CHAPTER ONE

INTRODUCTION

1.1 **Background of study**

Long waiting time remains an issue of major concern in health care systems, despite considerable amount of resources devoted to financing hospital supply (Siciliani, 2005).

Waiting time is generally referred to as the length of time between when a patient is enrolled on a waiting list and when the service is received (McDonald et al, 1998). A waiting list is a list that patients are enrolled in once they opt to pursue an elective procedure (nonemergency surgery) assuming that they cannot get this procedure performed immediately. However, depending on the type of services being sought, different definitions are given to waiting time **:** such as time from seeing a General Practitioner (GP) to treatment, time from seeing specialist to treatment, time from being enrolled on hospital waiting list to treatment, among others. Thus there are different measurements of waiting times according to whether treatment is offered immediately (outpatient health care) or a patient is put on waiting list (for elective procedures) (Chua, 2005/2006). On these bases waiting time may also differ from country to country as situations apply.

Waiting time can arise under various situations. Generally in all situations waiting time arises as a result of variations in supply and demand. When demand for health care exceeds supply for whatever reason, supply of health care cannot be instantaneous and consumers will have to wait to access health care.

Using the Queuing theory, Lindsay and Feingenbuam (1984) explained how waiting times generally result in economic situations out of queues. Queues are observed to emerge in two distinct settings in economic theory. On the one hand they result as a byproduct of stochastic variation in one or both sides of the market where instantaneous adjustment of output and or prices is prohibitively costly (De Vany, 1976). On the other hand queues emerge in non stochastic settings when piece is below or above the market clearing level due to transaction cost or external price constraints. Where prices are below market clearing level, queues of demanders will form to ration available supply. In this case queues will form and grow until the expected wait in the queues – waiting time exact a cost in time equal to the value of the goods received for the marginal demanders (Lindsay and Feingenbuam, 1984).

In the literature waiting time is said to be commonly associated with universally financed health care systems mostly in the UK and other OECD countries, and Ghana for that matter (DeCoster, 1998). When health care is free of charge and supply is constrained, part of the demand remains untreated and the formation of a waiting list or queues occurs and people will have to wait to access health care (Siciliani,2005). So in most OECD countries where public health care is free, admissions via waiting list are commonly used as a rationing device for non – emergency procedures.

In order to overcome the problem of long waiting times, countries try to implement policies to introduce greater patient choice like making provision for private care that mostly provide health care at shorter waiting times. In most cases patient choice is seen as an instrument to reduce waiting times for elective (non-emergency) hospital services (Diane e tal, 2006).

This study studies waiting time for seeking outpatient health care for malaria treatment. Thus this study defines waiting time as the length of time a patient spend at a healthcare facility before receiving an outpatient healthcare service.

Dalinjong and Laar (2012) reported that long waiting times at the hospitals especially in urban areas is a phenomenon of concern and practical problem in Ghana, and this can affect the control of malaria toward the achievement of the millennium development goal on malaria eradication for Ghana.

According to Mohamad (2006), excessive waiting time for outpatient treatment seeking arise due to three factors; the registration time, insufficient number of counter service staff and insufficient number of doctors.

Waiting time is important to look at because it has been shown to be a significant determinant of demand for health care. According to Pizer (2010), the time spent waiting for an outpatient appointment limits demand in health care delivery systems that do not use monetary prices. This study finds out the effect of waiting time on outpatient demand for malaria treatment in Ghana. Seeking care for simple outpatient cases in Ghana normally involves long hours of waiting especially in hospitals covered by the National Health Insurance Scheme.

In Ghana malaria dominate outpatient sickness at the hospitals, It remains the number one cause of morbidity accounting for 40% of outpatient attendance with annual reported cases of 2.2 million between 1995 -2001, and over 10% ending up on admission, and the leading cause of mortality in children under five years (Asenso-Okyere & Asante,2003).

It is also the leading cause of workday loss due to illness in the country. For instance, it accounts for 3.6 ill days in a month, 1.3 workdays absent and 6.4% of potential income loss to Ghana for 1998/99. The disease is again responsible for 10.2% of all healthy life lost from other diseases

making it the chief cause of lost days of healthy life in Ghana (Chuks & Irene, 2007**).** Malaria accounts for 37.5% of all outpatient illnesses, 36% of all admissions and 33.4% of all deaths in children under-five years. Amongst pregnant women it accounts for 13.8% of all out patient department attendances, 10.6% of admissions and 9.4% of deaths (Department for international development, 2011).

Eradication of malaria is a world assignment, as extraneous efforts are presently being made both at international and national levels in controlling and preventing the disease.

Ghana as a country has over the years designed and implemented a number of policy interventions and measures with the support of international corporations and NGOs in the effort to control the disease. Since 1998, Ghana has committed itself to the Roll Back Malaria (RBM) Initiative of the World Health Organization (WHO), which builds on the Global Malaria Strategy with a focus on Africa. Based on the initiative, the country drew up a 'Medium Term Strategic Plan for Malaria Control in Ghana' (1998-2002), which sought to improve the coverage of Malaria control activities by adopting an inter-sectoral approach involving and promoting partnership with the private sector and the community (Anti-Malaria Drug Policy for Ghana, 2009).

In spite of all these measures to ensure that appropriate treatment is given to malaria, malaria management in Ghana often still take place outside the formal sector, starting from the household level and help is sought from the community pharmacist or licensed chemical seller (registered suppliers of specified over-the-counter-medicines) after the initial therapy has failed. Most patients reporting at clinics and hospitals facilities would have gone through home-based treatment or community drug shops/pharmacies initially (Buabeng et al., 2007).

It is thus important to examine the relationship between waiting times at hospitals and peoples behaviors towards malaria treatment within the framework of the National Malaria control policy and strategy.

According to literature, time factor has become important in recent times in determining demand for health care in developing countries. Time factor is an indirect cost that includes cost such as working time lost to seeking health care, waiting time (time spent at the health facility), health care needs and time allocation (Russell, 2008; Akin et al., 1985). According to Acton (1975) time price composed of waiting and travel times. He pointed out that, the out – of – pocket money price of medical care has been decreasing as a proportion of total price in recent years primarily because of the spread of health insurance and the rising opportunity cost of time due to increased time needed to receive care. This follows the same proposition according to the Human Capital Model of health care demand by Grossman (2000) in which it is established that as people's incomes increases in the market they reduce time spent on health care as the opportunity cost of seeking treatment in terms time cost increases.

Waiting times for seeking treatment at the hospitals are reported to be high in Ghana, especially in public hospitals and private hospitals accredited with the National Health Insurance Scheme.

There is the likelihood that waiting times could have an effect on demand for Out – Patient health care of which malaria dominate from public hospitals and some private hospital accredited to the National Health Insurance Scheme.

1.2 Statement of Problem

Economists have traditionally viewed hospital waiting times as a non-monetary rationing mechanism that reconciles limited supply with excess demand for health care (Siciliani e tal, 2007). Waiting times imposes a time cost on consumers of health. This, according to Grossman (1972), and Acton (1975), is due to the opportunity cost of own time input in the households production function. As a result increases in waiting time can cause people to reduce demand or look for alternative care (Blundell &Windmeijer, 2000), Ofili & Ofovwe, 2005).

In Ghana concerns have been raised about waiting times being long for outpatient health care delivery. It has been established by Van den Boom (2004) that consulting a doctor takes on average four hours, and costs eight times more than self-medication in Ghana. Malaria has been the major cause of morbidity and death in Ghana. Treatment of malaria mostly occurs outside of the formal health sector, and this poses a challenge to the control of the disease.

The National malaria control programmer's case management strategy disapproves treatment of malaria outside the formal health facility. According to the policy informal treatment of malaria most often leads to clinical complications, such as severe anemia, cerebral malaria, which may lead to coma and or other parasitological complication such as the development of drug resistant parasites whose emergence in Ghana since1986 has been a major obstacle to the control strategy of prompt recognition and adequate treatment (Chuks & Irene, 2007**)**. Thus if waiting time reduces healthcare demand, the control of malaria in the country will remain a problem.

While the relationship between waiting times and the demand for health care have been established by previous health care demand studies, the extent to which waiting time impact on the demand for health care taking into consideration both direct and indirect effects has not been explored. Most studies in Ghana have failed to look at the effect of waiting time on individual's decisions on using insurance to seek health care from hospitals, seeking health care from public hospitals, higher income individuals, and how waiting time can affect people employed and need more time for working. This study seeks to fill this gap in literature.

1.3 Objectives of study

The general objective of the study was to examine the influence of waiting times at the hospitals on the demand for medical care for malaria. In this study, the study sought to;

- Determine the effect of longer waiting time on the quantity of health care people demand from the hospital for malaria.
- Examine the influence of waiting time on the use of health insurance in seeking health care from hospital on demand for health care for malaria.
- To find out whether long waiting times at hospitals encourage the use of informal health care in treating malaria.

1.4 Study hypothesis

1. $H_{0:}$ waiting time does not reduce demand for medical care for malaria in Ghana.

   H_1: waiting time reduces demand for medical care for malaria in Ghana.

2. $H_{0:}$ waiting time does not cause insurance use to reduce demand for medical care for malaria.

$H_{1:}$ waiting time causes the use of insurance to reduce demand for health care.

1.5 Justification of the study

Malaria eradication is very important to the world as a whole. The worldwide seeks to eradicate malaria across all parts of the world where the disease is prevalent. The United Nations Millennium Declaration set a target to halt and begin to reverse the global incidence of malaria by 2015(Millennium Declaration, United Nations; 2000). In 2005 the World Health Assembly urged Member States to establish policies and operational plans to ensure that at least 80% of those at risk of, or suffering from malaria, benefit by 2010 from major preventive and curative interventions, so as to ensure a reduction in the burden of malaria of at least 50% by 2010 and 75% by 2015. These targets are echoed in the Roll Back Malaria Partnership Global Strategic Plan 2005-2015 (WHO, 2007).

In the course of eradicating malaria it is highly imperative to determine the factors that influence malaria health care seeking behaviors and health care choices.

According to Davy et al, (2010) by identifying treatment- seeking patterns and understanding the influences that are likely to shape a person's behavior in each context, policy makers will be better able to make informed decisions about resource and infrastructure allocation.

It is easy to get content that a universally funded health care system will increase access and increase demand for health care because health care is free. Health care demand theory confirms this perception though as health care demand will generally increase, however demand is not likely to increase under all situations because of certain factors that constraint demand under insurance system. According to the Grossman's model of the demand for health care factors other than the monetary price of health care tend to increase the cost of health care through the

shadow price of health care and decrease demand (Grossman, 2000). Social health insurance comes with higher waiting times to replace out – of – pocket cash price for medical care, and as waiting times increases the opportunity cost of demand for health care tend to increase as incomes and wages increases in the commodity market (Grossman, 2000).

Given this hypothesis, and also given the availability of several health care alternatives for treating malaria in Ghana, the study would examine how waiting time at the hospital affect demand for health care from hospital for malaria in Ghana since individuals can substitute hospital care for the other alternatives if the cost of waiting at the hospital is high.

By determining the effects of waiting time on the demand for health care from the hospital in the presence of the National Health Insurance Scheme, this study will also bring to bear the counter effects to the objective for the introduction of the national health insurance scheme.

The study will therefore be relevant to health policy makers in terms of measures to improving quality of health care at the hospitals to ensure immediate treatment and enhance the control of the malaria disease that is currently a major problem to the country.

The study will also add to literature on how time cost, incomes, working status, affect consumer decision to seek health care under a universal system of health care financing in developing countries including Ghana.

1.6 Scope of the Study

The study covered the effect of waiting time at the hospital on the demand for health care from the hospital for malaria. By estimating a model of the factors that influence the demand for health care, the study determined the direct effect of waiting time on the demand for health care. Indirect effect of waiting time was estimated on the use of health insurance in seeking health care

and the choice of public hospital for seeking health care. The study was undertaken in the Kumasi metropolis on a sample population of malaria health care seekers from the hospital. The Kumasi metropolis was chosen because of it urban setting giving it all the features in terms availability of health facilities both formal and informal and diverse individual characteristics that will give a correct estimate for the factor influencing demand for health care. A sample size of 540 respondents was used for the study.

1.7 Organization of the Study

The study was organized into five chapters. Chapter one covers the introduction to the study. Chapter two reviewed theoretical and empirical literature to the study and chapter three looked at the methodology for the study. The data analysis and results is covered in chapter four. Finally, chapter five contains summary of findings, recommendations and conclusion of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

This chapter reviews literature theoretically and empirically on how waiting time determines demand for health care.

Most economist view waiting time as natural in health care systems, acting as a balancing instrument between demand and supply in case of excess demand. And as far as waiting time will continue to exist it can be expected to have significant effects on the demand for health care.

2.1. Theoretical Review of Literature

According to Acton (1975), time price is expected to assume an increasingly important role in influencing the demand for health care as out-of-pocket price falls. That, as net or out-of-pocket price falls either because of increasing insurance coverage or availability of subsidized care, demand becomes relatively more sensitive to changes in time price. According to the model, with decreasing relative importance of money price, it is reasonable to expect an alternative mechanism to control demand, and a mechanism involving time is more likely to assume this role as seeking medical care usually involves a payment of both travelling and waiting times.

According to Blundell and Windmeijer (2000) waiting time is a price that influences people to choose alternative care from private hospitals, or not seek care at all when the waiting time gets too long. The model explains waiting time as a hassle cost to treatment that endogenously determines demand for health care in equilibrium. It explains that, in equilibrium waiting time cost will be just sufficient to reduced demand to equal supply of services. When demand

increases, it will increase waiting time, which in turn will cause the demand to decrease. Thus waiting times essentially plays the role of a price, influencing people to look for alternative care, possibly private, or no care at all. For this study waiting time is expected to reduce demand for medical care (health care from hospital) for out-patient health care needs (Blundell and Windmeijer, 2000).

The Grossman model of demand for health care (1972) "The Human Capital Model" form the basic framework of demand for health care that explains the difference between health as an output and medical care as one of a number of inputs in the production of health. According to the Grossman model, health is both an investment and a consumption good that individuals invest to produce throughout their lifetime, and so individuals demand health care both for consumption and for investment. The model views health as a durable capital stock that yields an output of healthy time, and individuals inherit an initial amount of this stock that depreciate with age and can be increased by investment. Health as a consumption commodity enters directly in the consumer's preference or utility function, and as an investment commodity it determines the total amount of time available for market and non market activities. The model employed the household production function of consumer behavior analogous to the firms production function to explain the gap between health as an output and medical care as one of the inputs into its production. Demand for medical care and other inputs of health are said to be derived demand, derived from the basic demand for health. According to the model, consumers produce gross investment in health in the non – market or household sector together with a composite good for all other market goods (money earnings and commodities) by combining medical care purchased in the market to contribute to gross investment in health in the non- market sector and own time

for producing both health and the market commodities. Thus individual's own time is said to be constraint to producing both market and non market commodities (production of market earnings), and all other possible uses. This means there will be substitution in the time use among its uses according to the value giving to each use. When wages increase in the market time required for producing market earnings increases, which will require the individual to reduce time for producing health. Thus if for example waiting time for purchasing medical care increases consuming medical care will be at the expense of market earnings. It means when waiting time increases individuals are more likely to reduce demand for medical care.

Also, according to Grossman, the price of medical care is zero in the presence of health insurance. In effect the model therefore postulates that health care will be rationed by waiting and travel times. In this case the opportunity cost of seeking health care will increase as wages increases in the market. With respect to this study the absence of monetary price to ration health care under an insurance system will mean possible long queues as a result of free monetary cost, hence giving rise to long waiting time. In the existence of a parallel alternative health care like a private health care system with a probable shorter waiting time, individuals with high opportunity cost of time would be prepared to pay high prices to seek care from such sources as the private hospitals. Otherwise individuals may have to substitute health for market earnings by reducing health care demand.

Under the pure investment model of the Grossman's model, time spent producing health can be substituted for medical care as wage increases. This is because as Wage increases, time spent producing health falls so that demand for medical care increases due to substitution in production between market and non market activities. When wage increases, time spent to produce health becomes costly so individuals reduce time spent to produce health and increase demand for

medical care. However on the basis of this study consumption of medical care can also become costly in time if waiting times associated with seeking care are long. Which means individuals will have to seek care from alternative sources of care with minimum waiting times. Alternative forms of health care such as over the counter prescriptions or home self – medications could be used to avoid long waiting time. Or individuals may use preventive measures such as protection with mosquito nets, and good eating habits as ways of producing malaria care.

Acton, (1973, 1975) developed a similar model based on Grossman's (1972) and Newhouse's (1972) models. The model was an empirical model to test the proposition of models such as the above, that time is important in determining demand for health care. The model, like the Grossman's model, assumed two goods, medical services (m) and a composite good for all other goods and services (X) entering the individual's utility function. Also, assuming full income and that fixed proportions of money and time is spent by the individual to consume m and X, the model is represented as;

$$\text{Max} \quad U = U(m, X)$$

St.

$$(p + wt)m + (q + ws)X \leq Y = y + wT$$

Where;

U= utility, m = medical services, X = all other goods and services, p = out – of – pocket money price per unit of medical services, t = own–time input per unit of medical services, q = money price per unit of X, s = own time input per unit of X, w = earnings per hour, y = total income, T = total amount of time available for market and own production of goods and services. Acton's

analysis of the model centered basically on the effect of changes in income. An exogenous change in earned income (changes in per hour wage rate) is said to either increase or decrease demand for medical services because of offsetting influences. An increase in earnings per hour is said to produce an income effect, which acts to increase demand for medical services, at the same time the increase in hourly wages increases the opportunity cost of time, which reduces demand for time – intensive health care services. Thus in this model the net effect of increase in per hour wages or earnings on demand for medical services depends on the time intensity of the price of medical services relative to the time intensity of the price of all other goods and services.

According to this study, it means that as waiting time gets longer for outpatient health care demand the time intensity for seeking treatment for uncomplicated malaria becomes high relative to the production of all other commodities. Thus when waiting times get longer demand for hospital treatment for malaria becomes costly to individuals. Seeking treatment from the hospitals under long waiting times would mean reductions in incomes earned in the market, giving the tendency for consumers to reduce demand for medical care.

Thus from the Grossman's and Acton's models reviewed above the time input involved in the production and consumption of health is said to produce an opportunity cost in the market in terms of lost wages. In this context this study will find the effect of incomes in the market, and time needed for working as indirect effects of waiting time on the demand for health care, since waiting for medical care will imply forgoing working and increasing incomes.

According to Pizer (2010), policy initiatives to improve health care access (such as the introduction of universally funded health care) and restrain costs could increase outpatient waiting time and limit demand.

According to Rebba and Rizzi (2011), rationing by waiting times are the most frequently used instruments for the direct control of health care demand within public health care systems even though they may determine negative effects in terms of equity and allocative efficiency. They thus explained that the presence of a private alternative health care financed by out-of-pocket payment will reduce the waiting time cost associated with public health care.

Rebba and Rizzi further established that Waiting times may induce the elimination (or reduction) of public health care demand, not only by patients capable to turn to private health care services, but also by low income patients who forgo health care because waiting would determine a too high opportunity cost of time.

According to Fergusson (2002) waiting times can be reduced by paying a high monetary price to access health care.

A Patients' waiting time has been defined as "the length of time from when the patient entered the outpatient clinic to the time the patient actually received his or her prescription (McDonald et al, 1998).

In literature, waiting time is sometimes used interchangeably with a related concept "waiting list", though there is no consensus on whether waiting lists can be used as a proxy for waiting times (Centre for Health Economics Research and Evaluation, 2010).Waiting list on the other hand is use to refer to a list that patients are enrolled in once they opt to pursue an elective procedure, assuming that they cannot get this procedure performed immediately (Chua, 2006) "Waiting time" or "wait time" is more difficult to define. Different countries define it differently. A common definition is the length of time between when a patient is enrolled on a waiting list and when the service is received (McDonald et al, 1998).

This study however is based on, and uses the waiting time, which refers to the waiting periods at seeking outpatient medical services as defined by the Centre for Health Economics Research and Evaluation, 2010.

2.2. Empirical Review of Literature on the relationship between waiting time and demand for health care.

Quite a number of empirical studies have been carried out in finding out the influence of waiting time on demand for health services for particular health treatments and health care in general across the world, especially in the developed world where the opportunity cost of time spent on health care is very high and significant.

Acton's (1976) empirical study on demand for health care in America examined the effects of waiting time and travel distance in determining the demand for medical services in New York City. Demand for health care by type of provider was estimated in a simultaneous equation system using the two- stage least squares (2SLS) method of estimation. Four structural equations were specified involving 28 exogenous variables, and transformed the equations into their reduced forms. The important endogenous variables at the right – hand side of the model included waiting time (the opportunity cost of time) and the health status of the user, which in turn influence the travel distance variable used to represent all the endogenous variables that determined the demand for Out Patient Department (OPD) services in the model. The reduced – form of the model was used to estimate the effect all the endogenous variables as one coefficient for the travel distance variable that entered the model as the only endogenous variable. The estimation results found the effect of waiting time to be consistent with model prediction. People

with high opportunity cost of time demand less time intensive OPD and hospital care, and more private – physician care.

Blundell and Windmeijer (2000) used differences in average waiting times to identify determinants of demand for health services in the United Kingdom. A framework of equilibrium waiting time was developed which relaxed the full equilibrium assumptions by selecting areas with shorter waiting times to estimate a semi – parametric selection model. The essence of using areas with relatively shorter waiting times was to capture demand when the time costs of waiting are low, since at longer waiting times, waiting time variable is likely to interact in a complicated way with needs for care variable. Determinants of supply were used as instruments for the endogeneity of waiting times. The results of the study showed that long waiting times significantly influence demand, and cause demand to fall by acting as the hassle cost constraining demand whist low waiting time do not influence demand.

Besley, Hall, and Preston (BHP) (1999) estimated a model of the demand for private health care in Britain as a function of regional waiting time and found that, increases in waiting time for public health care causes people to shift demand away from the public sector and increased demand for private health care where waiting time was low. The results of the study indicated that the demand for private health care increased by 2% as the waiting list increases. This finding has been interpreted as indicating that the demand for private treatment is responsive to the quality of public health care as the long term waiting list served as an indirect measure of quality of care that provide the incentive to demand alternative care.

The results of BHP has been used to support arguments for subsidizing Private Health Insurance (PHI) in order to shift the health care burden to the private sector and reduce public hospital waiting times (Siciliani & Hurst, 2003, 2005). Between 1997 and 2000, the Australian

government embraced this strategy to reduce public hospitals' waiting times (Willcox et al., 2007; Duckett 2005).

BHP's analysis was replicated in 2010 by the Centre for Health Economics Research and Evaluation using Australian data and the result was found consistent with BHP's. Long waiting time significantly increased private insurance demand as people reduced demand for public health care associated with long waiting times (Martin & Smith, 1999).

Jofre-Bonet (2000) also used the Spanish National Health Survey to construct waiting time for respondents who were on the waiting list and were admitted during the study period. Consistent with BHP results, the study found a large effect of waiting time on the insurance decision. The found that the probability of PHI purchase increased by 0.3 - 0.4 percentage points for an additional 15 days of waiting. This result however was significant only at the 10% level and is sensitive to model specification and sample selection. In particular, a highly significant result is found only when the respondent is not a household head (i.e., they are likely to be beneficiaries rather than the purchaser of the insurance).

King and Mossialos (2005) updated the BHP analysis using 1997–1999 NHI data in the UK. They measured long waiting time using the proportion of patients waiting over 6 months for an inpatient stay. They found that long waiting time influences individually-purchased health insurance decisions but not employer-financed insurance decisions. They found that a 1% increase in waiting time was associated with a 4% increase in the odds-ratio of insurance purchase for private health care.

Using data from the Medicare Current Beneficiary Survey and the Department of Veterans (VA) Affairs in America, Pizer and Prentice (2010) estimated models to investigate the impact of outpatient waiting times on insurance choice between VA (with low cost and high waits) and

Medicare (higher cost, low waits). The results show that higher VA waiting times causes demand for Medicare-financed services to increase with an elasticity of 0.4.

Other studies identified the cost of waiting through willingness to pay for quicker admissions based on Lindsay and Feigenbaum, (1984) that there is a cost in waiting as a good is worth less today if its consumption is delayed.

Using a stated preference technique, which asked respondents their most likely action in a hypothetical scenario described by attributes, Leung et al. (2004) found that patients who value time highly choose private treatment that is readily accessible, and are prepared to pay to reduce waiting time to treatment.

Propper (1990; 1995) and Johannesson et al.(1998) also found evidence that individuals are willing to pay non-trivial amounts to avoid long waiting time for medical treatment.

Costa and Garcia (2003) used expressed satisfaction with the public system and found that perceived lower quality (in terms of longer waiting time) increases the probability of purchasing PHI in Catalonia.

Heaney et al. (1991) studied data on waiting times and consultation time in Lothian in U K and found large variations in the time patients wait for and spend with their doctor. This study, which sets consultations into their administrative framework, examines factors which cause this variation. The empirical estimation showed that Consultation time was found to be affected by the total number of patients attending a particular surgery.

Literature on demand for health care in developing countries has estimated econometric models that relate demand for out – patient health services to waiting times at the hospitals.

Studies in Ghana and Tanzania have identified the role of time prices in influencing health care utilization. These studies argued that when the cost of health care services rises, the demand for such services will fall.

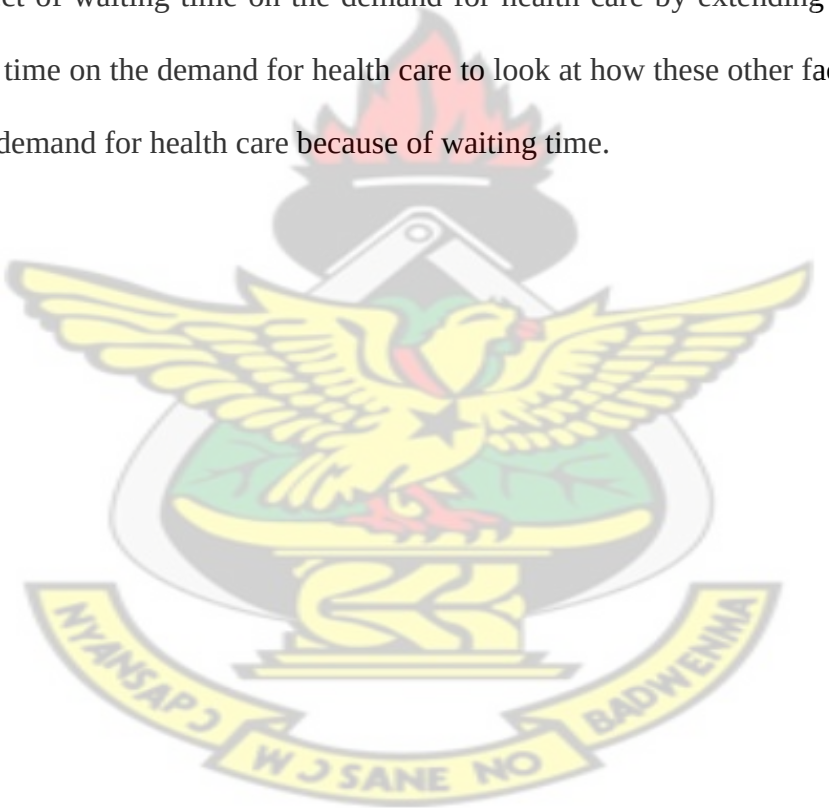
Nonvignon et al, (2010) studied treatment choices for fevers in children under five in rural Ghana and found that longer waiting and treatment times encourage people to use self-medication and over-the-counter providers compared to public and private providers. The study employed a multinomial response model in a random utility framework base on the assumption that an individual chooses a given health care option only if the utility the individual derives from the chosen option is greater than the utility that can be derived from an alternative option.

Dzator and Asafu-Adjaye,(2004) hypothesized a negative relationship between treatment, travel and time costs and the probability of choosing a malaria care provider by specifying a Multinomial Logit (MNL) model of malaria care provider choice. The empirical results from estimation showed that waiting time had the expected negative sign but was not statistically significant. This result was however found to be surprising given that public health facilities in particular in Ghana are characteristically associated with long waiting times.

Nketia – Amponsah and Ulrich (2009) found waiting time as a significant determinant of Consumer Satisfaction of Health Care in Ghana and in determining the Choice of Health Care Provider.

According to Davy e tal, (2010) a significant reason why people most of the time do not seek health care for malaria treatment in Papua New Guinea was due to lack of time. The study was carried out using the Probit model to estimate factors that determined whether people sought treatment for presumptive malaria or not in Papua New Guinea.

All of these works have looked at the effect of waiting time on the demand for health care in the direct way in terms of when waiting time itself increase or decreases, and have established that waiting time is negatively correlated with the demand for health care; however these studies have not looked at other effects such as losses in incomes when people wait longer to access health care, when people have to leave work and wait to access health care, or when waiting time gets longer due to insurance in relation to demand for health care. Hence this study gives a holistic study of the effect of waiting time on the demand for health care by extending from the direct effect of waiting time on the demand for health care to look at how these other factors mentioned indirectly affect demand for health care because of waiting time.



CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter covers the background of the study area, the design of the study, and the method of data collection to find out the influence of waiting time at the hospital on demand for health care for malaria. Quantitative and descriptive methods were used for the data analysis. The study employed the logit and multinomial logit regression models for the empirical estimation under the quantitative method.

3.1 Background of the study area

The Kumasi metropolis is situated in the transitional forest zone and is about 270km north of Accra which is the capital of Ghana. It is found between longitude 1.30^{o} – 1.35^{o} and between latitude 6.35^{o} – 6.40^{o}, an elevation which ranges between 250 – 300 metres above sea level with an area of about 254 square kilometres. Its central location makes it attractive for many people to migrate to. The metropolis shares boundaries with Atwima District to the west, Ejisu-Juaben Municipal to the east, Kwabre East District to the north and the south with Bosomtwe. Its green environment has accorded it the accolade of being the "Garden City of West Africa" (Ministry of Local Government and Rural Development and Maks Publications & Media Services, 2006).

Beginning with the three communities of Krobo, Bompata and Adum, it has grown in a concentric form to cover an area of approximately ten (10) kilometers in radius. The direction of growth started along the arterial roads due to the accessibility they offered resulting in a radial

pattern of development. Kumasi encompasses about 90 suburbs, many of which were absorbed into it as a result of the process of physical expansion and growth. Figures from the year 2000 Population Census kept the population at 1,170,270. It was projected to be about 1,610,867 in 2006 and 1,889,934 by 2009 (Ministry of Local Government and Rural Development and Maks Publications & Media Services, 2006).

The choice of the metropolis is to be able to capture all factors that influence demand for health care in terms of access to health facilities, as well as individuals with all characteristics that will reflect consumer behaviors that will give correct estimate of demand for health care.

In the Metropolis can be found the Komfo Anokye Teaching hospital which is the second largest health facility in Ghana as well other district hospitals and many private hospitals and clinics. It is very heterogeneous in the sense that it has people with almost all the features of the people in the other regions of Ghana living in it.

3.2 Theoretical framework

This study is based on Grossman (1972), and Acton (1973) theories of demand for health care. In these models waiting time is a component of the time input of the household production function in the production both market and non market commodities. Thus, when waiting time increases it increases the time input of demand for health care. This increases the opportunity cost of time for market production due to wage effect. Depending on the wage elasticity, increases in waiting time can influence individual to reduce demand for health care.

3.3. Data collection

Primary data were employed for the study. The data were gathered by the use of structured questionnaire to interview respondents from the study population. This is because direct responses from respondents were deemed appropriate to provide the relevant information on the relevant variables for the study. The study only relied on interviews of the study population for the necessary data.

The Method for the collection of the data involved administration of structured questionnaire from the sample population of malaria health care seekers within the study area selected. The study population was constituted of outpatient hospital attendants and households – outpatient respondents seeking malaria treatment. The outpatient hospital attendants were selected from both public and private hospitals accredited to the NHIS and private non – NHIS accredited hospitals. This is to account for variations in waiting times due to the presence of health insurance among the hospitals, and also compared to private hospitals without insurance.

The purposive method of sampling was used in the selection of people seeking malaria care. A sample size of 540 respondents was selected. The sampling took into consideration the socio – economic characteristics and the individual attributes of the population. The sample population included individuals of all income groups, occupations and employment status, levels of education and education status, and insurance status.

3.4. Data analyses

Both descriptive and quantitative methods were employed in analyzing the data. The descriptive method involved the use of percentages and mean values to present the results of the analyses on variables of interest. This provides a simple straightforward and comprehensive understanding of the results in the very descriptive form.

The study employed quantitative analyses for empirical estimation of the data. Quantitative methods help one to know the actual relationships between two or more variables being studied as Strauss and Corbin (1990) established. They explained that using quantitative techniques help in providing insight on issues that little is known about. Also according to Alan (2008), quantitative technique enables us to describe fine differences between people in terms of the characteristics being studied as well as providing a consistent yardstick for arriving at such distinctions. It also provides the basis for the actual estimate of the degree of relationship between concepts.

The quantitative analysis for this study employs Econometric and Statistical methods of estimation. The econometric method of estimation applied to this study follows the discrete choice modeling approach. This stem from the theoretical analysis that the outcome of the study seeks to determine, that is health care demand, measures a discrete choice among the set of alternative choices, unlike a continuous measure of some activities such as consumption, output of production, cost of production, or even exchange rate data.

Measurement of health care demand, the dependent variable for this study takes discrete values for qualitative responses, and it was on this basis that the use of Qualitative Response (QR) model in discrete choices is appropriate for the estimation of this study. The normal linear

regression model of estimation cannot be used for this estimation and so it is not appropriate for use of this study (Green, 2008).

3.4.0. Empirical estimation

The study estimated demand for health care from hospital employing the multinomial logit estimation. The model was used to estimate demand for health care based on theoretically underlying explanatory variables of demand for health care, and other important factors that influence demand for health care based on individual characteristics and attributes pertaining to the health care facility. Individual based characteristics included income, age, and education levels, employment status, and sector of employment, whiles the important factors based on health care facility attributes where medical care was sought were waiting time, insurance coverage and hospital type whether public or private. Binomial logit was used to examine the effect of waiting time on the demand for health care.

3.4.1 The effects of waiting time on the demand for health care

The effect of waiting time on the demand for health care was looked at in two parts; direct and indirect effects.

Direct effect

The waiting time people experience at the hospital is expected to have an own effect on the demand for health care as waiting time at the hospitals generally increase or decrease. When

waiting times are long accessing health care could be discomforting and reduces the tendency for seeking care. In this way, waiting time will determine demand autonomously or exogenously.

Indirect effect of waiting time

Factors determining demand for health care such as the mode of payment for health care (that is whether an individual uses insurance or pays cash), the type of hospital an individual chooses to seek care (public or private), income of individual, employment status of individual can be influenced by waiting time in determining demand. These will constitute indirect effects of waiting time on the demand for health care.

Generally Health insurance itself increases demand for health care because of absence of out-of-pocket payment. But when demand increase the product is long waiting times, which will in turn determine demand for health care. Thus waiting time is likely to determine whether an individual seeking health care using insurance will reduce health care demanded or not. Also in literature public hospitals are said to generally have higher waiting times. As a result the influence of waiting time on the demand for health care from a public hospital is likely to be significant.

Due to the opportunity cost of time in terms of lost per hour earnings (incomes) demand for health care becomes sensitive to waiting time. So that if waiting time increases demand for health care is likely to fall because the cost of waiting will rise. Thus waiting time is likely to determine demand for health care as wages (earned incomes) increase in the market; the higher income earners become sensitive to waiting times in seeking health care.

In a related form people who are employed and working are likely to be influenced by waiting times for seeking health care. People working (especially those that do not earn fixed salaries but earn their salaries based on hours worked) are likely to be sensitive to health care demanded if waiting times are long.

3.5.0 Model estimation

Multinomial logit model was used on the basis that the demand for health care is measured as a categorical outcome with more than two categories that are unordered (Green, 2008).

Demand for health care was measured in four categories based on how often an individual seeks health care from the hospital for malaria over a minimum period of 1 year conditional on falling sick. The categories of the demand were; not at all, once a while, most of the times, all the times.

The multinomial logit model for the demand for health care is specified for a general model as below;

Model 1: multinomial logit model of demand for health care

$$\text{Prob}(Y_i = j / w_i) = P_{ij} = \frac{exp(w_i\alpha)}{1 + \sum_0^3 = 1 + \exp(w_i\alpha_j)}, \quad j = 0, 1, \ldots..3$$

where;

Y_i = demand for health care for malaria

= 0 if an individual did not seek health care at all from hospital for all malaria attacks over a minimum period of 1 year

=1 if an individual responded seeking health care from the hospital only once a while for malaria attacks

=2 if an individual responded seeking health care most of the times from the hospital for malaria

=3 if an individual responded seeking health care all the times from the hospital for malaria

$$W_i = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta 3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12} + \varepsilon_i$$

Where also;

X_1 = waiting time variable (in number of hours)

X_2 = dummy variable for mode of payment for health care (X_2 =1 if an individual used health insurance to seek health care, and 0 if cash)

X_3 = dummy variable for choice of hospital to seek care (X_3 = 1 if care was sought care from a public hospital, and 0 if private)

X_4 = dummy variable for household income level in GH C (X_4 = 1 if individuals income fall within lower income group, and 0 if otherwise)

X_5 = dummy variable for household income level (X_5 = 1 if individuals income fall within middle income group, and 0 otherwise)

X_6 = dummy variable for household income level (X_6 = 1 if individuals income fall within higher income group, and 0 otherwise)

X_7 = age in years

X_8 = dummy variable for sex of individual,(X_5 =1 if sex of individual is female, and 0 if male)

X_9 = dummy variable for Tertiary level education,(X_6 = 1 if individuals' education is tertiary, and 0 if otherwise)

X_{10} = dummy variable Secondary level education (X_7 = 1 if individuals' education is secondary level, and 0 if otherwise)

X_{11}= dummy variable for Basic level education (X_8 = 1 if individuals education is basic level, and 0 if otherwise)

X_{12} = dummy variable for employment status (X_{10} = 1 if individual is employed, and 0 if unemployed)

ε_i = the stochastic error term

Model 1 above is a general model of demand for health care for malaria specified to estimate the relationships of all the specified explanatory variables with the demand for health care.

3.5.1 A priori expectations for estimated parameters

Waiting time coefficient is expected to be negative, as long waiting time at hospitals is expected to influence people to reduce demand for health care from the hospital. This is based on the theoretical fact that increases in time cost in health care demand increases the opportunity cost for demanding healthcare (medical care) in the market to individuals (Acton, 1975, Grossman, 1999). Higher waiting times increase the shadow price of health care demand which can reduce the quantity of health demanded whilst at the same time increasing the quantities of health inputs demanded for investment.

With respect to Malaria treatment in Ghana there exist a number of alternative treatment choices which include both formal and informal forms of treatments for malaria. So, due to long waiting times experienced at the hospitals, individuals are most likely to substitute alternative on – demand health care (such as over – the counter prescriptions, self – home medication, and use of traditional herbal medicine for the treatment of malaria) for hospital health care, thus causing individuals to demand less of hospital health care for malaria treatment. Thus β_1 is expected to be negative for most times and all the times categories of demand for health care relative to once a while. The expected sign for β_1 with respect to the not at all category compared to once a while cannot be determined because there is no waiting time for people who did not demand health care at all from the hospital.

Insurance use is likely to increase demand for health care from hospital for malaria because of free health care, so insurance use is expected to have a positive relationship with demand for

health care for malaria from the hospital. According to Novingnon e tal, 2010, households with health insurance coverage use care from public providers compared to over-the-counter providers.

The a priori expectation for seeking care from Public hospital cannot be determined. Demand from public hospital will decrease if waiting time is higher in public hospitals than in private hospital, and it will increase if waiting time is lower relative to waiting time in private hospital; though according to Novingnon e tal, 2010, higher waiting times at public facilities encourage people to use private facilities.

A positive relationship is expected between age and demand for health care for malaria for most of the times and all the times relative to once a while. As age increases individuals health stock decreases, increasing demand for health care.

The expected sign for the female gender group is not known. This is because there is no underlying basis to assume that demand for health care for malaria will increase or decrease or decrease for females compared to male, though most previous studies found a positive relationship between female and demand for health care.

The expected sign for income is undetermined and depends on the income level of individual compared to the control group. The income levels of individuals were classified under the poor, the lower income earners, middle income earners, and the higher income earners based on the National Minimum wage index according to Wagstaff (2002). Using the current minimum wage for the country, income earners classified as poor are people whose monthly income falls below the minimum income level for the country, which is 157 Ghana cedis. Individuals who earn a monthly income above 157 to 500 Ghana cedis are classified under lower income earners, individuals earning above 500 to 1000 Ghana cedis are middle income, and those earning above

1000 are higher income earners. For lower income individuals demand may increase because of the need to keep healthy life to work and increase incomes, but due to the fact that low income individuals may not be able to afford medical care, demand may fall for lower income group. Higher income individuals will increase demand for health care because higher income individual value medical care because of their desire to live good. However if the higher income individuals choose to invest in producing health care by engaging in lifestyles and activities that will keep healthy life, consuming medical care will be substituted for producing health, and demand for health care is likely to fall.

Employment status for employed is expected to have a negative sign on the basis that employed individuals are more likely to substitute time spent on health care for working to increase incomes, and are more likely to reduce demand for medical care. Works that are time - intensive will also cause the employed to reduce demand.

A positive sign is expected for education (tertiary, secondary, basic). This is because the educated individuals are expected to be more informed on the consequences of treating malaria from informal sources, and are more likely to demand more medical care.

3.6 Estimating the effect of waiting time on the demand for health care

In order to determine the effect of waiting time on the demand for health care binary logit models were estimated as follows;

prob(event i occurs) = prob (Y = i) = F (relevant factors, parameters), such that;

Prob(Y = 1/x) = F(x, β)

Prob(Y = 0 /X) = 1 - F(X, β), so that

y = x′β + ε

for F(X, β) = x′β

The total effect of waiting time on the demand for health care was estimated as;

$$\frac{\partial y}{\partial w} + \frac{\partial y}{\partial INSUR} \cdot \frac{\partial INSUR}{\partial w} + \frac{\partial y}{\partial PUBHOSP} \cdot \frac{\partial PUBHOSP}{\partial w} \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(eqn.1)}$$

Where;

$\frac{\partial y}{\partial w}$ is the direct effect of waiting time on the demand for health care, and

$\frac{\partial y}{\partial INSUR} \cdot \frac{\partial INSUR}{\partial w} + \frac{\partial y}{\partial PUBHOSP} \cdot \frac{\partial PUBHOSP}{\partial w}$ is the indirect effect of waiting time on the demand for health care on the use of health insurance in seeking health care and on seeking health care from public hospitals.

Direct effect

For the direct effect of waiting time on the demand for health care the binary logit model was applied to the demand for health care in model1such that;

Prob (Y=1) = $\beta_0 + \beta_1X_1 + \beta_2X_2 + \beta 3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10}$

$+\beta_{11}X_{11} + \beta_{12}X_{12} + \varepsilon_i$ ……. Model 2

for all variables the same as in model 1.

Thus the direct effect of waiting time on the demand for health care is estimated as;

$\partial y / \partial w = \beta_1 (e^{\beta X} / 1+e^{\beta X}) \times (1/1+e^{\beta X}))$

where β_1 is the coefficient for waiting time from model 2 which is the log odd or logit of the probability of health care demand as a result of waiting time, and the $e^{\beta X}{}_s$ are the probabilities for waiting time on demand for health care, and are computed at the mean values of waiting time. This effect was estimated based on the influence of waiting time itself in terms of the number of hours waited at the hospital before receiving treatment.

Indirect effect of waiting time on demand for health care

The indirect effect of waiting time on the demand for health care was estimated in two parts; the first part on the use of health insurance as a mode of payment as compared to cash payment and on the choice of public hospital as against private for seeking health care. This is because waiting time is likely to affect these decisions based on the possible relationships between waiting time and these variables. Hence from equation 1 this effect is given as;

$$\frac{\partial y}{\partial INSUR} \cdot \frac{\partial INSUR}{\partial w} + \frac{\partial y}{\partial PUBHOSP} \cdot \frac{\partial PUBHOSP}{\partial w}$$

where;

$\frac{\partial y}{\partial INSUR}$ and $\frac{\partial y}{\partial PUBHOSP}$ are the effects of using health insurance in seeking care and seeking care from a public hospital on the demand for health care respectively estimated from model 2 based on the estimated parameters for using health insurance and seeking care from a public hospital. $\frac{\partial INSUR}{\partial w}$ and $\frac{\partial PUBHOSP}{\partial w}$ are the effects of waiting time on the decision to demand health care using health insurance and seeking care from a public hospital respectively.

From model 2;

$\partial y / \partial INSUR = \beta_2(e^{\beta X}/1+e^{\beta X}) \times (1/1+e^{\beta X}))$,

$\partial y / \partial PUBHOSP = \beta_3(e^{\beta X}/1+e^{\beta X}) \times (1/1+e^{\beta X}))$,

where β_2 and β_3 are the logits of the probabilities of the demand for health care as a result of insurance use and seeking care from a public hospital, and the $e^{\beta X}$ are their associated odd ratios for demand for health care estimated at the mean values of the explanatory variables.

∂INSUR / ∂w and ∂PUBHOSP / ∂w were estimated by the same approach above based on the estimates from models for the likelihood of seeking health care using health insurance and the likelihood that an individual will seek care from a public hospital, using the binary logit estimation as below;

Model 2: **the influence of waiting time on the likelihood of using insurance for seeking health care from hospital**

This model was estimated to determine whether long waiting time at the hospital reduces the likelihood that an individual will use health insurance to seek health care from the hospital for malaria or not.

: Prob(INSURANCE = 1) = ^(α_0 + α_1WT + α_2PUBHOSP + α_3NHIS+ α_4TER + α_5SEC + α_6BSIC + α_7EMP + α_8INC$_2$ + α_9INC$_3$+ α_{10}INC$_4$ + α_{11}FEMALE + α_{12} AGE + ε_i **)**

Where;

^ is the logistic cumulative distribution function

INSURANCE = 1 is the dependent dummy variable for using Health insurance to go to the hospital, and = 0 if cash is used.

WT = waiting time at the hospital

PUBHOSP = Dummy variable for hospital type (PUBHOSP= 1 if individual attended a public hospital, and 0 if private hospital)

NHIS = dummy variable for insurance status (NHIS = 1 if an individual has health insurance, and 0 otherwise).

EMP = Dummy variable for employment status (EMP= 1 if individual is employed, and 0 if otherwise)

TER = dummy variable for tertiary education (TER = 1 if individual have tertiary education, and 0 for otherwise

SEC = dummy variable for secondary education (SEC = 1 if individual have secondary education and 0 otherwise)

BASIC = dummy variable for basic education (BASIC = 1 if individual have basic education and 0 otherwise

FEMALE = dummy variable for sex (FEMALE = 1 if individual is of female sex, and 0 if male)

AGE = Age variable

INC_2 = dummy variable for household income (INC_2 = 1 if household income of individual falls within the lower income group, and 0 otherwise)

INC_3 = dummy variable for household income (INC_3 = 1 if household income of individual falls within the middle income group, and 0 otherwise)

INC_4 = dummy variable for household income (INC_4 = 1 if household income of individual falls within the higher income group, and 0 otherwise)

ε_i = Stochastic error term

3.6.1 Expected signs of estimated coefficients

Waiting time (WT) is expected to be negative. This is because waiting time is likely to reduce the likelihood of using health insurance to seek health care for malaria from the hospital because there is the likelihood that using insurance will have higher waiting time compared to cash and carry. Thus α_1 is expected to give a negative sign.

Seeking care from Public hospital (PUBHOSP) is expected to negatively correlate with the use of insurance because waiting times are likely to be high in public hospitals relative to private hospitals. So α_2 is expected to show a negative sign. Having health insurance (NHIS) is expected to increase the likelihood of using health insurance to seek care from the hospital because of absence of cash payment, and so β_3 is expected to be positive. The expected sign for employed (EMP) is negative in the sense that people who are employed require more time to work. Thus employed individuals would most likely seek care from private hospitals that are not accredited with the National Health Insurance Scheme. The expected sign for education (TER, SEC, and BASIC) in relation to the use of health insurance compared to the uneducated cannot be determined. Females are more likely to use insurance in seeking care on the basis that females are not mostly income earners or they don't earn much compared to males and are more likely to use insurance than cash. So the coefficient for female is expected to be positive. The a priori expectation for age in relation to insurance use cannot be determined. Income (INC) is expected to negatively correlate with insurance use. This is because as individual's incomes increases they are more likely to have higher opportunity cost of time for market production and are not likely to spend more time consuming health care. And since insurance use is likely to have high waiting times for seeking treatment than cash payment, higher income earners are more likely to use cash more than insurance hence a negative sign is expected for income coefficient.

Model 3: the influence of waiting time on seeking care for malaria from public hospital

This model was estimated to determine whether waiting time in public hospitals compared to private hospitals reduces the likelihood for seeking health care from hospital for malaria treatment or not.

prob(PUBHOSP = 1) = ^ ($\gamma_0 + \gamma_1 WT + \gamma_2 INSUR + \gamma_3 NHIS + \gamma_4 TER + \gamma_5 SEC + \gamma_6 BASIC + \gamma_7 EMP + \gamma_8 INC_2 + \gamma_9 INC_3 + \gamma_{10} INC_4 + \gamma_{11} FEMALE + \gamma_{12} AGE + \varepsilon_i$)

Where;

^ = the logistic cumulative distribution function

PUBHOSP = 1 is the dummy dependent variable if an individual seeks care from a public hospital and = 0 if from a private hospital, and the explanatory variables are;

WT = waiting time at the hospital

INSUR = dummy variable for the use of insurance to seek care (INSUR = 1 if individual used insurance to seek care, and 0 if cash was used)

EMP = Dummy variable for employment status (EMP= 1 if individual is employed, and 0 if otherwise)

TER = dummy variable for tertiary education (TER = 1 if individual have tertiary education, and 0 for otherwise)

SEC = dummy variable for secondary education (SEC = 1 if individual have secondary education and 0 otherwise)

BASIC = dummy variable for basic education (BASIC = 1 if individual have basic education and 0 otherwise)

INC_2 = dummy variable for household income (INC_2 = 1 if household income of individual falls within the lower income group, and 0 otherwise)

INC_3 = dummy variable for household income (INC_3 = 1 if household income of individual falls within the middle income group, and 0 otherwise)

INC_4 = dummy variable for household income (INC_4 = 1 if household income of individual falls within the higher income group, and 0 otherwise)

FEMALE = dummy variable for sex (FEMALE = 1 if individual is of female sex, and 0 if male)

AGE = Age in years

ε_i = Stochastic error term

3.6.2 Expected signs of estimated parameters

Waiting time is likely to reduce the likelihood of seeking health care from public hospitals. This is partly because of insurance presence in public hospitals, and partly as result of inefficiency in operation in public hospitals because of lack of competition compared to private hospitals, giving rise to increase in waiting time in public hospitals relative to private hospitals. Thus waiting time is expected to negatively influence individuals to choose public hospital for seeking care compared to private hospital all other things being equal.

Higher income level is expected to have a negative relationship with seeking care from a public. This is because higher income earners tend to have a higher opportunity cost of waiting and are less likely to seek care from public hospitals where waiting time is likely to be higher. So being a higher income earner is expected to have a negative sign. The signs for being middle income and lower income earners could not be determined a priori.

Insurance use is likely to positively influence insurance use in seeking care from a public hospital because of insurance presence in public hospitals everywhere. Thus a positive sign is expected for insurance.

Employed is expected to negatively correlate with seeking care from a public hospital because employed individuals tend to have a high opportunity cost for time, and so are less likely to seek care from public hospitals where waiting time is likely to be relatively higher.

The expected sign for age cannot be determine a priori.

Female is expected to positively correlate with seeking care from public hospital because females are likely to choose public hospital for seeking health care because of insurance presence.

The signs for education with respect to choosing public hospital to seek care could not be determined a priori since level of education is indifferent to choosing between public and private for health care if quality of care is the same for both private and public care. So the expected signs for tertiary, secondary, and basic educations are not known.

In the second part, the effect of waiting time on the demand for health care by higher income individuals and people who are employed was analyzed by interacting waiting time on the higher income earners and the employed from the multinomial logit model (model 1). This is on the basis that due to the opportunity cost of time, waiting time is likely to affect demand for health care by the higher income earners, and the employed. According to theory and previous literature higher incomes earners have higher opportunity cost of time as they require more time for producing market earnings. Thus an increase in waiting time is likely to cause the higher income group to reduce demand for medical care and increase investment in health inputs. Also if the

time intensity involved in seeking care is more than the time involved in producing market earnings, the opportunity cost of people in the informal sector is likely to be higher for seeking medical services, and individuals are likely to substitute health care for producing market earnings (Grossman, 2000, Acton,1975, Amporfu,2011).

CHAPTER FOUR

ANALYSIS OF RESULTS

4.0 Introduction

In this chapter data on 540 individuals who have fallen sick of malaria in the sampled population was analyzed using Stata 11.2 for both the descriptive statistics and the quantitative analysis. Using the logit regression estimation, a multinomial logit (ML) was used to estimate demand for medical care (health care from hospital) for malaria treatment to find the impact of waiting time at the hospital on how it generally influence peoples malaria treatment seeking behaviors from the hospital. A binary logit regression estimation was then used to examine the effect of long waiting time on seeking treatment for malaria from the hospital, and also taking into consideration the impact of the presence of the national health insurance on waiting time and how it influence treatment seeking for malaria from hospital.

4.1 Descriptive analysis

Table 4.1a Descriptive statistics of variables for the study

Variable	percentage
Female	58.89
Employed	77.22
Informal sector	53.83
NHIS Insured	79.63
Insurance using	80.23
Public hospital	63.91
Tertiary education	29.81
Secondary education	18.89
Basic education	24.81
Hospital care for malaria	80
Second treatment for malaria	57

Table 4.1b

Variable	**Mean**	**Standard Deviation**	**Minimum Value**	**Maximum Value**
Age	35.27037	10.26735	20	76
Expenditure GHs	355.43	694.75	25	2200
Waiting time	3.31	1.613	0.5	8

Source: Field survey, April 2013

Table 4.1a and b shows summaries of the variables covering the socio – economic and demographic characteristics of the sample population and the factors that determine demand for health care.

From the tables 58.89% of the respondents constituted females against 41.11% males, 77.22% were employed against 22.78% who were unemployed, whilst 53.83% of the employed were in the informal sector against 46% in the formal sector, 79.63% of the sample were insured to health insurance against 20.37% who were not insured, and for the insured, 63.91% used insurance to go to the hospital, whilst 19.77% did not used insurance to go to hospital, they used cash. 29% of the sample also had tertiary education, 18.89% had secondary, and 24.81% had basic educations whilst 26.48% were uneducated. The age of the sample population ranged from lowest 20 years to highest 76 and the mean age was 35.3 years with a standard deviation of 10.3, the average monthly income for the sample was 355.429 Ghana cedis ranging between 25 Ghana cedis to 2200 Ghana cedis with a standard deviation of 694.75.

With regards to demanding health care from the hospital for malaria treatment, responds of the sample population show that 80% of respondents have ever sought treatment for malaria from the hospital against 20% who have fallen sick of malaria and did not seek treatment from the hospital. Out of those who have sought treatment for malaria, 57% went back for a second treatment as were asked by the doctor to go back, whilst 43% who were asked to go back did not.

Table 4.1b also shows that the average waiting time for the respondents that demanded health care from the hospital both public and private was 3.31 hours. The lowest waiting time was 0.5 hours and the highest was 8 hours with a standard deviation of 1.613.

4.2 Quantitative analyses

Table 4.2: Results of multinomial logit model of demand for health care for malaria from hospital

Explanatory variable	model 1 General model	model with interaction b/n Waiting t. and Higher income	model with interaction b/n waiting t. and employed
	Not all category		
Waiting time	47.25006	0.989	-9.377198
Age	1.945588	0.995	2.007639
Female	62.20171	0.998	64.87124
Middle Income group	-87.53852	0.992	-90.18963
Higher income group	-95.416	0.997	-98.3579
Employed	38.79184	0.997	-133.9687
Insurance using	16.62669	0.999	18.26052
Public hospital	-200.7064	0.994	-206.9033
Tertiary education	90.46306	0.997	93.63079
Secondary education	91.35099	0.997	95.69469
Basic education	56.60476	0.998	59.23037
waiting*incomecat4		-31.42384	-
waiting*employed		-	58.20626
	Most times category		
Waiting time	-.672703***	-.6922722***	-.2978586
Age	.1032339***	.1038472***	.1042017
Female	1.084079**	1.097985	1.136596
Middle Income group	.850585*	.8593593*	.8052526*
Higher income group	1.087203*	.825473	1.023643*
Employed	-.0518553	-.03719	1.26979
Insurance using	1.734052***	1.666782***	1.699338
Public hospital	-.3532053	-.359187	-.3897209
Tertiary education	1.107193**	1.10974**	1.111484
Secondary education	1.601834**	1.598022**	1.585981
Basic education	-.1723358	-.1665305	-.1858904
Waiting*incomecat4		.0974129	-
Waiting*employed		-	4596556
	All the times category		
Waiting time	-.6368477*	-.5824447*	.1947307
Age	.1690912***	.1678569***	.1705467***
Female	1.817312**	1.766312**	1.862869**
Middle Income group	-.7959221	-.7872961	-.8004377

Higher income group	-2.234011*	1.522214	-2.264773**
Employed	-.3268318	-.4150994	2.675368
Insurance using	-.52486	-.4252574	-.4532294
Public hospital	-.1553146	-.1701795	-.0938489
Tertiary education	3.218818**	3.348971**	3.156059
Secondary education	2.347686 *	2.503137*	2.250495
Basic education	1.258949	1.330697	1.000002
waiting*higher income		-2.67197	-
waiting*employed		-	-1.15342*

Legend: *p – value < 0.05; **p – value < 0.01 *** p – value < 0.001

```
Log likelihood = -215.60702                   Number of obs   =        435
                                              LR chi2(33)     =     219.50
                                              Prob > chi2     =     0.0000
                                              Pseudo R2       =     0.3373
```

Table 4.2 shows the results of multinomial logit regressions involving four categories of demand for health care for malaria (not at all, once a while, most times, and all times). Once a while was set as the base category with which the demand for health care for most of the times, all the times or not all, were being compared to. The table presents the coefficients of the estimates with their statistical significance determined by the stars (*) placed on them according to the interpretations given in the legend. The estimates for most of the variables met the expected signs, with most of them being statistically significant at least at 5% error margin. The parameter estimates show that;

Comparing the demand for health care once a while with most of the times, all the times or not at all, waiting time at the hospital is negatively correlated with demand for health care. This meets a priori expectation. The negative signs for most of the times and all the times categories means that increase in waiting time reduces the likelihood of demanding health care from the hospital

most of the times and all the times that an individual fall sick of malaria compared to once a while. The estimates are statistically significant with their p – values < 0.05. The not at all category show that waiting time is also negatively correlated with not demanding health care at all compared to once a while. This is statistically insignificant with a p – value greater than 0.05, and it means waiting time do not affect the likelihood that an individual will not demand health care from the hospital. The results implies that as waiting time increases there is the less likelihood for individuals to demand health care from the hospital most of the times and all the times, meaning higher waiting time reduces demand for health care from hospital for malaria. The result is consistent with theoretical propositions and most empirical works on the relationship between waiting time and the demand for medical care, including Acton, 1975, Nonvignon et al., 2010, among others. Based on the estimates for the most of the times and all the times categories which are statistically significant, the Ho hypothesis for this study is rejected and H_1 accepted.

The estimated coefficients for age show that age had a positive significant impact on demand for hospital health care for malaria comparing demand for health care for most of the times and all the times with demand for health care once a while. The positive relationship means that increase in an individual's age increase the likelihood that an individual will demand health care for malaria most of the times and all the times compared to once a while, and they are statistically significant with p – values less than 0.05. Comparing the not all category with once a while, age is negatively related to not demanding health care at all, meaning as age increases there is less likelihood that an individual will not demand medical care for malaria. This is however insignificant at 95 percent confidence level with a p – value > 0.05. The results imply that all other variables held constant as individuals increase in age they demand more medical care. This

meets a priori expectation for this study, on the basis that as individual's increases in age their health needs increases due to depreciation in capital stock making them demand more health care.

Female is positively related with demand for medical care for most of the times and all the times compared to once a while, meeting a priori expectation and statistically significant with p – values < 0.05.The estimation means that being a female increases the likelihood of demanding health care from hospital most of the times and all times compared to once a while. This result implies that females are more likely to demand more health care than males all things beings equal. The results also show that there is a negative relationship between female and not going to the hospital at all comparing the not all category with once a while with female having a negative sign. This results however not being significant at 95 percent confidence level imply the estimation has no impact, meaning there is no difference in not demanding health care at all for females and males compared to demand for health care once a while. To explain this result from empirical point of view, literature studied have it that women are generally more prone to malaria attacks, and suffers the most complications (particularly pregnant women).This could explain the reason why women go to the hospital most times and all the times for malaria treatment.

Insurance use is positively correlated with demand for health care for most of the times and not all whilst negatively correlated with all the times compared to once a while. It is statistically significant for the most of the times which has a p – value < 0.05 and insignificant for all the times and not at all with p – values that that are > 0.05.The results met a priori expectation and implies that the use of insurance in seeking care as compared to cash payment increases the likelihood of seeking health care from the hospital most of the times, and not demanding health

care at all compared to once a while, and reduces the likelihood for seeking health care all the times compared to once a while.

Seeking care from public hospital is negatively correlated with demand for health care most of the times, all the times, and not all compared to once a while. The estimates are statistically insignificant for all the categories having p – values greater than 0.05. The results imply that the choice of public hospital for seeking health care has no significant impact on the demand for health care for most of the times, all the times, or not all compared to once a while, and compared to seeking care from private hospital. Its negative coefficients means that seeking care from public hospital reduces the likelihood for seeking health care most of the times and all the times compared to once a while, and also reduces the likelihood of not demanding health care at all compared to once a while.

Income estimates showed that being a middle income earner is positively correlated with the demand for health care most of the times compared to once a while, whilst negatively correlated with the demand for health care all the times and not all compared with once a while. People of higher income earners is positively correlated with demand for health care for most of the times compared to once a while whilst negatively correlated with the demand for health care all the times and not at all compared to once a while. The middle income earners is statistically significant for demand for health care most of the times with a p – value that is less than 0.05 whilst insignificant for the demand for health care all the times and not all with p – values that are greater than 0.05. The higher Income earners is statistically significant for most of the times and all the times with p – values that are less than 0.05 whilst insignificant for not at all with p – value greater than 0. 05. The positive estimated sign for the middle income earners for demand for health care most of the times means that belonging to the middle income earners increases the

likelihood of demanding health care from the hospital most of the times for malaria treatment compared to once a while whilst its negative signs for all the times also means that being a middle income earner reduces the likelihood for demanding health care all the times compared to once a while, and also for the not at all means that being a middle income earner also reduces the likelihood of not demanding health care at all compared to once a while. For the higher income earners, the positive sign for most of the times means being a higher income earner increases the likelihood of demanding health care most of the times compared to once a while. The negative sign for all the times means that being a higher income earner reduces the likelihood of demanding health care all the times compared to once a while, and the negative sign for not all also means that being a higher income earner reduces the likelihood of not demanding health care at all. The income estimates implies that being a higher income earner has a negative significant impact on demand for health from the hospital for malaria treatment all the time compared to once a while.

Employment status (employed) met a priori expectation for all the times. There is a positive relationship between being employed and demanding health care most times compared to once a while, which means that employed individuals are more likely to demand health care most of the times than once a while, whiles there is a negative relation of employed for demand for health care all the times compared to once a while which is expected. Also the negative sign shown by the not all category means that being employed reduces the likelihood of not seeking medical care at all which is also expected. The estimates are however insignificant at 5% error level with all the categories having p – values greater than 0.05. The negative sign for all the times is consistent with the empirical work of Grossman, (1972), which found a negative sign between wage increases and demand for medical care.

The estimates for education (basic secondary and tertiary) met a priori expectation. All the educations show positive signs with demand for health care for most of the times, all the times, and not at all categories of demand for health care compared to once a while. The estimates for tertiary and secondary levels are statistically significant for most of the times and all the times, and insignificant for not at all base on their p – values of compared to 0.05. Basic is insignificant for all the categories. The positive significant coefficients for the tertiary and secondary educations for most of the times and all the times mean that having tertiary and secondary educations increases that likelihood for seeking health care most of the times and all the times compared to not being educated.

Also from the table 4.2, the third column show the regression results of a multinomial logit model for the demand for health care showing an interaction effect between waiting time and the higher income earners. The estimate for the interactive term between waiting time and the higher income earners show a negative correlation for demand for health care for all the times and not all compared to the demand for health care once a while, and show a positive sign for most of the times compared to once a while. The result is statistically insignificant for all the categories of demand for health care. The negative estimated coefficient for all the times and not at all means that the effect of waiting time on demand for health care for the income earners reduces the likelihood for demanding health care all the times or not at all compared to once a while. The positive sign for the most of the times also implies that the effect of waiting time on the demand for health care for most of the times increases the likelihood for demanding health care most of the times compared to once a while.

Table 4.2 above also show the regression results for the multinomial logit model showing the effect of waiting time on the demand for health care for employment status given by the

interaction between waiting time and the employed. The results shows that the effect of waiting time on the demand for health care by people who are employed is negative for demand for health care most of the times and all the times compared to the demand for health care once a while and positive for not demanding health care at all compared to once a while. This means that as waiting time increases it reduces the likelihood for the employed to demand health care most of the times and all the times compared to once a while, and increase the likelihood not to demand health care at all. The results is significant for all the times compared to once a while with p – value less than 0.05, and this means that waiting time reduces demand for health care all the times compared to once a while for people who are employed as against those who are not employed. The results is insignificant for most of the times and not at all compared to once a while with p – values greater than 0.05 which means that waiting time does not have impact on the demand for health care for employed individuals comparing the demand for health care for most of the times and not at all to once a while.

Table 4.3 binomial logit results for demand for health care.

Dependent variable**:** demand for health care

Explanatory variables	coefficient	standard error	p – value
Waiting time	-.5504799	.1160906	0.000
Age	.0817406	.0184573	0.000
Female	.8287517	.2917239	0.004
Employed	-.1598313	.3493145	0.647
Public hospital	.0287167	.3343287	0.932
Insurance use	1.173513	.3910345	0.003
Lower income	1.755598	.8250413	0.033
Middle income	1.678337	.8364252	0.045

Higher income	1.881993	.9139146	0.039
Tertiary education	2.037831	.3921912	0.000
Secondary education	1.675797	.4112358	0.000
Basic education	.0558755	.3654696	0.878

Log likelihood = -175.05226 **Number of obs = 361**

LR chi2(12) = 143.68

Prob > chi2 = 0.0000

Pseudo R2 = 0.2910

Table 4.3 shows the results of binomial logit for demand for health care. The model was estimated in order to estimate the effects of waiting time on the demand for health care. The results show that waiting time is negatively correlated with demand for health care and statistically significant at 95% confidence level. Also age is positively correlated with demand for health care and statistically significant at 95% confidence level, being a female is positively related with demand for health care and statistically significant at 95% confidence level, being employed is negatively related with demand but insignificant, seeking care from public hospital is positively related with demand and insignificant, the use of insurance is positively related with demand for health care and significant, all three income levels (lower, middle and higher) are positively related with demand for health care and significant, and tertiary and secondary educations are positively related with demand and significant, whilst basic education is positively correlated with demand but insignificant.

Table 4.4 binomial logit results of a model finding the influence of waiting time on the use of insurance in seeking medical care.

Explanatory variables	coefficient	standard error	p – values
Waiting time	1.360151	.2089298	0.000
Age	-.0030893	.0180897	0.864
Female	.2685968	.3686282	0.466
Insured	4.060749	.3686282	0.000
Employed	-.5129872	.4689675	0.274
Public hospital	-.3378218	-.3378218	0.421
Lower income	-1.729527	-1.729527	0.072
Middle income	-1.186278	-1.186278	0.244
Higher income	-2.567971	-2.567971	0.022
Tertiary education	.8807355	.8807355	0.069
Secondary education	.3253547	.3253547	0.548
Basic education	.5828326	.5828326	0.379

Log likelihood = -103.84004 Number of obs = 435

LR chi2(12) = 224.88

Prob > chi2 = 0.0000

Pseudo R2 = 0.5199

Table 4.4 is the results of binary logit model for using health insurance to seek medical care finding the impact of waiting time on using health insurance to go to the hospital.

The results show a positive relationship of waiting time with the use of health insurance compared to the use of cash. This means that as waiting time increases there is the high likelihood of using insurance. The estimate is statistically significant with p – value < 0.05, meaning that waiting time have significant impact on the use of insurance. The positive estimated correlation between waiting time and insurance use did not meet expected sign as the study expected a negative relationship based on the fact that insurance will increase the number

of people demanding health care at the health facility, giving higher waiting times in those facilities, and this is likely to discourage most people from seeking health care using health insurance. The result however could mean that as waiting time increases people prefer to use insurance to seek health care so as to offset the cost of waiting time.

The other variables in the regression show that attending public hospital, being employed, the lower income earners, middle income earners, and higher income earners are negatively correlated with the use of health insurance which meets a priori expectation. The female sex, age, and education are positively correlated with insurance use. Insured and higher income earners are statistically significant with p – values less than 0.05, meaning being insured and belonging to the higher income earners have impact on the use of insurance compared to their control groups. The other variables with p – values > 0.05 are insignificant meaning they don't have significant impact or their impacts are not any different from their control groups on the likelihood of insurance use. The overall regression was statistically significant with a p – value of 0.0000 < 0.05.

Table 4.5 Binomial logit results of a model finding the influence of waiting time on seeking care for malaria from public hospital

Explanatory variables	coefficient	standard errors	p – values
Waiting time	1.060748	.1260463	0.000
Age	.0299727	.01399	0.032
Female	-.0380738	.2581134	0.883
Employed	-.3207996	.304864	0.293
Insurance using	-.1586457	.3376616	0.638
Lower income group	.1268523	.6390223	0.843
Middle income group	-.3898427	.6595229	0.273

Higher income group	-.8033606	.7323805	0.273
Tertiary education	-.2257617	.3436788	0.511
Secondary education	.1965467	.3812314	0.606
basic education	.1739773	.4090298	0.671

Log likelihood = -205.46594 Number of obs = 435

LR chi2(11) = 160.25

Prob > chi2 = 0.0000

Pseudo R2 = 0.2806

Table 4.5 shows a logit results for seeking care from a public hospital against a private hospital. The parameter estimates shows that waiting time is positively related with choosing to seek care from a public hospital. The estimate is statistically significant with a p – value less than 0.05. The positive sign of waiting time means that as waiting time increases there is the high likelihood for seeking care from public hospitals compared to private hospitals. This result is contrary to the study's expectation, and the reason could be that given longer waiting time individuals are more likely to seek health care from public hospitals since one is likely to pay lower price at the public hospital relative to private hospital.

The estimation of the other variables in the model show that apart from age which is also statistically significant with a p – value < 0.05, all the other variables, female sex, employed, income groups lower income earners, middle income earners, and higher income earners, tertiary, secondary and basic educations, with p – values greater than 0.05 are insignificant.

4.3 The effect of waiting time on demand for health care

The effect of waiting time on the demand for health care gives the margin of change in demand for health care as waiting time increases. The effect involves direct and indirect effects;

4.3.1 Direct effect

The direct effect of waiting time on the demand for health care is the effect of waiting time itself at the hospital on demand for health care. The direct effect was estimated based on the estimated coefficient for waiting time in the binomial regression of demand for health care.

By calculating $\partial y/\partial w = \beta_1 (e^{\beta X}/1+e^{\beta X}) \times (1/1+e^{\beta X}))$ from model 2 the direct effect of waiting time on the demand for health care is - 0.17.

The result means that a unit increase in waiting time by 1 hour reduces demand for health care by 17%. The result being statistically significant means that waiting time at the hospital directly reduces demand for health care and this met the study's expectation.

4.3.2 Indirect effect

The indirect effect of waiting time estimated the effect of waiting time on the use of insurance in seeking care against cash payment and seeking care from a public hospital against private, and also for higher income individuals and employed individuals.

From models 2, 3 and 4, the indirect effect of waiting time on insurance use and seeking care from public hospitals; $\partial y/\partial w = \partial y/\partial NHIS\ (\partial NHIS/\partial w) + \partial y/\partial pub\ (\partial PUB/\partial w)$.

Based on the estimated coefficients from models 2 and 3 the effect of waiting time on the use of health insurance on the demand for health care = $\partial y/\partial NHIS\ (\partial NHIS/\partial w)$ is 0.07. This effect though statistically significant did not met the study's expectation. The result implies that as waiting time increases by 1 hour the use of insurance increases the demand for health care by 7%, and this not consistent with theory. However, the result could mean that as waiting time increases people tend to use insurance to seek health care to offset the waiting time cost, instead of paying cash.

Also the indirect effect of waiting time on demand for health care for seeking care from the public hospital is 0 since the influence of waiting time on seeking care from public hospital was statistically insignificant.

4.3.3 Total Effect

Hence given the direct and the indirect effects from insurance use and seeking care from public hospitals, the total effect of waiting time on the demand for health care $\frac{\partial y}{\partial w} + \frac{\partial y}{\partial INSUR} . \frac{\partial INSUR}{\partial w} + \frac{\partial y}{\partial PUBHOSP} . \frac{\partial PUBHOSP}{\partial w}$ $= 0.17 + 0.07 + 0 = -0.1$. This means that a 1 hour increase in waiting time reduces the demand for health care by 10%. This is consistent with the study expectation.

By interacting waiting time with the higher income earners and the employed groups from the multinomial logit model, table 4.2, the indirect effect of waiting time on the demand for health care was determined on the higher income earners and the employed individuals. The results show that the interactive effect between waiting time and the higher income earners on the demand for health care was insignificant. The interaction effect between waiting time on the employed group on demand for health care was statistically significant.

CHAPTER FIVE

SUMMARY OF STUDY FINDINGS AND POLICY RECOMMENDATION

5.0 Introduction

This study was carried out basically to find out the influence of waiting time at the hospital on the demand for health care for malaria in the Kumasi Metropolis of Ghana. This chapter presents the major findings of the study, and gives policy recommendations based on the conclusions that will be drawn from the study findings.

5.1 Summary of major findings

The study revealed that 80% of the sampled population who had been attacked by malaria has ever sought a first time treatment from the hospital, out of which 57% sought the second treatment as requested by doctor.

The study found that waiting time at the hospital, individual's age, sex, the use of insurance, household income levels, tertiary education, and secondary education have significant influence on the demand for health care for malaria from the hospital based on statistical significance at 95% confidence level, by comparing the demand for health care most of the times, all the times and not at all with once a while, whilst the choice of hospital type for seeking care, employment status and basic education does not have any or have only little influence on the demand for health care for most of the times, all the times and not all compared to once a while . There is a negative relationship of waiting time with the demand for hospital care for malaria for most of the times and all the times compared to once a while, which implies that as waiting times increase at the hospitals there is the less likelihood for people to seek health care from the

hospital for malaria for most of the times and all the times compared to once a while. The estimated effect of waiting time on the demand for health care is 0.17. This effect measure the direct own effect of waiting time on demand for health care and it means that a unit increase in waiting time by 1 hour reduces the demand for health care by 17%.

Age, female sex, tertiary and secondary educations have positive significant influence on the likelihood for seeking medical care from the hospital for malaria, which means that increase in these factors or belonging to the groups increase the likelihood that an individual in the sample population will demand health care for malaria treatment compare to the control groups.

The study also found that the effect of waiting time on demand for health care by the higher income earners in the sample population is negative and significant for all the times category of demand for health care compared to once a while. The results means that as waiting time increases individuals in the higher income earners are not likely to demand health care all times for malaria compared to once a while.

The study also found that the effect of waiting time on the use of insurance in seeking health care on the demand for health care was 0.07. This is the indirect effect of waiting time on demand for health care through insurance use but it did not meet the study's expectation. The results imply that a unit increase in waiting time by 1 hour increases demand for health care by 7% for insurance use. The indirect effect of waiting time on the demand for health care for seeking care from a public hospital was 0 because the coefficient for seeking care from public hospital on demand for health care was insignificant. However the coefficients from the multinomial logit results show that seeking care from public hospital compared to private hospital is negatively correlated with the demand for health care most of the times, all the times or not at all compared

to once a while, which means that the choice of public hospital for seeking health care reduces the likelihood for seeking health care for malaria.

Also the study found that the effect of waiting time at the hospital on the demand for health care by individuals who are employed is negative and significant for demand for health care all the times compared to once a while. The results means that as waiting time increases it reduces the likelihood for individuals who are employed to seek health care for malaria all times compared to once a while.

5.2 Conclusion

Based on the findings above, it can be established that long waiting time at hospitals has a negative direct effect on the demand for health care for malaria from the hospital. Waiting time generally tend to reduce demand for health care from the hospital.

Also contrary to expectation, as waiting time increases people rather tend to use insurance to offset the time cost impose by longer waiting time. Thus there is an indirect positive effect of demand for health care with respect to the use of health insurance in seeking health care. This result could mean that a lot of the people cannot afford cash payment to avoid longer waiting times associated with insurance use, hence individuals are willing to use insurance to seek health care at zero monetary cost which will offset the waiting time cost.

With respect to the choice of public hospitals compared to private hospitals in the demand health care the study found no effect of waiting time on the demand for health care. However the impact of waiting time on the choice of demanding health care from public hospitals was found

unexpectedly to be positive. To explain the result, it means that as waiting time increases people tend to seek health care from public hospitals because they are likely to pay relative lower prices in the public hospitals.

Indirectly waiting time also reduces the demand for health care for higher income earners and the employed. This is because these categories of people are likely to have higher opportunity cost of time. It means that as the time intensity involved in seeking health care increases (that is as waiting time increases) individuals tend to allocate their time in such that they substitute time for producing and consuming health care for producing market commodities. It thus implies that individuals use informal sources of health care such as self – medication in treating malaria most times for treating malaria due to long waiting times at the hospitals, which is against the national policy for malaria management in Ghana.

5.3 Policy recommendation

The study recommends that longer waiting times at the hospitals should be addressed.

In achieving this there is the need to increase the number of hospitals providing health care, so that supply can be increased. Thus the government and other stakeholders should establish more health facilities whiles increasing the capacity of existing ones in terms of expansion in infrastructure.

There is also the need to increase the staff capacity at the hospitals. Thus more health personnel should be trained into the hospitals to reduce personnel – patient ratio to facilitate health care delivery.

Since the higher income earners and people employed tend to reduce demand for health care from the hospital because of longer waiting time the study recommends that the malaria control board should advise these groups of individuals to adopt preventive lifestyles by using treated mosquito nets, keeping clean environments, eating good to avoid frequent malaria attacks.

The study also recommends that the malaria control board should do much in the education and sensitization of the public on the essence of seeking malaria treatment from the hospital.

5.4 Limitations of the study

The main limitation to the study was data collection problems. People were unwilling to respond to the questionnaires whiles some gave biased responses.

As a result the small sample size used for the study was a disadvantage to logit estimation in terms of estimating of efficient and unbiaseness of the results. A Larger sample could have produced much efficient coefficients estimated with respect to the significance and the signs of the estimates.

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Appendix 1 QUESTIONAIRE

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF ECONOMICS

QUESTIONNAIRE FOR RESEARCH IN MPhil., ECONOMICS; ON HOSPITAL WAITING TIME AND DEMAND FOR MALARIA CARE.

This questionnaire is administered for a research in partial fulfillment for the award of MPhil., ECONOMICS degree. You are therefore assured that all the information you will provide would be treated with strict confidentiality mainly for academic purpose.

Please provide appropriate responses by ticking or writing as questions require.

1. Have you being to the hospital before for malaria treatment?

a. yes [ ] b. no [ ] if no skip to number 8 and continue.

2. How long did you spend waiting to see the doctor? .....

3. State the hospital whether PUBLIC/GOVERNMENT or PRIVATE? ……

4. Did you use INSURANCE or you paid CASH (underline)

5. Did the doctor ask you to go and see him or her again?

yes [ ] no [ ]

6. Did you go to see the doctor again as requested?

Yes [ ] no [ ]

7. How often do you go the hospital for malaria treatment each time you are attacked by malaria? (tick appropriate response).

a. not at all b. once a while c. most of the times d. all the times

Questions based on individual attributes and Socio – Economic characteristics

(Please tick or provide appropriate response)

8. Sex male [ ] female [ ]

9. Age [ ]

10. Level of education

a. Tertiary [ ] b. Secondary [ ] c. Basic [ ] d. Uneducated [ ]

11. Employment status a. Employed [ ] b. unemployed [ ]

12. Sector of employment a. formal sector b. informal sector

13. Monthly household expenditure on food, health, education, car fuel etc. (please kindly provide this information as an estimate.) …….

14. Do you have health insurance? a. yes [ ] b. no [ ]

THANK YOU.

Appendix2. Results of multinomial logit model of demand for health care for malaria from hospital

oftenmalar~t	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
notatall						
waiting	47.25006	3409.566	0.01	0.989	-6635.377	6729.877
age	1.945588	287.6849	0.01	0.995	-561.9064	565.7976
employed	38.79184	9211.056	0.00	0.997	-18014.55	18092.13
female	62.20171	21695.72	0.00	0.998	-42460.64	42585.04
paymentmo~ce	16.62669	21304.73	0.00	0.999	-41739.87	41773.12
tertiary	90.46306	23003.99	0.00	0.997	-44996.53	45177.46
secondary	91.35099	24567.45	0.00	0.997	-48059.97	48242.67
basic	56.60476	20207.18	0.00	0.998	-39548.75	39661.96
publichosp~l	-200.7064	25512.69	-0.01	0.994	-50204.67	49803.26
Income_Cat3	-87.53852	8964.364	-0.01	0.992	-17657.37	17482.29
Income_Cat4	-95.416	22414.63	-0.00	0.997	-44027.28	43836.45
_cons	-392.9707	70005.58	-0.01	0.996	-137601.4	136815.4
onceawhile	(base outcome)					
mosttimes						

waiting	-.672703	.1425989	-4.72	0.000	-.9521918	-.3932143
age	.1032339	.0192119	5.37	0.000	.0655792	.1408886
employed	-.0518553	.3649805	-0.14	0.887	-.7672039	.6634933
female	1.084079	.3279067	3.31	0.001	.4413933	1.726764
paymentmo~ce	1.734052	.4677088	3.71	0.000	.8173601	2.650745
tertiary	1.107193	.4165723	2.66	0.008	.2907259	1.923659
secondary	1.601834	.461333	3.47	0.001	.6976383	2.50603
basic	-.1723358	.5199645	-0.33	0.740	-1.191448	.8467758
publichosp~l	-.3532053	.3361583	-1.05	0.293	-1.012064	.3056528
Income_Cat3	.850585	.4077453	2.09	0.037	.051419	1.649751
Income_Cat4	1.087203	.5216786	2.08	0.037	.0647318	2.109674
_cons	-6.223475	.9199344	-6.77	0.000	-8.026513	-4.420437
alltimes						
waiting	-.6368477	.300937	-2.12	0.034	-1.226673	-.047022
age	.1690912	.0258884	6.53	0.000	.1183508	.2198316
employed	-.3268318	.6226421	-0.52	0.600	-1.547188	.8935244
female	1.817312	.6462924	2.81	0.005	.5506022	3.084022
paymentmo~ce	-.52486	.7561805	-0.69	0.488	-2.006946	.9572265
tertiary	3.218818	1.134428	2.84	0.005	.9953791	5.442256
secondary	2.347686	1.212357	1.94	0.053	-.0284899	4.723863

basic	1.258949	1.262532	1.00	0.319	-1.215569	3.733467
publichosp~l	-.1553146	.7098736	-0.22	0.827	-1.546641	1.236012
Income_Cat3	-.7959221	.6284052	-1.27	0.205	-2.027574	.4357294
Income_Cat4	-2.234011	.9400556	-2.38	0.017	-4.076486	-.3915357
_cons	-9.303452	1.686786	-5.52	0.000	-12.60949	-5.997412

Appendix3 binomial logit results for demand for health care

Logistic regression — **Number of obs = 361**

LR chi2(11) = 138.68

Prob > chi2 = 0.0000

Log likelihood = -177.55095 — **Pseudo R2 = 0.2809**

seektreatm~t	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
waiting	-.5320078	.1143571	-4.65	0.000	-.7561435	-.3078721
age	.0855242	.0184075	4.65	0.000	.049446	.1216023
female	.8415097	.2881227	2.92	0.003	.2767996	1.40622
employed	-.0848091	.3443256	-0.25	0.805	-.7596748	.5900566
publichosp~l	.0140268	.3296532	0.04	0.966	-.6320817	.6601352

paymentmode1	**1.108454**	**.3831096**	**2.89**	**0.004**	**.3575733**	**1.859335**
Inc_Cat13	**.0502035**	**.3262285**	**0.15**	**0.878**	**-.5891927**	**.6895997**
Inc_Cat14	**.2725872**	**.5027931**	**0.54**	**0.588**	**-.7128691**	**1.258043**
tertiary	**1.969554**	**.3864765**	**5.10**	**0.000**	**1.212074**	**2.727034**
secondary	**1.609061**	**.4049258**	**3.97**	**0.000**	**.8154213**	**2.402701**
basic	**.093938**	**.3652456**	**0.26**	**0.797**	**-.6219301**	**.8098061**
_cons	**-3.239421**	**.7437597**	**-4.36**	**0.000**	**-4.697164**	**-1.781679**

Appendix 4 binomial logit regression of results of the influence of waiting time on the use of insurance in demanding health care

				Number of obs	=	435
				LR chi2(11)	=	160.25
				Prob > chi2	=	0.0000
Log likelihood = -205.46594				Pseudo R2	=	0.2806

paymentmo~ce	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
waiting	1.360151	.2089298	6.51	0.000	.9506556	1.769645
age	-.0030893	.0180897	-0.17	0.864	-.0385444	.0323658
employed	-.5129872	.4689675	-1.09	0.274	-1.432147	.4061723
female	.2685968	.3686282	0.73	0.466	-.4539011	.9910947
insured	4.060749	.5464623	7.43	0.000	2.989703	5.131795

tertiary	.8807355	.4849388	1.82	0.069	-.0697272	1.831198
secondary	.3253547	.5412704	0.60	0.548	-.7355157	1.386225
basic	.5828326	.6624911	0.88	0.379	-.7156261	1.881291
publichosp~l	-.3378218	.4200958	-0.80	0.421	-1.161194	.4855509
Income_Cat2	-1.729527	.9605441	-1.80	0.072	-3.612159	.1531045
Income_Cat3	-1.186278	1.017255	-1.17	0.244	-3.180061	.8075047
Income_Cat4	-2.567971	1.118845	-2.30	0.022	-4.760866	-.3750758
_cons	-3.639877	1.118835	-3.25	0.001	-5.832753	-1.447

Appendix5 binomial logit regression of results of the influence of waiting time on demanding health care from public hospital

publichosp~l	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
waiting	1.060748	.1260463	8.42	0.000	.8137022	1.307795
age	.0299727	.01399	2.14	0.032	.0025528	.0573926
employed	-.3207996	.304864	-1.05	0.293	-.918322	.2767227
female	-.0380738	.2581134	-0.15	0.883	-.5439667	.4678191
Income_Cat4	-.8033606	.7323805	-1.10	0.273	-2.2388	.6320787
Income_Cat3	-.3898427	.6595229	-0.59	0.554	-1.682484	.9027985
Income_Cat2	.1268523	.6390223	0.20	0.843	-1.125608	1.379313
basic	.1739773	.4090298	0.43	0.671	-.6277064	.975661
secondary	.1965467	.3812314	0.52	0.606	-.5506532	.9437465

tertiary	-.2257617	.3436788	-0.66	0.511	-.8993598	.4478363
paymentmo~ce	-.1586457	.3376616	-0.47	0.638	-.8204502	.5031588
_cons	-2.985475	.8063348	-3.70	0.000	-4.565862	-1.405088