND POLICY IMPLICATIONS

5.1 Discussion of the Study Findings

Malaria still affects a considerable number of households in the two study communities. Unlike Dzator and Asafu-Adjaye´s (2004) finding (77.8% of the Ghanaians treated malaria with informal providers) in this study the leading malaria care providers are formal providers (88.1 % in Ga Mashie and 61.9% in Gomoa). However, this seeking pattern varied significantly from community to community, as more household members in Gomoa reported seeking malaria care with informal providers than their counterparts in Ga Mashie.

In the specific sample analysed in Ga Mashie and Gomoa communities, the choice of malaria care provider is mainly influenced, to different extent, by five factors including demographic and socio-economic factors. These factors include the religion of the patient, the household location (urban or rural), the socio-economic status of the household members, the age of the patient and the size of the household (hh_size).

As Olive (2004) asserted, the variable religion has been given very little attention on clinical investigations. As predicted, in this study and particularly for the households in Ga Mashie, religion had a positive statistically significant (at a 1% significance level) impact on the choice of malaria care provider. The study findings suggested that Christian individuals in Ga Mashie community were more likely to seek care with informal malaria care providers (which includes traditional and faith healers) rather than with formal providers, which was contrary to non-Christians. Similar to these results were the findings by Reindl and Brown (2004); Nkosi (2005; unpublished), which stated that religion influenced individual healthcare seeking behaviour and subsequently the utilisation patterns of the services. One potential reason for this outcome might be because Ghana is a country of strong religious and cultural believes. Hence, Christians might prefer to rely on self treatment that could include mainly prayers by a priest or pastor or faith healer rather than orthodox medicine. Surprisingly, the descriptive results showed that only individuals from Gomoa reported using informal malaria care. This might be due to their preference for prayer or herbs to orthodox medicine. Yet, religion was not a statistically significant factor on the choice of malaria care

provider among households in Gomoa. Actually, very few individuals in Gomoa reported their preference for prayers or herbs, thus making the sub-sample too small to be a significant factor. In Ga Mashie, where no household reported preference for prayer or herbs as an alternative to malaria treatment, the significance of the variable religion might have been influenced by the Hawthorne effect. This might be due to the fact that the researcher can never be completely certain if the respondents are giving true responses or if they are omitting some information. On the other hand, many Christian households may prefer to omit the fact that they actually sought orthodox care afraid of being considered "*a person of little faith*" or being confronted by other family members. For instance, Tolhurst and Nyonator (2006) asserted that elders and mothers-in-law are very influential in decision-making to seek malaria care in some communities in Ghana.

Similar to Mugisha et al. (2004); Nkosi (2005; unpublished); Develay et al. (1996) this study also found that the location (urban or rural) of the household influences significantly the choice of malaria care provider between formal and informal malaria care providers. The coefficient of the variable location turned out negative, implying that individuals from Gomoa (rural) are more likely to seek malaria care with informal care providers rather than their counterparts in Ga Mashie (urban). In this study, several possible reasons can be given for this outcome. For instance, 56.5% of the household members in Gomoa who reported seeking informal malaria care did it due to financial barriers (formal providers too expensive). In addition, 8.1% of those who sought informal malaria care appointed poor geographic access of the formal health facilities as the main cause for their reliance on the informal care for malaria.

Results from the grey literature such as the Ministry of Finance and Development Planning (2003) in Ghana also emphasised that the geographic access to healthcare facilities in the Central Region (where Gomoa is located) was very poor. Therefore, based on the above evidence there is sufficient reasons to explain why these households (in Gomoa) would mainly rely on the informal malaria care providers.

Another key predictor of the choice of the malaria care provider, particularly in Gomoa community is the socio-economic status of the household members. As envisaged, families with low socio-economic status are more likely to use informal malaria care providers as

opposed to formal malaria care providers rather than families with high socio-economic status. This finding, which was congruent with various other studies (Yip et al., 1998; Buritwum et al., 2000; Visser and Booysen, 2004), can be explained by the fact that families with low socio-economic status in most of cases tend to put their health as a second priority, prioritising other needs, including food. In addition, families with low socio-economic status tend to rely more easily on left-over drugs from previous treatments, due to the lack of money to buy new drugs. Households with low socio-economic status are also more prone to rely on the informal malaria care provider (e.g. Drug sellers), as evidence shows that they are more willing to sell half dosage drugs and cheaper drugs than the formal providers (Baffoe-Wilmot, 2002).

The study result also suggests that households in Ga Mashie community and in Gomoa community have very different needs and are affected by different factors in most cases. For instance, having better living standards (SES) could influence substantially the choice of malaria care provider in Gomoa. In Ga Mashie on the other hand, where households have better geographic access to formal health facilities and less financial barriers (e.g. there are more people covered with health insurance than in Gomoa) social factors such as religion plays a significant role on their malaria care seeking behaviour. Therefore, these dissimilarities on the choice of malaria care providers by the two communities should be taken into account when deciding on the policies and reforms aimed to improve malaria management and control.

The age of the patient also turned up as a significant factor influencing both the choice of malaria care providers between formal and informal malaria care providers as well as between formal malaria care providers and no care. This implied that older household members are more likely to seek informal or no malaria care rather than to seek formal care as done by the younger people, ceteris paribus. The outcomes of the variable age can, on one hand, be explained by the opportunity cost of seeking care that adults or elderly people have. Usually, adults have less time (compared to children) and elders have less strength to wait long hours in queues to receive care in formal care providers. Surprisingly, this study finding was congruent with the findings from several studies such as the one conducted by Develay et al. (1996); Bós and Bós (2004); Mugisha et al. (2004); Dzator and Asafu-Adjaye (2004) which suggested that adults are more likely to seek informal care or no care than formal care.

The fact that household members have to wait long hours to receive care in formal healthcare facilities can influence significantly the malaria care seeking behaviour. On the other hand, it can also be explained by the fact that adult households in malaria endemic countries are accustomed to malaria, thus affecting their perception of severity of malaria. As consequence, they perceive malaria to be a minor illness and they also believe to have enough knowledge to treat it. These patterns were evident throughout the interview process of this study. For instance, some individuals mainly from Ga Mashie reported that *"they did not seek care for malaria because they already had at home the anti-malarial drugs that would be prescribed to them at the hospital".* Although the interview did not explore further on this point, many questions and concerns came up, particularly those with respect to the sources of these drugs. Were the drugs used by them left-over's from the treatment of other malaria episodes?

Despite the fact that many of the study participants in both communities perceived malaria as a minor illness and as consequence sought either informal or no malaria care, the severity of the malaria episode is also a very significant predictor of the choice of malaria care provider. This outcome is due to the fact that in this study none of the household members who had critical malaria episodes opted for no malaria care. Similarly, Dzator and Adjaye (2004) also found that the severity of the malaria episodes plays a crucial role on the choice of malaria care provider.

Unlikely the prior expectations described in Chapter 3, the rest of the explanatory variables (gender, marital status, education, employment and health insurance) were not statistically significant at 1%, 5% and 10% significance levels. Thus, these do not seem to influence the choice of malaria care providers in the sample of these two study communities. Consequently, no further discussion of these variables is provided in this study.

6.2 Study Limitations

Like most research studies, the results of this study can be subjected to limitations. The first limitation has to do with the research design used, a cross-sectional study design. This design, as previously asserted is often associated with bias, particularly selection (sampling) and

recall biases. Although an inclusion criteria was in place to ensure that the three members selected per household included at least one child, one adolescent and one elder, this was not the case all the time. Indeed, households inhabited only by youngster or elderly were also identified. Hence despite the caution taken during the process of selecting participants, selection bias could have been introduced.

It is also worthy highlighting that a larger sample size should be included in the study (where at least 469 questionnaires for each community should be included) in order to strength the statistical results. Therefore, caution should also been taken in this respect.

Another limitation concerning the selected study design has to do with the possibility of recall bias (a measurement error). In most clinical studies a recall period of less than four weeks is often used. However, in this study due to the seasonal patterns of malaria in Ghana, a recall period of 6 months had to be given, thus making the possibility of introduction of the recall bias quite inevitable.

The possibility of Hawthorne effect, which is an almost unavoidable type of bias, can also be regarded as another limitation to the results of this study. It is very difficult to know exactly whether the study respondents are giving true responses or not. Households responses can seek to give a good impression to the interviewer or to the other family members present during the interview. A good example in this study can be the question about whether they sought malaria care or where they sought care. The respondent can simply say yes, when in fact it is not true or saying that sought care in one place when in fact sought in another place. Hence, despite of all the efforts made and reported in Chapter 4 to control these limitations, caution must still be taken when extrapolating the study results internally and externally.

The study may also have methodological limitations. To estimate the living standards or socio-economic status (SES) of the participants, PCA had to be used to generate asset indexes. One of the underlying limitations of this statistical method is that there is lack of theoretical motivation to explain either the choice of variables or the appropriateness of the weights. Since PCA deals with a sub-set of uncorrelated linear combinations of the original variables, it was ensured that no highly correlated variables were included in this study.

Similar to other statistical and economic models, the Multinomial Logistic Model (MNLM) used in this study has some limitations. Among them is the difficulty to include the entire range of relevant variables that influence malaria care seeking behaviour, thus, this may give rise to the problem of omission bias. Nonetheless, the magnitude of this problem is controlled by the fact that most of the crucial variables, including the main demographic and socio-economic variables (as reported by the international literature) were included.

Despite the aforementioned limitations, the findings of this study are very useful at illustrating the current malaria care seeking behaviour in Ghana. The study findings to a certain extent emphasise similar results from other studies conducted in the African context and worldwide. Therefore, although taking into consideration the limitations above, the results of this study are useful and pertinent for the African context as well as worldwide.

6.3 Policy Implications of the Study Findings

Behavioural and socio-cultural factors have often been neglected in research. However, Gyapong and Garshong, (2007), suggested that the negligence of both these factors contributed significantly to the failure of earlier malaria control efforts. In addition, they also proposed that poor and inadequate investment in communities, led to poor performance of these communities in holding preventive programmes.

Therefore, despite the potential limitations, the results of this study have important implications for the Ghana Malaria National Control Programme and for the RBM partnership in Ghana. On one hand, the study provides substantial information on the characteristics of malaria incidence in each of the selected communities, which can assist the RBM strategy in the re-assessment of the current preventive measures in place in the two communities and elsewhere. On the other hand, the findings provide information on the extent of the households' reliance on informal malaria care providers and the various socio-demographic and economic factors facilitating this reliance. This latter finding can be relevant both for the Ghana's Malaria Control Programme, WHO Country Office and other partners supporting country efforts to achieve the Abuja target (i.e. to ensure that 60.0% of malaria episodes are appropriately treated within 24 hours of onset of symptoms). In addition, both the Programme and WHO are interested in the promotion of prompt access to

effective anti-malarial treatment, which is believed to be one of the major strategies for reducing the burden of malaria. According to WHO (2004), prompt access to effective treatment means the availability of effective anti-malarial drugs as closest home as possible so that the treatment can be initiated within 24 hours of the onset of the symptoms.

Before introducing the study possible policy implications it is beneficial to discuss the current malaria control strategies, targets and achievements based on 2006 Ghana Annual Report on Malaria (Ghana Malaria Control Programme, 2006). Several strategies have been put in place to control malaria in Ghana and this has been possible with full involvement of the government and the partnership of several stakeholders. These stakeholders include: RBM Coordinating Committee, WHO, UNICEF, national case management task force, Anglogold Ashanti and many NGOs. Currently, the country has been experiencing progress in the management of malaria. Accordingly, in the 2006 Annual Malaria Report it was asserted that there has been a steady decline in the number of cases attributed to malaria attended at the Outpatient Department (OPD) over the past three years. In addition, the progress towards the achievement of the Abuja targets is also apparent and it is through strategies such as:

- Case management of malaria through prompt, effective and correct treatment; in order to improve the case management of malaria the main target in place is to improve the proportion of patients who receive early and correct treatment for uncomplicated malaria from 22.0% to 60.0% and to reduce the malaria case fatality rate in children under five years from 3.2% to 2.8%;
- Scaling-up the use of malaria preventive methods such as IPT and Insecticide bed-nets (ITNs); the main target in this respect is to increase the proportion of pregnant women receiving IPT as directly observed treatments (DOTS) from 30.0% to 60.0%; to increase the proportion of children under five years (3.5% to 60.0%) and pregnant women (2.7% to 60.0%) who sleep under the ITNs.
- The promotion of home-based care of malaria; the main target is to increase the proportion of caretakers who could recognize signs and symptoms of malaria and take correct action from 22.1% to 60.0%.

Regardless of the fact that all the aforementioned strategies are already being implemented in Ghana, yet, evidence shows that the country is still facing several challenges. These

challenges include: the unavailability of the new anti-malaria drug, incorrect diagnosis of malaria, difficult geographic access to some communities, difficult quality monitoring among others (Ghana Malaria Control Programme, 2006). Therefore, it is within the blanket strategies, the targets and challenges of the Ghana Malaria control program and the WHO policies that the study considered the policy implications of the results. Henceforth, the policy implications of this study were analysed with reference to the descriptive, quality of service and regression analysis results.

Unlike the findings by Dzator and Asafu-Adjaye (2004), which stated that most of the malaria episodes in Ghana are treated by informal malaria care providers, in this study the majority of the malaria cases were treated by formal care providers (77.8%). This outcome can reflect an improvement of the malaria care seeking behaviour in Ghana, as a result of all the reforms implemented so far in the country to improve the malaria management and control. Therefore, this improvement could be explained by improvements on the geographic or financial access, in some communities. The fact that many healthcare facilities are currently functioning in Ga Mashie community could influence on the households malaria care seeking behaviour. In addition, the introduction of health insurance probably also served as an incentive to improve malaria care seeking behaviour in Ghana.

Despite that, some communities in the country still rely heavily on the informal malaria care. In the rural community (Gomoa) which registered a slightly higher malaria incidence (24.2%) than the urban community of Ga Mashie (23.2%), a considerably large number of household members still rely on informal malaria care providers (particularly drug sellers). The main reasons reported by the households in Gomoa were either due to financial barriers, due to their perception of malaria as non-severe illness or due to poor geographical access. Hence, based on these findings it could be recommended to continue encouraging the population to seek formal care in locations where there are low financial and/or geographical access problem. For instance, in Ga Mashie were more households are covered by health insurance and many healthcare facilities are available it would be desirable to encourage the population to use the available formal facilities. Conversely, in areas where both the geographic and financial access are restricted like in Gomoa, in the short term an emphasis should be made to promote education at family level on Home-based Malaria Management

(HMM). Further, as a long term goal an effort should also be made to improve geographical deployment of facilities to a certain extent.

Most of the households in the two communities could correctly state the symptoms of malaria, thus it shows that inability to recognise the malaria symptoms is not a problem amongst households in Ga Mashie and Gomoa communities. This implies that household are able to recognize malaria symptoms at an early stage and therefore to be able to use HMM. Evidence shows that HMM is both feasible and effective in ensuring prompt access to appropriate treatment in the African Region (particularly sub-Saharan Africa) and thus, it has become a cornerstone of malaria case-management (Baffoe-Wilmot, 2002; WHO, 2004; Gyapong and Garshong, 2007). HMM might be the way to go in Gomoa community, especially if increasing public health facilities proves unfeasible in the short-term.

Indeed, many countries, including Burkina Faso, Nigeria, Uganda, Zambia, Kenya and even Ghana have embarked on this initiative in order to increase the geographic access to malaria treatment. Accordingly, some countries have included HMM in their strategic plans to roll back malaria, or even as a way to successful apply to the Global Fund to fight AIDS, Tuberculosis and Malaria (Gyapong and Garshong, 2007). HMM has also been referred to as a positive shield to the achievement of the Abuja target of ensuring that 60.0% of malaria episodes are appropriately treated within 24 hours of onset of symptoms. This commitment emphasizes the need to increase the access of communities to effective anti-malaria drugs as well as to improve their ability to timely recognize and treat malaria.

As mentioned previously, in Ghana HMM is already in place in some communities. However, evidence (Baffoe-Wilmot, 2002) shows that its implementation is inappropriate since the introduction of HMM strategy requires commitment by both the benefactors and the beneficiaries. Great community involvement is a key factor for the success of any programme (eg. malaria control programme). Therefore, to successfully introduce the HMM in Gomoa and in other areas in need, a great commitment and engagement of the beneficiary community is needed. Similarly, Gyapong and Garshong (2007) also argued that in various countries including some mentioned above, HMM strategy was successfully implemented due to a strong commitment by the communities in question. For example, individual members in the Gomoa community could assist in the selection of the drug distributors (also known as community-based agents in Ghana), as they should come from the targeted

communities. Evidence show that, the more the targeted communities are involved, the better and more sustained the drug delivery process (Mutabazi and Duke, 1998). In this way, it is recommended that the focus should be on the selection of farmers, small traders and existing drug sellers.

This recommendation is in agreement with the findings of the descriptive statistics which illustrated that most of the households in Gomoa are either farmers or small traders. Additionally, many households (29.0%) in the community relied on drug sellers (shopkeepers, drug vendors, chemical sellers and drug shop owners) for their malaria treatment. By assisting in the selection of the drug distributors the community members would be more familiarised with the distributors. Likewise, they would feel that they are assisting the government and the involved stakeholders in the health improvement of their communities.

After the selection of the drug distributors an intensive training programme should be carried out. This could include: training drug sellers or even shopkeepers to offer appropriate anti-malarial drugs at the right dosage. This would be in line with WHO (2004) which asserted that involving drug seller or shopkeepers has been possible without compromising their profit margins; even better, it has been demonstrated that it increased their sales. This training is also highly recommended as evidence from Ghana indicated that only 52.0% of the drug sellers and chemical sellers knew correctly how to treat malaria. Moreover, only 42.0% sold full dosages of the medication (Baffoe-Wilmot, 2002), but the customers still rely on their assistance.

By promoting HMM strategy, policy makers could alleviate the geographic access in Gomoa; yet, one problem would still be prominent. This problem refers to the financial constraints that work as a barrier for many households to seek formal malaria care. In the past the GoG attempted to provide health service free of charge, however, it was accompanied by heavy financial burden and subsequently, to a decline in the quality of service delivered. Health insurance, particularly SHI has been identified as one of the most desirable way to reduce inequalities and catastrophic financial burdens due to health problems. Although in this study health insurance did not turn out to be a significant predictor of malaria care seeking behaviour in the two communities, but most of the covered household members opted to use formal care (see tables 4.6 and 4.7). Likewise, a very restricted number of households in

Gomoa were covered with health insurance as opposed to their counterparts in Ga Mashie. Therefore, an emphasis should be made to increase the number of households members enrolled in the social health insurance scheme (SHIS). In order to achieve that, an emphasis should be put once more on the population health education with respect to the benefits that the scheme could have on their lives. The fact that the likelihood to seek either informal or no malaria care increases as the age increase, an especial focus should be to target the elderly. Furthermore, elderly in African communities play a crucial role on the community decision-making process.

In Ghana most of malaria cases are due to the *plasmodium falciparum,* as result it can have fatal outcomes if not treated early. Hence, early and effective treatment can save many lives. However, if the community is not well educated and informed about the available strategies in place, these strategies are in vain and unproductive. Therefore, an effective and sustainable information, education and communication (IEC) to the population at the family or community level, particularly on effective ways to treat malaria at home, is also essential. To mass educate the population in Burkina Faso, for example, sensitization tours were done as part of the IEC process. In Ghana posters were used, while in Nigeria posters, drug labels, short stories on flipcharts, plays developed by drama experts and later performed by high school children were used. Uganda used visual media and activities including posters, messages on calendars, t-shirts, and dramas. In most of these countries they successfully educated their population, including in Ghana. In June 2007 a WHO press release, showed that women in Accra region (where the Ga Mashie community is sited) were successfully treating malaria at home. However, in many regions of the country household members do not have access to such information. Therefore, despite the existing IEC campaigns in Ghana, it is also recommended to promote the development of training centres. These training centres could aim at building the capacity of community members, the media and the various sectors of the economy on malaria control strategies.

The use of such training centres has proven to be an effective way to scale-up malaria prevention and the adherence to appropriate malaria treatment in many countries, including Tanzania and the Gambia (Gates Malaria Partnership, 2006). For instance, in Gambia a strategy was created (Centre for Innovation Against Malaria/CIAM) to scale-up malaria management (Gates Malaria Partnership, 2006). The training was done in partnership with

key national and international broadcasting corporations; where a radio soap opera that incorporated messages on malaria prevention and management was developed. The main purpose of this intervention was to change people's knowledge, attitudes and practices; 26 programmes were broadcasted twice on a weekly basis. The results of this strategy indicated that the beneficiaries changed considerably their perceptions and knowledge concerning the malaria management. For example 68.0% of those who had listened to the programme recognised malaria as the major theme and 41.0% recalled specific themes about malaria prevention.

Since, in this study more than 50.0% of the household members in the two communities (Ga Mashie 85.7% and Gomoa 69.7%) possessed a radio; it would be recommended that a similar programme be established in these communities. This could assist to scale-up malaria prevention, adherence of the right treatment and the choice of correct malaria care provider. In addition, similar programmes could also assist on the education of the population in the two communities, especially regarding some measures to improve the hygienic and sanitary conditions, healthcare seeking behaviour and adherence to health insurance. Among the broadcasted programmes, topics such as proper and effective ways to treat malaria, advertisement about the various trained anti-malarial drug distributors in the communities and the various benefits of health insurance coverage, could be included.

The results of this study also indicate that special focus should be given to Christian population when planning future malaria management and control interventions. This is due to the fact that Christian households in Ga Mashie were more likely to opt for informal malaria care than formal malaria care. Therefore, IEC campaigns should also be done in churches in order to target the Christian communities. In addition, a greater involvement of Priest, Pastors and Imans on the IEC campaigns to improve malaria management and control is also recommended.

The differences in the household SES in Ga Mashie and Gomoa had also impacted on the factors that influence the choice of malaria care providers. This serves once more as a call to the government and policy-makers in Ghana and elsewhere. A study conducted by Biritwum et al. (2000) in two Ghanaian communities also pointed out that the patterns for treating malaria (mainly in children) varies considerably with the SES of the caregiver. Therefore,

reforms towards the improvement of the standard of living of the most deprived households in Ghana would influence significantly their healthcare seeking behaviour.

In this study many of the households interviewed, informed that they decided to seek either informal care or no care because they believed that the malaria episodes were minor. However, evidence from Ghana and other malaria endemic countries indicated that malaria is still the leading cause of death. Accordingly, this perception of the population is another health problem that deserves close attention by the governments and the stakeholders involved in the campaigns for better health. Community involvement once more plays a crucial role here. As if the drugs distributors selected by the community members are: well trained (able to educate their customers); willing to administer the first dosage and subsequently willing to do follow up visits to patients, it could ensure completion of the treatment and referral of patients in case of severe malaria episode. Therefore, by doing so it would lend a hand on the reduction of severe and critical malaria episodes.

Households' also appointed the use of left-over anti-malarial tablets (at home) as another reason that encouraged them not to seek formal care and rely on self-treatment. Evidences assign the misuse of anti- malarial drugs as one of the main causes for the development of malaria resistant parasite. This includes incomplete dosage or poor storage of the drugs, which affects directly its effectiveness. Hence, regardless of the introduction of the new first line anti-malarial drug (ACT) in Ghana, if individuals continue to misuse the new drugs, it may lead once again to the development of a parasite resistant to the new drug. Accordingly, more IEC campaigns and health education at population level should be done. This would be done to discourage households to rely on self-treatment using left-over drugs kept at home (incomplete dosage) or drugs poorly stored, such as those sold by untrained drug sellers or drug peddlers.

The private sector for healthcare such as hospitals and clinics is a market that has been in continuous expansion in Ghana and worldwide. In this study private malaria care providers were utilised in the two communities (Ga Mashie 13.3% and Gomoa 24.9%). This seeking behaviour pattern was more common in the Gomoa community where the number of public healthcare providers is very restricted. Although this is a sector in expansion, in countries where the health system is not well regulated, the private sector still instigates serious

concerns to consumers and public health authorities, especially policy-makers (Kumaranayake et al., 2000; and Prata et al., 2005). One of the main problems linked with this sector is that many for-profit providers make use of the information asymmetry existing between doctors/health personnel and patients to induce demand for healthcare. Therefore, they raise the financial burden on these poor households (Prata et al., 2005). Thus, there is need that the government enforces the regulation of the private sector for healthcare, primarily the fee and drug pricing regulation. At the same time, the government needs to encourage this sector through creation of incentives for the private providers. The incentives could include training of private healthcare, promoting policy guidelines that facilitate their performance and development. This action is in line with the recommendation of the World Bank, which encourages countries to be involved in the New Public Management (NPM) strategy. The NPM strategy is mainly concerned with the reinvention of government in such a way that a mix between the public and private sector is apparent, so that the private sector can cover the public sector on the areas where they have deficiencies. In Ghana, there is an apparent disparity on the distribution of health facilities between urban and rural areas. Thus, if the private sector for healthcare is well regulated and incentives are offered to those who provide health services in the most deprived areas of the country, it could be of great assistance to the government. This could assist at the reduction of the pressure on the resources allocated to each health facility as well as on the health personnel imposed due to the migration of rural population to urban communities seeking curative care.

To reduce the financial burdens of individuals from the most deprived areas in Ghana, such as the ones in Gomoa, the government could also provide subsidies directly to the private healthcare providers functioning in the deprived areas so that they could charge less. The fact that in most cases private providers in this study were more efficient and effective[14] than the public ones, should serve as an incentive to encourage a greater involvement of private providers on the improvement of malaria control and access to quality care.

The main reason that the malaria incidence is slightly higher in Gomoa (24.2%) than in Ga Mashie (23.2%) might be due to the differences on the malaria preventive measures used in each community and the level of health education for malaria control. Therefore, once again it is recommended that an emphasis should be put on the IEC for those households,

[14] This argument is based on the outcomes of the perceived quality of service in the two communities.

particularly in Gomoa where the malaria incidence is higher. By doing so, it may reduce the malaria incidence and thus, reducing the various social costs spent in the fight against malaria and allowing these funds to be diverted into other important social problems, including the construction of additional healthcare facilities for Gomoa and other deprived regions, such as the Northern, Upper East and West Regions; investment on the training of medical staff, especially doctors; and increase of funds engaged on malaria preventive measures such as increasing IEC campaigns.

Notwithstanding all the recommendations presented above, it is essential that a consultative process is undertaken by the interested stakeholders to assess the situation prior the implementation of any policy initiative directly linked with the malaria care seeking behaviour.

CHAPTER 6: CONCLUSION

Malaria is still one of the leading causes of morbidity and mortality worldwide. Most countries in Africa are malaria endemic, including Ghana. It kills millions of people every year, most of whom are pregnant women and children.

In the year 1998 more than 50.0% of the population in Ghana relied on informal care for malaria and it was regardless of their age groups. For these and other reasons, there was a need to undertake a study on malaria care seeking behaviour that reflected the current situation. The main objective of this study was to investigate the major factors influencing the choice of malaria care providers in two Ghanaian communities.

The descriptive statistics revealed that the households in the two communities had very different characteristics, principally those linked to socio-economic features. Accordingly, households in Ga Mashie showed patterns of people with better standards of living when compared to those in Gomoa. With respect to the households' assets, a great disparity was also apparent between the two communities; whereas the households in Ga Mashie had assets mainly like TV, fridge, radio and car, their counterparts in Gomoa owned more livestock.
Great differences were also apparent on the households' income and expenditure in the two communities; household members in Ga Mashie spent 2.5 times more than those in Gomoa.

The malaria care seeking behaviour in the two communities was also significantly different. Surprisingly, the incidence of malaria was slightly lower in Ga Mashie (23.2%) than in Gomoa (24.2%). Household members who reported having critical malaria episodes in both communities were more aware of the risk of the illness and thus, sought malaria care mainly from formal care providers. This suggests that the severity of the malaria episode does play a role on the household's malaria care seeking behaviour. In addition, households in the two communities were familiarised with the malaria symptoms which highlighted that they could identify malaria at an early stage. Thus, this could allow them to avoid the malaria episode to progress towards a severe or critical phase.

Another remarkable finding is that most of the study participants who reported having malaria within the study recall period sought care with formal malaria care providers. This surprising result was incongruent with the findings of studies conducted previously. Hence, this proposes that the reforms geared toward the improvement of healthcare (malaria) seeking behaviour in Ghana (including health insurance) are positively impacting the population.

Despite the abovementioned findings, some individuals still rely on informal malaria care (especially drug sellers) and this pattern was much higher in Gomoa. Different reasons for the reliance on the informal care or no care for malaria were provided by those households and they varied from community to community. In Ga Mashie household members appointed mainly behavioural factors, attitude and believes while, households in Gomoa appointed mainly financial and geographical barriers to the formal healthcare facilities.

The MNLM results showed that the choice of malaria care providers is influenced by five factors including religion, location (urban or rural), socio-economic status and age . Age was the most frequently outlined predictor of malaria care seeking behaviour in most comparisons. The significance of factors influencing the choice of malaria care provider varied when comparing formal care versus informal care and formal care versus no care, and from community (Ga Mashie) to community (Gomoa). For instance, the variable religion often ignored in research, turned out to be the most statistically significant predictor of malaria care seeking behaviour in Ga Mashie. In Gomoa, the socio-economic status was the most significant. Therefore, the religion and the socio-economic status of the households should not be ignored on future policy initiatives.

The policy implications of this study suggest that future health reforms to improve malaria care seeking behaviour and control should consider using multi-facet approaches. The socio-economic status variable turned out as a significant predictor of malaria care seeking behaviour in the Gomoa community. This suggests that joint efforts should be made between the various economic sectors in the countries (including the informal sector) to create multi-sectorial approaches to correct the deviations on the households' healthcare seeking behaviour.

In summary, the study key policy implications in a more general level include:

- Creating policy initiatives that will promote HMM to improve access to proper and effective malaria treatment;
- Promote IEC campaigns to educate the population at community and household levels, including education on the effects of late treatment of malaria through the use of the media such radios, the churches and mosques.
- Create policy initiatives that will improve the enrolment of household members' health insurance coverage in order to reduce financial barriers;
- Incentive public-private mix in the healthcare sector in order to improve access to effective and proper malaria care, with a great focus on the training of drug sellers and fair distribution of healthcare facilities, especially in the most deprived communities;
- Creation of multi-sectorial strategies that could assist on the improvement of living standards of the household members in the community, including the involvement of private business and NGOs on the fight against malaria, through the support of small traders willing to improve access to prompt malaria care.

The study results successfully revealed that the choice of malaria care seeking behaviour between formal care and informal care in Ghana's urban and rural communities is subject to a variety of socio-demographic and socio-economic factors. Moreover, the results also revealed that the household members in the two communities have very different reasons to rely on the informal malaria care providers. Therefore, based on these findings it is recommended that policies to improve malaria care seeking behaviour in the two communities should be implemented at district level to take into consideration the variability between the two communities. The formal sector should be encouraged in the Ga Mashie community, where there is both better financial and geographic access to healthcare facilities. In Gomoa, where the situation is the inverse of Ga Mashie, informal malaria care should be encouraged, but with especial attention on the training of drug distributors. At country level it is recommended that strategies to improve HMM be reinforced in all the communities in Ghana, through mass IEC campaigns on HMM. Furthermore, it is recommended greater involvement of private healthcare provider, especially in areas with few public healthcare facilities, like Gomoa.

Regarding future researches, there is a need for a similar study to be conducted, but with greater focus on the impact of health insurance on the choice of malaria care provider amongst households in rural areas of the country.

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APPENDIX A: Data Collection Instrument

HOUSEHOLD SURVEY ON MALARIA-CARE SEEKING BEHAVIOUR

UNIVERSITY OF CAPE TOWN

SCHOOL OF PUBLIC HEALTH - HEATH ECONOMICS UNIT

Instrument Number_____

District _____

Rural/Urban_____

Interviewer's name_____

Starting Time_____

INTRODUCTION

[***Interviewer:*** *Read the following introductory statement*.]

My name is _____ and I am conducting a survey about malaria issues in Ga Mashie and Gomoa. This is on behalf of a Master student of the University of Cape Town in South Africa. We are interested in learning what people do when they fall sick with malaria. This research will inform the government on the availability and accessibility of malaria services in your community. Further, it might influence decisions on malaria coverage. We are interviewing many different households in Ga Mashie and Gomoa. This interview will be kept **completely confidential**, and if at any time you wish to stop the interview or not answer a specific question, this is entirely up to you. Would you like to participate? 1= No 2=Yes

Are you the household head?

1=No 2=Yes

NB: Preferably respondents should be household heads. If household head is not around, respondent must NOT be below the age of 18 years.

PART 1: HOUSEHOLD CHARACTERISTICS.

I would like to ask some questions about your household.

1. How many people live in your household (family members)? _____ ☐ CODE

(NB: Interviewer: This section and all other sections must be answer by the household head. He/she will then provide information about other 3 household members. Please encourage the household head to give information about an elder, young and child household member).

2. CODE *Identifier code for household member* (**Ask for names**)	3. Age (in years) *Enter age as at the last birthday*	4. Gender *1=M* *2=F*	5. Relationship of members to the household head. *1= head* *2= wife/Husband* *3= Daughter/son* *4= Grandchild* *5= Parent* *6= Grandparent* *7= Brother/sister* *8= other relative* *9= other(specify below next to the member)* *10=Tenant* *11=Sister/brother in Law* *50= Don't Know*	6. Household members' marital status. *1= Single* *2= Married* *3= Divorced* *4= Living together* *5= Widow* *9= other (specify below next to the member)*	7. Household members' religions. *1= Christian* *2= Muslim* *3=African religions* *4= Fekankar* *5= Buddhist* *9= other (specify below next to the member)* *50= Don't Know*	8. What is the highest educational level of each person? *1= no schooling* *2= Crèche – Sub B* *3= Primary* *4=Middle/JSS* *5= Secondary/SSS* *6= Univ. Degree* *7= Diploma* *8= Vocational School* *9= Literacy training* *10= Other(specify below next to the member)* *50=Don't Know* *60= not applicable*	9. What is the occupation of each person listed? *1= Unemployed* *2= Subsistence Farmer* *3= Agricultural labourer* *4= Non-agricultural labourer* *5= Skilled labourer/tradesman* *6= Small Trader* *7= Civil servant* *8= Soldier/Security* *9= Student* *10= Housewife/Self-employed* *11= Other (specify)* *12= Pensioner* *13=Fisherman* *60= not applicable*
Member1 ☐ **(Household Head)**							
Member2 ☐							
Member 3 ☐							
Member 4 ☐							

10. Are you or any member of your household covered by a health insurance? (*circle correct answer*) ***If Yes → 11***

1= No 2= Yes 50= Don't Know

11. Please specify which one? _____ CODE ☐

PART 2: HOUSEHOLD SOCIO-ECONOMIC PROFILE & POSSESSIONS

Now I want to ask you some questions about where do you get money for your daily expenses and what you have at your house (possessions).

12. About how much of the consumed food in your house you grow yourself? (*Circle the relevant one)*

1= Very little/none
2= About half
3= Almost all
4= Don't know

13. About how much money is spent on food in your household monthly (excluding food grown by the household)? _____ Cedis

14. What is the **MAIN** source of water for this household? (*Circle the relevant one)*

1= Piped (tap) water, in the house
2= Piped (tap) water, the compound
3= Public Tap
4= Water carrier or Tanker
5= Borehole in the compound
6= Borehole (Communal)
7= Rain water tank in the compound
8= River
9= Dam/Pool/Stagnant water
10= Well/Spring
11= Other (specify) _____ CODE ☐

15. What is the main source of energy/fuel used for cooking by this household? (*Circle the relevant one)*

1= Electricity
2= Gas
3= Kerosene
4= Charcoal
5= Firewood
6= Animal dung
7= Solar energy
8= Other (specify) _____ CODE ☐

16. About how much money does your household spend on the following items, in Cedis:

1= Transport: (**per month**) _____ Cedis

2= Electricity/other fuel sources mentioned in ***question 19*** (**per month**): _____ Cedis

3= Water (**per day**): _____ or (**per month) _____**Cedis

4= Rent (if house is rented) (**per month**): _____ Cedis (*if house is owned enter zero*)

17. What type of toilet facility is available for this household? (*Circle the relevant one)*

1= Flush toilet (WC) in the house	5= Other pit latrine
2= Flush toilet (WC) in the compound	6= Bucket toilet
3= Public toilet	7= No toilet
4= Pit latrine with ventilation (K-VIP)	8= Other(specify)_____ CODE ☐

18. Could you tell me if someone in your household owns any of the following, and how many of each

(NB: Interviewer: In each category, indicate the number of items owned by the respondent. If household does not have an item, enter zero.)

ANIMALS	Yes	No	How many	HOUSEHOLD GOODS	Yes	No	How many
1. Chickens	1	0		7. Radio	1	0	
2. Goats	1	0		8. Television	1	0	
3. Sheep	1	0		9. Tractor	1	0	
4. Cows	1	0		10. Fridge	1	0	
5. Pigs	1	0		11. Bicycle	1	0	
6. Other *(Ask to specify)*_____				12. Car	1	0	

(NB: Interviewer: This table is to be answered for the same household members identified in question 2 only. These members must be employed)

Any of the four previously selected household member who receive any income. *(Member 1 must be the respondent)*	19. What is the **monthly** income of each household member? *Fill in amount in Cedis..*	20. Is there any other source of income in this household? *0= No* *1= Yes* *50= Don't know* ***If Yes →21***	21. How much money does each receive from other sources **monthly**? *Fill in amount in Cedis. If nothing is received fill in zero.*
Member1 ☐ **(Household Head)**			
Member2 ☐			
Member3 ☐			
Member4 ☐			

OBSERVATIONS (*Interviewer please observe and fill in the following*)

22. Type of walls of house

1= Reeds
2= Canvas
3= Cement blocks
7= Wood
4= Mud or mud bricks
5= Fire bricks
6= Stone/cement
8=Other (specify)_____ CODE ☐

23. Type of roof for the house

1= Thatch
2= Tile
3= Corrugated Iron sheets
7= Wood
4= Canvas
5= Asbestos
6= Slate
8= Other (specify) _____ CODE ☐

PART 3: MALARIA TREATMENT SEEKING BEHAVIOUR AND QUALITY OF CARE

Now I want to ask you some questions about your family Malaria history and where you go when anyone of you is sick with Malaria

Identifier CODE for household member *(Member 1 must be the respondent)*	24. When was the last time that you or any of the other three members was sick with Malaria or fever? *1=1month/<1month ago* *2=>2months/<6 months ago* *3=7months/<1years ago* *4=1year/>1 year* *5=No Malaria* *50= Don't Know*	25. How did you know that it was Malaria? *(Ask respondent to describe the symptoms. If space is small use back of page).*	26. How do you rate the Malaria episode? *1= Minor* *2= Moderate* *3= Severe* *4=Critical Condition*	27. Did you or any of the household members seek care? *1= No* *2= Yes* *50 = Don't Know* ***If No, → 28*** ***If Yes, → 29***	28. Why not? *(Ask respondent to say give reasons. If space is small use back of the next page)* ***(NB: Interviewer end interview here for this respondent.)***	29. Where did you seek care first? *1= Public hospital* *2= Private hospital* *3= public clinic* *4=private clinic* *5= public/private pharmacy* *6= Traditional healer* *7= Faith healer* *8=Drug seller* *9= Drug peddler* *10= Self-treatment/ no treatment* *11= Other (specify below next to the member)* ***If answered 1 to 5 → cont 31*** ***If answered 6 to 11→ 30***	30. If did not seek care in number 1 to 5 in **question 32**, why not? *1= Too expensive* *2= Too far* *3= Too expensive & far* *4=Was not severe* *5= Herbs & prayers are more effective* *6= Had drugs at home* *7= Don't like hospitals* *9= other (specify below next to the member) 50= Don't Know*	31. How did you get there? *1= Walking* *2= Taxi* *3= Bus* *4=Train* *5=Own transport* *6=Stayed at home* *9= other (specify below next to the member)*	32. How long did it take you to get there? *(Can write responses in hours or minutes).*
Member1 ☐ **(Household Head)**									
Member2 ☐									
Member 3 ☐									
Member 4 ☐									

PART 4: QUALITY OF CARE

Now I want to ask you about the how was the service provided to you in the health facility where you sought Malaria care.

(NB: Interviewer. These questions must be asked ONLY to household members who were identified as having had a Malaria episode and sought care from #1 to 5(question 29).

Identifier CODE for household member *(Member 1 must be the respondent)*	33. Was the facility where you sought Malaria care clean? *1= No* *2= Yes* *50=Don't Know*	34. Were the facility open hours convenient for you? *1= No* *2= Yes* *50=Don't Know* ***If No**, do you have any suggestion? (Place suggestions below, next to the member)*	35. Did you get the anti-Malarial drugs? *1= No* *2= Yes* *3=Please specify which one below next to the member* ***If No → 36***	36. Where did you get the drugs? *1=Public/private hospital* *2= Public/ private pharmacy* *3= Drug seller (in the market)* *4=Drug peddler* *9= other (specify below next to the member)*	37. How long did you have to wait to receive care? *(Can write responses in hours or minutes).*	38. Do you consider _____a long time? *1= No* *2= Yes* *50=Don't Know*	39. Did the facility staff treat you well? *1= No* *2= Yes* *50=Don't Know*	40. Did they tell you what sickness you have? *1= No* *2= Yes* *50=Don't Know*	41. Did you have Malaria test in the facility? *1= No* *2= Yes* *50=Don't Know*	42. How satisfied were you with the service provided? *1= Very satisfied* *2= Satisfied* *3=Neither satisfied, nor dissatisfied* *4=Dissatisfied* *5=Very dissatisfied* *50=Don't Know*
Member1 ☐ **(Household Head)**										
Member2 ☐										
Member 3 ☐										
Member 4 ☐										

43. Did you have to pay for the service provided in the health facility?

1= No *2= Yes* *50= Don't Know*

44. What did you pay for? *(Tick √ where applicable)*

Costs	**Member 1** ☐ **(Household Head)**	Member 2 ☐	Member 3 ☐	Member 4 ☐	Member 5 ☐
1=Consultation cost					
2=Drug cost					
3=Malaria test					
4=Other *(specify next to the member)*					

This is the end of our interview. Thank you very much for your time and assistance.

_____Time ended

Interviewer Final Remarks

How many other adults were present during the interview? _____

Did any of these other people contribute to the interview, other than the respondent?

1= No 2= Yes

Any other observation? Or comments based on the observation?

_____

_____

_____

APPENDIX B: Independent variables collapsed into dummy variable

Initial variables	Variable categories	New variables	Categories
Gender	1. Male 2. Female	gender_dummy	0. Male 1. Female
Marital status	1. Single 2. Married 3. Divorced 4. Living together 5. Widow 9. Other	marital_dummy	0. Not married (1,3,4,5,9) 1. Married (2)
Religion	1. Christian 2. Muslim 3. African religions 4. Fekankar 5. Buddhist 9. Other	religion_dummy	0. Non Christian (2,3,4,5,9) 1. Christian (1)
Education	1. No schooling 2. Primary(completed) 3. Middle/JSS 4. Secondary/SSS 5. Univ.Degree 6. Diploma 7. Vocational school 8. Literacy training 9. Other	education_dummy	0. No schooling (1) 1. Schooling (3,4,5,6,7,8,9)
Occupation	1. Unemployed 2. Subsistance farmer 3. Agricultural labourer 4. Non-agricultural labourer 5. Skilled labourer/tradesman 6. Small trader 7. Civil servant 8. Soldier/security guard 9. Student* 10. Housewife/self-employed 11. Other 12. Pensioner* 13. Fisherman	employment_dummy	0. Unemployed (1) 1. Employed (2,3,4,5,6,7,8,10,11,13)

Location	1. Rural 2. Urban	Location	0. Rural 1. Urban
Health insurance	1. No 2. Yes 50. Don't know	health_insurance	0. No insurance(1,50) 1. Health insurance (1)
Malaria care prov	1.Public hospital 2. Private hospital 3. Public clinic 4.Private clinic 5.Public/private pharmacy 6.Traditional healer 7.Faith healer 8.Drug seller 9.Drug peddler 10. Self-treatment 11. Other	malaria care provider	1. Formal care (1,2,3,4,5) 2. Informal care (6,7,8,9,10,11) 3. No care (1 seek care)
Seek care	1.No 2.Yes 50.Don't know		

*** These variables were not used since students and pensioners are neither employed nor unemployed.**

APPENDIX C: Independent Variables Correlation Matrix

C.1 Correlation Matrix for the two Communities Combined

	hh_size	*Age*	*Locat*	*Gender*	*Marits*	*Relig*	*Educa*	*Employ*	*Insur*	*SES*
hh_size	**1.0000**									
Age	0.0722	1.0000								
Locat	0.1034	0.1459	1.0000							
Gender	0.0485	0.0689	-0.0247	1.0000						
Marits	-0.0229	0.1420	0.0552	0.1168	1.0000					
Relig	0.0345	0.0653	0.0684	-0.0559	-0.0647	1.0000				
Educa	-0.0152	-0.0733	0.2403	-0.0942	-0.2277	0.0843	1.0000			
Employ	0.0727	0.0469	0.2147	-0.0052	-0.0406	-0.0420	0.1154	1.0000		
Insur	0.0704	0.1413	0.1359	0.0095	0.0060	0.0397	0.1694	0.0581	1.0000	
SES	-0.0050	0.0418	*0.5992*	-0.0040	-0.0389	0.0859	0.3533	0.3258	0.2553	1.0000

Locat-Location, Marits- Marital status, Relig- Religion, Educa- Education, Employ- Employment, Insur**-Insurance**

C.2 Correlation Matrix for the Ga Mashie Community

	hh_size	*Age*	*Gender*	*Marits*	*Relig*	*Educa*	*Employ*	*Insur*	*SES*
hh_size	1.0000								
Age	0.1311	1.0000							
Gender	0.0307	0.0959	1.0000						
Marits	0.0156	0.1540	0.1390	1.0000					
Relig	0.0104	0.0213	-0.0414	-0.0811	1.0000				
Educa	-0.0274	-0.1378	-0.0995	-0.2622	0.0855	1.0000			
Employ	0.1199	0.0812	-0.0056	-0.0870	-0.0547	0.0059	1.0000		
Insur	0.0102	0.1017	0.0047	0.0076	-0.0862	0.0936	0.0015	1.0000	
SES	-0.0472	-0.0024	0.0103	-0.0307	0.0562	0.2475	0.1822	0.2419	1.0000

C.3 Correlation Matrix for Gomoa

	hh_size	*Age*	*Gender*	*Marits*	*Relig*	*Educa*	*Employ*	*Insur*	*SES*
hh_size	1.0000								
Age	-0.0619	1.0000							
Gender	0.1071	0.1185	1.0000						
Marits	-0.1082	0.1502	0.0495	1.0000					
Relig	0.0964	0.1522	-0.0992	-0.0428	1.0000				
Educa	0.0087	-0.1529	-0.0030	-0.2267	0.0568	1.0000			
Employ	-0.1248	-0.2129	0.0415	0.0266	-0.0703	0.2448	1.0000		
Insur	0.1814	0.1120	0.0603	-0.0146	0.4618	0.2547	0.0375	1.0000	
SES	-0.1188	-0.1579	0.0395	-0.2272	0.0838	0.3408	0.4842	0.2406	1.0000

APPENDIX D: Results of Principal Component Analysis (PCA)

D.1 PCA of the Ga Mashie Community (urban)

(Principal components; 7 components retained)

Component	Eigenvalue	Difference	Proportion	Cumulative
1	3.35495	1.13560	0.1973	0.1973
2	2.21935	0.27612	0.1305	0.3279
3	1.94322	0.23808	0.1143	0.4422
4	1.70514	0.19777	0.1003	0.5425
5	1.50738	0.28025	0.0887	0.6312
6	1.22712	0.18546	0.0722	0.7034
7	1.04166	0.08855	0.0613	0.7646
8	0.95311	0.09560	0.0561	0.8207
9	0.85751	0.12017	0.0504	0.8711
10	0.73734	0.12512	0.0434	0.9145
11	0.61222	0.16355	0.0360	0.9505
12	0.44867	0.05633	0.0264	0.9769
13	0.39233	0.39233	0.0231	1.0000
14	0.00000	0.00000	0.0000	1.0000
15	0.00000	0.00000	0.0000	1.0000
16	-0.00000	0.00000	-0.0000	1.0000
17	-0.00000	0.00000	-0.0000	1.0000

	Eigenvectors					
Variable	1	2	3	4	5	6
Electricity-gas	0.37725	0.22714	-0.16885	-0.09459	-0.37037	-0.24753
Charcoal-wood-kerosene	-0.37725	-0.22714	0.16885	0.09459	0.37037	0.24753
Chicken	-0.08748	-0.04139	0.05861	0.12314	-0.01023	0.08573
Goat	0.03852	0.14245	0.13282	0.30442	-0.08458	0.14640
Radio	0.21389	0.14210	0.18970	0.14263	0.43747	-0.12637
Television	0.24411	0.20150	0.20835	0.14702	0.44571	-0.11053
Fridge	0.27821	0.26903	0.04614	0.19640	0.25356	-0.08189
Bicycle	0.17883	0.13023	0.04225	0.43800	-0.12434	0.15806
Car	0.27101	0.17429	-0.04567	-0.07537	-0.10959	0.02576
Water at home	0.19800	-0.47290	0.24317	0.29367	-0.19524	-0.13263
No water at home	-0.19800	0.47290	-0.24317	-0.29367	0.19524	0.13263
No flush toilet	-0.34132	0.21373	-0.19718	0.41806	-0.12969	-0.13573
Flush toilet	0.34132	-0.21373	0.19718	-0.41806	0.12969	0.13573
Mud bricks wall	-0.19629	0.24773	0.56107	-0.13817	-0.21109	-0.12154
Cement blocks wall	0.19629	-0.24773	-0.56107	0.13817	0.21109	0.12154
Corrugated iron sheet	-0.11787	-0.17871	-0.08893	-0.16077	0.14303	-0.60013
Thatch-other roof	0.12528	0.03129	0.05462	-0.10077	-0.13089	0.57133

Eigenvectors

Variable	7
Electricity-gas	0.05099
Charcoal-wood-kerosene	-0.05099
Chicken	0.51849
Goat	0.55369
Radio	-0.08159
Television	-0.17343
Fridge	-0.00917
Bicycle	0.11929
Car	-0.17991
Water at home	-0.14357
No water at home	0.14357
No flush toilet	-0.25087
Flush toilet	0.25087
Mud bricks wall	-0.04486
Cement blocks wall	0.04486
Corrugated iron sheet	0.05301
Thatch-other roof	-0.40257

(Unrotated principal components)

Scoring Coefficients

Variable	1
Electricity-gas	*0.75450*
Charcoal-wood-kerosene	0.00000
Chicken	-0.08748
Goat	0.03852
Radio	0.21389
Television	0.24411
Fridge	0.27821
Bicycle	0.17883
Car	0.27101
Water at home	0.39600
No water at home	0.00000
No flush toilet	*-0.68264*
Flush toilet	0.00000
Mud bricks wall	-0.39258
Cement blocks wall	0.00000
Corrugated iron sheet	-0.11787
Thatch-other roof	0.12528

D.2 PCA of the Gomoa community (rural)

(Principal components; 7 components retained)

Component	Eigenvalue	Difference	Proportion	Cumulative
1	3.54235	0.45817	0.2084	0.2084
2	3.08418	1.20074	0.1814	0.3898
3	1.88344	0.18529	0.1108	0.5006
4	1.69816	0.20461	0.0999	0.6005
5	1.49355	0.30385	0.0879	0.6883
6	1.18970	0.15750	0.0700	0.7583
7	1.03220	0.23292	0.0607	0.8190
8	0.79928	0.08643	0.0470	0.8661
9	0.71285	0.06072	0.0419	0.9080
10	0.65213	0.10219	0.0384	0.9463
11	0.54994	0.18773	0.0323	0.9787
12	0.36221	0.36221	0.0213	1.0000
13	0.00000	0.00000	0.0000	1.0000
14	0.00000	0.00000	0.0000	1.0000
15	-0.00000	0.00000	-0.0000	1.0000
16	-0.00000	0.00000	-0.0000	1.0000
17	-0.00000	0.00000	-0.0000	1.0000

	Eigenvectors					
Variable	1	2	3	4	5	6
Electricity-gas	0.34737	-0.11134	0.39394	0.22363	-0.10209	-0.20757
Charcoal-wood-kerosene	-0.34737	0.11134	-0.39394	-0.22363	0.10209	0.20757
Chicken	0.03638	0.13612	0.10335	0.34485	0.08390	0.54526
Goat	0.08668	0.10420	-0.18681	0.41458	0.15597	0.37591
Radio	0.25871	0.03787	0.02303	0.03402	0.04678	0.29915
Television	0.37853	-0.01631	0.01666	0.07906	0.16755	0.10478
Fridge	0.32413	-0.07169	0.09990	-0.05782	0.26710	0.09336
Bicycle	0.06851	-0.03739	0.18755	0.18139	0.25814	-0.31598
Car	0.10907	0.30085	0.00058	-0.20011	0.11329	0.19033
Water at home	0.24470	0.32851	-0.30859	-0.03423	0.28116	-0.28337
No water at home	-0.24470	-0.32851	0.30859	0.03423	-0.28116	0.28337
No flush toilet	-0.18680	-0.37476	0.02404	0.00063	0.51752	0.00727
Flush toilet	0.18680	0.37476	-0.02404	-0.00063	-0.51752	-0.00727
Mud bricks wall	-0.31164	0.26057	0.06782	0.43178	0.05489	-0.17048
Cement blocks wall	0.31164	-0.26057	-0.06782	-0.43178	-0.05489	0.17048
Corrugated iron sheet	0.13074	-0.32752	-0.44569	0.27411	-0.18294	-0.07459
Thatch-other roof	-0.13074	0.32752	0.44569	-0.27411	0.18294	0.07459

Variable	Eigenvectors 7
Electricity-gas	-0.21688
Charcoal-wood-kerosene	0.21688
Chicken	0.03935
Goat	-0.35035
Radio	0.38684
Television	-0.08250
Fridge	0.27972
Bicycle	0.58719
Car	0.24740
Water at home	-0.14811
No water at home	0.14811
No flush toilet	-0.11594
Flush toilet	0.11594
Mud bricks wall	0.09623
Cement blocks wall	-0.09623
Corrugated iron sheet	0.16074
Thatch-other roof	-0.16074

(Unrotated principal components)

Scoring Coefficients

Variable	1
Electricity-gas	*0.69474*
Charcoal-wood-kerosene	0.00000
Chicken	0.03638
Goat	0.08668
Radio	0.25871
Television	0.37853
Fridge	0.32413
Bicycle	0.06851
Car	0.10907
Water at home	0.48939
No water at home	0.00000
No flush toilet	0.00000
Flush toilet	0.37359
Mud bricks wall	0.00000
Cement blocks wall	0.62329
Corrugated iron sheet	0.00000
Thatch-other roof	*-0.26148*

APPENDIX E: Full results of the MNLM

E.1 Multinomial Logistic Regression Analysis for the Combined Sample

```
Multinomial logistic regression                 Number of obs   =        442
                                                LR chi2(20)     =     101.45
                                                Prob > chi2     =     0.0000
Log likelihood = -229.86196                     Pseudo R2       =     0.1808

------------------------------------------------------------------------------
Malaria_care  |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
informal care |
hh_size       |   .0387442   .0534446     0.72   0.468    -.0660053    .1434937
Age           |   .0177127   .0068969     2.57   0.010     .004195     .0312303
Location      | -1.575381    .393818     -4.00   0.000   -2.34725     -.8035119
Gender        |  -.2716882   .2870217    -0.95   0.344    -.8342403    .290864
Insurance     |  -.1991948   .3698051    -0.54   0.590    -.9239995    .5256099
Marital status|  -.2761919   .3258661    -0.85   0.397    -.9148777    .3624939
Religion      |  1.667964    .8734184     1.91   0.056    -.0439046   3.379833
Education     |  -.091818    .3283378    -0.28   0.780    -.7353482    .5517123
Employment    |   .2380244   .4922263     0.48   0.629    -.7267215   1.20277
SES           |  -.2651742   .0964268    -2.75   0.006    -.4541672   -.0761812
Constant      | -3.013131   1.131095     -2.66   0.008   -5.230036    -.7962255
--------------+---------------------------------------------------------------
no care       |
hh_size       |  -.2303258   .1403401    -1.64   0.101    -.5053874    .0447357
Age           |   .0231291   .0131828     1.75   0.079    -.0027086    .0489669
Location      |  -.0537206   .7154761    -0.08   0.940   -1.456028    1.348587
Gender        |  -.2357425   .5211711    -0.45   0.651   -1.257219     .785734
Insurance     |  -.9821805   .6827442    -1.44   0.150   -2.320334     .3559735
Marital status|  -.7244857   .5647666    -1.28   0.200   -1.831408     .3824366
Religion      |   .523115   1.080261      0.48   0.628   -1.594157    2.640387
Education     |   .6040037   .8297338     0.73   0.467   -1.022245    2.230252
Employment    |  -.0043357   .6923053    -0.01   0.995   -1.361229    1.352558
SES           |   .158657    .1534139     1.03   0.301    -.1420287    .4593427
Constant      | -2.929464   1.648958     -1.78   0.076   -6.161363    .3024352
------------------------------------------------------------------------------
(Outcome Malaria_care_provider==formal care is the comparison group)
```

E.2 Multinomial Logistic Regression Analysis for the Ga Mashie Community

```
Multinomial logistic regression                 Number of obs   =        269
                                                LR chi2(18)     =      59.07
                                                Prob > chi2     =     0.0794
Log likelihood = -110.53908                     Pseudo R2       =     0.1763

------------------------------------------------------------------------------
Malaria_care  |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
Informal care |
hh_size       |   .1091375   .0662448     1.65   0.099    -.0206999    .238975
Age           |   .0106766   .0125146     0.85   0.394    -.0138515    .0352047
Gender        |  -.6109904   .5273756    -1.16   0.247   -1.644628     .4226467
Insurance     |   .0025904   .5545213     0.00   0.996   -1.084251    1.089432
Marital status|  -.7845525   .5626581    -1.39   0.163   -1.887342     .318237
Religion      | 18.73497    1.010202     18.55   0.000   16.75501    20.71493
Education     |  -.2996283   .6388474    -0.47   0.639   -1.551746     .9524896
Employment    |   .2122318   .6565612     0.32   0.747   -1.074605    1.499068
SES           |  -.1374438   .1651069    -0.83   0.405    -.4610474    .1861597
Constant      |-21.43777          .        .     0.000           .           .
--------------+---------------------------------------------------------------
No care       |
hh_size       |  -.1756808  .1467489    -1.20   0.231    -.4633034   .1119419
Age           |   .022181   .0147989     1.50   0.134    -.0068243   .0511862
Gender        |  -.2046848  .5944973    -0.34   0.731   -1.369878    .9605084
Insurance     |  -.7718483  .7136065    -1.08   0.279   -2.170491    .6267948
Marital status|  -.6239503  .6423098    -0.97   0.331   -1.882854    .6349538
Religion      |   .3210348 1.107155     0.29   0.772   -1.848948   2.491018
Education     |   .1072072  .8783648     0.12   0.903   -1.614356   1.82877
Employment    |  -.0305966  .7342846    -0.04   0.967   -1.469768   1.408575
SES           |   .1145247  .1550456     0.74   0.460    -.189359    .4184085
Constant      | -2.475703  1.63167     -1.52   0.129   -5.673717    .7223113
------------------------------------------------------------------------------
(Outcome Malaria_care_provider==formal care is the comparison group)
```

E.3 Multinomial Logistic Regression for the Gomoa Community

```
Multinomial logistic regression                 Number of obs   =        173
                                                LR chi2(18)     =      83.62
                                                Prob > chi2     =     0.0060
Log likelihood = -110.86978                     Pseudo R2       =     0.1763

------------------------------------------------------------------------------
Malaria_care  |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
Informal care |
hh_size       |  -.0354237   .0800689    -0.44   0.658    -.1923559    .1215085
Age           |   .0160779   .008532      1.88   0.060    -.0006445    .0328002
Gender        |  -.0661866   .3541824    -0.19   0.852    -.7603714    .6279982
Insurance     |  -.2388803   .5210251    -0.46   0.647   -1.260071     .7823101
Marital status|  -.024029    .416334     -0.06   0.954    -.8400286    .7919706
Religion      |  1.112165    .9589366     1.16   0.246    -.7673159   2.991647
Education     |   .1016211   .3959644     0.26   0.797    -.6744549    .877697
Employment    |   .3778692   .878057      0.43   0.667   -1.343091    2.098829
SES           |  -.3599592   .1207487    -2.98   0.003    -.5966223   -.1232962
Constant      | -2.283266   1.421006     -1.61   0.108    -5.068386    .5018543
--------------+---------------------------------------------------------------
No care       |
hh_size       | -1.029112    .555359     -1.85   0.064    -2.117596    .0593712
Age           |   .0145537   .0372009     0.39   0.696     -.0583587   .0874662
Gender        |   .1685318  1.327916      0.13   0.899    -2.434136    2.771199
Insurance     |-33.64574    1.57e+07    -0.00   1.000    -3.08e+07    3.08e+07
Marital status| -1.741372   1.269075    -1.37   0.170    -4.228714    .7459693
Religion      | 14.71596   9336.431      0.00   0.999    -18284.35    18313.78
Education     | 20.09708   9336.431      0.00   0.998    -18278.97    18319.17
Employment    | 19.4999    9336.431      0.00   0.998    -18279.57    18318.57
SES_          |   .4351924  .3489643     1.25   0.212     -.2487651    1.11915
Constant      |-52.71586           .         .    0.000            .           .
------------------------------------------------------------------------------
(Outcome Malaria_care_provider==formal care is the comparison group)
```