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Economic Analysis of Under-Five Morbidity, Mortality and Health-Seeking Behaviour-Evidence from Ghana

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I dedicate this work to my grandmother for her keen interest in education although she never had formal education.

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List of Abbreviations and Acronyms

ANC	Antenatal Care
ARI	Acute Respiratory Infections
BCG	Bacillus, Calmette-Guerin
BMI	Body Mass Index
CHPS	Community Health and Planning Service
DANIDA	Danish International Development Agency
EPI	Expanded Programme on Immunization
DHS	Demographic and Health Survey
DPT	Diphtheria-Pertusis-Tetanus
ECOWAS	Economic Community of West African States
ERC	Ethical Review Committee
ERP	Structural Adjustment Programme
EU	European Union
GDHS	Ghana Demographic and Health Survey
GDP	Gross Domestic Product
GMHI	Ghana Macroeconomic and Health Initiative
GHA	Ghana Highway Authority
GHS	Ghana Health Service
GLM	Generalized Linear Model
GLSS	Ghana Living Standards Survey
GSS	Ghana Statistical Service
HIPC	Highly Indebted Poor Countries
HIV	Human Immunodeficiency Virus
IFS	International Financial Statistics
IMF	International Monetary Fund
ISSER	Institute of Statistical, Social and Economic Research
ITN	Insecticide Treated Nets
LDCs	Least Developed Countries
MDGs	Millennium Development Goals
NDPC	National Development Planning Commission
NGOs	Non-Governmental Organizations
OLS	Ordinary Least Squares

ORT	Oral Rehydration Treatment
PHC	Population and Housing Census
PPP	Purchasing Power Parity
TB	Tuberculosis
TBAs	Traditional Birth Attendants
TV	Television
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WDI	World Development Indicators
WHO	World Health Organisation
2SLS	Two-Stage Least Squares

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ABSTRACT

Maternal and child health issues remain central to national and global health policies. Among the eight Millennium Development Goals (MDGs) that were adopted by the 189 members of the United Nations (UN) in 2000, at least four are directly related to maternal and child health care. Consequently, this dissertation seeks to provide some insight by investigating three main areas of maternal and child health concerns. Firstly, we examine the factors driving the high under-five mortality rate with emphasis on supply side variables with public goods characteristics such as road infrastructure and nurse-per-population. It is envisaged that access to and utilization of allopathic care will reduce under-five mortality. Secondly, the study investigates the socio-economic and supply side factors influencing the demand for particular health providers' services. Thus conditional on childhood sickness, we investigate the type of health facility that parents or caregivers demand for children aged under-five years and the extent to which consumers are satisfied with health providers. In recent times, health insurance is considered an effective mechanism for inducing the demand for appropriate health care. If women in the reproductive age own health insurance, their own health and that of their children will improve and inherently, a reduction in under-five mortality. Thirdly, the study also explores the factors influencing a woman's decision to participate in health insurance and also investigates the socio-economic determinants of household's collective insurance decision.

To achieve the above objectives, 531 women (aged 15-49) who had at least one live birth between 2002 and 2007 were interviewed using stratified random sampling technique in three Districts in Ghana between October 2007 and February 2008. Methodologically, a mix of discrete choice and duration models are employed to address the objectives.

Using the Weibull parametric model; the study reveals that health inputs such as the utilization of antenatal care, childhood vaccination and Insecticide (mosquito) Treated Bednets are significant in curbing under-five mortality in Ghana. Supply side inputs particularly nurse-per-population and road infrastructure were statistically significant and inversely related to under-five mortality. Conversely, multiple births and higher order births are positively associated with under-five mortality. Household income had a puzzling positive relationship with under-five mortality, albeit weakly significant.

In the case of the demand for a given provider's services conditional on childhood sickness, multinomial choice model is utilized. In addition, the ordered logit model is used to investigate the impact of the choice of a given providers' services on consumer satisfaction of health care. The study reveals that household income is positively and significantly related to the demand for private medical care. In fact, the effect of income on private medical care is quadratic in nature. In the case of mothers who took their children to pharmacy shops, traditional healers and resorted to self treatment, the impact of income was less pronounced. Waiting time at the health facility which denotes opportunity cost was consistently and inversely related to the demand for private medical care, faith healing and self treatment. More importantly, supply side variables such as hospital-bed-per population and road infrastructure are significant predictors of the demand for private health care.

After controlling for other covariates, subscribers of private health care are approximately 12 percentage points more satisfied than those who subscribe to public health care. This suggests that the quality of care in private health facilities outweighs that of public health delivery. Provider characteristics particularly distance and waiting time were found to be inversely and significantly related to consumer satisfaction. In all, there are lower levels of satisfaction associated with the use of alternative health care providers. An important policy recommendation of this finding is that there is the tendency for allopathic care to increase at the expense of self treatment and traditional or faith healing as the quality of both private and public health care improves over time.

Using binary logit model, the study found that supply side factors particularly health inputs via availability of nurses and proximity (distance) are significant determinants of a woman's propensity to participate in health insurance. In terms of the household collective insurance decision, the fractional logit model was employed. At the household level, the study finds that nurse-per-population and distance to the nearest health facility were consistently and inversely related to the number of household members insured.

The study concludes unequivocally that increasing physical infrastructure such as tarred roads and health inputs such as nurses and hospital beds will increase the demand for modern health care and reduce the risk of under-five mortality. Given that the level of existing physical infrastructure (tarred roads) is inadequate, health care policies should urgently focus on increasing the level of public spending on physical and material infrastructure in order to achieve significant reductions in under-five mortality.

KURZFASSUNG

Gesundheit von Mutter und Kind ist und bleibt ein zentrales Thema nationaler sowie weltweiter Gesundheitspolitik. Mindestens vier der acht Milleniumsziele, welche von 189 Mitgliedern der Vereinten Nationen (UN) im Jahr 2000 eingeführt wurden, haben direkt mit dem Schutz der Gesundheit von Mutter und Kind zu tun. Entsprechend ist das Ziel dieser Dissertation, Einblicke in die Gesundheitssituation von Mutter und Kind zu erhalten, indem drei wesentliche Forschungsfelder in diesem Bereich abgedeckt werden:

Erstens werden Einflussfaktoren auf die Sterblichkeitsrate der unter 5-jährigen untersucht. Dazu werden Faktoren mit öffentlichem-Gut-Charakter, die mit der angebotenen Gesundheitsversorgung zusammenhängen, wie Verkehrsinfrastruktur und Anzahl an Krankenschwestern im Verhältnis zur Bevölkerung, in den Vordergrund gestellt. Es wird angenommen, dass Zugang zu und Inanspruchnahme von allopathischen Gesundheitseinrichtungen die Sterblichkeitsrate der unter 5-jährigen senken können.

Zweitens wird die Nachfrage nach bestimmten Gesundheitsdienstleistungen durch sozioökonomische Faktoren und Faktoren, die die Güte des Gesundheitsangebots beschreiben, erklärt. In Abhängigkeit von Krankheiten von unter 5-jährigen wird sowohl die Nachfrage nach verschiedenen Gesundheitseinrichtungen als auch die Zufriedenheit der Eltern bzw. Erziehungsberechtigten mit diesen untersucht. Heutzutage wird der Abschluss einer Krankenversicherung als effektiver Mechanismus betrachtet, um die Inanspruchnahme von geeigneten Gesundheitsdienstleistungen sicherzustellen. Wenn Frauen im gebärfähigen Alter eine Krankenversicherung abschließen, verbessert sich sowohl ihr eigener Gesundheitszustand als auch der ihrer Kinder und dadurch sinkt automatisch auch die Sterblichkeit bei unter 5-jährigen. Daher werden drittens im Rahmen dieser Studie Faktoren analysiert, die die Entscheidung von Frauen sowie die kollektive Entscheidung eines Haushalts eine Krankenversicherung abzuschließen, beeinflussen.

Dazu wurden 531 Frauen im Alter von 15 bis 49 Jahren mit mindestens einer Lebendgeburt zwischen 2002 und 2007 interviewed. Die Auswahl der Frauen erfolgte nach den Prinzipien einer geschichteten Zufallsstichprobe in drei Distrikten in Ghana. Bei der Analyse wurde eine Mischung aus „discrete choice“- Modellen und „Duration“-Modellen verwandt.

Ein parametrisches Weibull-Modell zeigt, dass Faktoren wie pränatale Gesundheitsvorsorge, Impfen im Kindesalter sowie die Anwendung mit Insektenschutz behandelter Mosquitonetze einen signifikanten Einfluss besitzen, die Sterblichkeitsrate der unter 5-jährigen in Ghana zu senken. Angebotsseitige Faktoren wie Krankenschwestern pro Bevölkerung und Infrastruktur haben einen negativen und statistisch signifikanten Einfluss. Umgekehrt steigern Mehrlingsgeburten und Geburten ab dem 4. Kind die Sterblichkeitsrate bei unter 5-jährigen. Haushaltseinkommen hat eine unerwartet positive, aber schwach ausgeprägte, Auswirkung auf die Sterblichkeit unter 5- jähriger.

Um die Nachfrage nach Gesundheitsdienstleistungen bedingt durch Krankheit eines Kindes zu analysieren, wurde ein multinomiales „Choice“ Modell benutzt. Zusätzlich dazu wurde ein „Odered logit“-Modell genutzt um die Zufriedenheit mit dem gewählten Anbieter von Gesundheitsdienstleistungen abzubilden. Die Ergebnisse zeigen, dass Haushaltseinkommen positiv und signifikant mit der Nachfrage nach privaten Gesundheitsdienstleistern zusammenhängt. Genau genommen liegt ein quadratischer Effekt beim Haushaltseinkommen vor. Für die Fälle, dass Mütter ihre Kinder in Apotheken, bei traditionellen Heilern oder selbst behandelten, war der Einkommenseinfluss weniger stark. Wartezeiten in der Gesundheitseinrichtung, die hier Opportunitätskosten darstellen, wirken sich durchgängig negativ auf die Nachfrage nach privater Gesundheitsversorgung, religiöser Heilung und Selbstbehandlung aus. Besonders hervorzuheben ist aber, dass Faktoren, die sich auf das Angebot von Gesundheitsdienstleistungen wie z.B. Krankenhausbetten pro

Bevölkerung und Strasseninfrastruktur beziehen, statistisch signifikant die Nachfrage nach privater Gesundheitsversorgung beeinflussen.

Wenn für andere Einflussfaktoren kontrolliert wurde, sind Haushalte, die private Gesundheitsdienstleister in Anspruch nehmen, um etwa 12 % zufriedener als Haushalte, die öffentliche Gesundheitseinrichtungen nutzen. Dieses Ergebnis führt zu der Schlussfolgerung, dass die Qualität privater Anbieter von Gesundheitsdienstleistungen die von öffentlichen Anbietern übersteigt. Charakteristiken von Anbietern wie etwa Distanz und Wartezeit hängen negativ und signifikant mit der Zufriedenheit der Haushalte mit diesen Einrichtungen zusammen. Mit alternativen Gesundheitseinrichtungen sind die Haushalte weniger zufrieden. Aus diesen Ergebnissen lässt sich schlussfolgern, dass mit steigender Qualität von privaten und öffentlichen Gesundheitseinrichtungen eine Tendenz von Selbstbehandlung und traditionellen/religiösen Behandlungsmethoden hin zu allopathischen Gesundheitsanbietern besteht.

Das binäre Logit-Modell zeigt, dass Faktoren wie die Verfügbarkeit von Krankenschwestern und Entfernung signifikante Bestimmungsgründe für die Bereitschaft darstellen, eine Krankenversicherung abzuschließen. Bei der kollektiven Entscheidung des Haushalts, eine Krankenversicherung abzuschließen, wurde ein partielles Logit Modell verwandt. Diese Modell zeigt auf Haushaltsebene, dass sich die Faktoren Krankenschwestern pro Bevölkerung und Distanz zur nächst gelegenen Einrichtung konsistent und negativ zur Anzahl der versicherten Haushaltsmitglieder verhalten.

Die Studie kommt eindeutig zu dem Schluss, dass Verbesserungen der Infrastruktur im Gesundheitsbereich wie geteerte Strassen und direkt mit der Gesundheitseinrichtung zusammenhängende Faktoren wie Anzahl an Krankenschwestern und Betten, die Nachfrage nach einer modernen Gesundheitsversorgung steigern werden. Da die gegenwärtige Infrastruktur (geteerte Strassen) nicht ausreichend ist, sollten die politischen Entscheidungsträger, die öffentlichen Ausgaben für den Bereich physische und materielle Infrastruktur erhöhen, um die Kindersterblichkeit der unter 5-jährigen deutlich reduzieren zu können.

CHAPTER ONE

INTRODUCTION

1.1 Background

Child health is one of the most important indicators for describing mortality conditions, health progress and the overall socio-economic wellbeing of a country. Knowles and Owen (1997) assert that there is a strong correlation between health (as proxied by life expectancy) and output per worker. Amartya Sen (1999) indicates that health, like education is among the basic capabilities that gives value to human life. Health contributes to both social and economic development. Better health translates into greater and more equitable distribution of wealth by building human and social capital that increases national productivity (Bloom *et al*. 2004, WHO, 2001).

Hence, child mortality remains an important agenda of public health and international development agencies, and has received widespread recognition as part of the United Nation's Millennium Development Goals (MDGs). The UN's commitment is reflected in their desire to reduce the level of under-five mortality rate by two-thirds from their 1990 levels by the year 2015, equivalent to an annual average rate of reduction of 4.3 percent as expressed in the Millennium Development Goals (MDG4). Despite numerous interventions and action plans, very little evidence exists on why the infant and child mortality rates remain pervasive in Ghana. If Ghana were to make the mark in actualizing the MDG on child mortality, it is imperative to attempt and determine what factors contribute to the high levels of child mortality and whether publicly induced health inputs play a major role.

Children in low-income countries face much higher risks of morbidity and mortality compared to their counterparts in more affluent societies. While the infant and child mortality rates in Ghana were 68 and 112 per 1000 children respectively, Sweden recorded only 3 in both mortalities in 2004 (World Bank, 2006). The causes of child mortality usually a combination of diseases and malnutrition which are preventable in high-income countries result in deaths in poor countries. For instance, deaths from diarrhoea can be sharply reduced with improvements in drinking water and sanitation and this call for increased community and/or public investments in these priority areas.

Approximately, 12 million infants and children under-five years of age die each year, with large variations in under-five mortality rates across regions and countries (Todaro, 2003). sub-Saharan Africa is the region most affected and accounts for more than one-third of deaths of children under the age of five (Hill *et al*., 1999). Baker (1999) reported that childhood mortality rates declined all over the world between the mid 1940s and early 1970´s. A great deal of these gains was achieved through interventions targeted at communicable diseases such as diarrhoea, respiratory infections, malaria and measles. Nevertheless, the health gains were ephemeral for Africa due to the fact that disease-oriented vertical programmes alone were not effective, resulting in a situation in which the mortality rate worsened in some countries (United Nations, 2002). Of the thirty countries with the world's highest child mortality rates, twenty-seven are in sub-Saharan Africa. The region's under-five mortality in 1998 was 173 per 1000 live births compared to the minimum goal of 70/1000 internationally adopted in the 1990 World Summit for Children (UNICEF, 2000).

Ghana's experiences with infant and under-five mortality rates have been mixed. The government through the Ministry of Health and the Ghana Health Service is responsible for public health policies of which reducing child mortality is one. After an initial decline of infant mortality rate from 81.3 per 1000 children in 1988 to 61 in 1998, the figure increased again to 64 in 2003, though better than the sub-Saharan average of 101. The under-five mortality rate follows similar pattern, recording a decline from 155 in 1988 to 110 in 1998 before increasing again to 111 and 112 in 2003 and 2004 respectively, albeit marginally (GSS, 2003).

Ghana is ranked 54th highest in terms of infant mortality with 56.36 per 1000 children dying before age one out of 226 listed countries. Singapore recorded the best country performance on this ranking with 2.10 per 1000 children dying before age one (World Facts Book, 2005)[1]. Infant and child mortality correlates with and is among the indicators of a country's level of health or development and is a component of the Physical Quality of Life Index[2].

[1] http://www.allcountries.org/wfb2005/ (Accessed November 15, 2007).
[2] The Physical Quality of Life Index (PQLI) has been supplanted by the Human Development Index. It suffers similar weaknesses associated with the HDI, though gives a snapshot of a country's economic performance. The PQLI is made up of three variables namely basic literacy rate, infant mortality and life expectancy at birth.

In Ghana, the public sector is the largest provider of health care with complements from the Missions (churches and other religious movements), the private sector and traditional medicine. Additionally, there is a "fee exemption policy" for all children aged under-five and adults over 70 years of age who utilize public health facilities. There is also free medical care for some conditions like limited pregnancy expenses, leprosy and TB treatment. It is envisaged that since under-five health care is "free", the poor especially will demand public health and thus public investment in health inputs are crucial in determining child mortality.

In the literature, a myriad of factors; household, socio-economic, environmental, demographic and community characteristics are regarded as the key determinants of child mortality. What has been missing in the debate is the role of public investments via health inputs. Public investment hereby refers to key public provision of health inputs including hospitals, clinics and the complementary inputs such as doctors, nurses, hospital beds, and above all accessibility or proximity to the health facilities (distance/the availability of motorable roads) *inter alia*.

This study thus posits that public investments via health inputs will contribute significantly in increasing the demand for modern health care and reducing child morbidity and mortality especially in the rural areas. Hence, we model the probability of a child dying before age five using a duration model. The probability of a child dying is assumed to be a function of child characteristics (which would include the gender of the child), characteristics of the mother and other socio-economic characteristics of the household. The choice of a health care provider conditional on childhood sickness is also explored. In the context of this study we include publicly induced inputs such as the doctor-to-patient and nurse-to-patient ratios, number of hospital beds per population, distance to the nearest hospital/health facility and kilometres of tarred roads among others.

1.2 Statement of the Problem

The problem is that child morbidity and mortality are high in Ghana. The numerous health policies enacted by the government through the Ministry of Health and Ghana Health Service notwithstanding, infant and child mortality remain pervasive in Ghana. In all, about

80,000 children in Ghana die before age five annually[3]. Some two-thirds of the child deaths in the developing world are caused by diseases (predominantly acute respiratory infections, diarrhoea and malaria), for which low-cost interventions, including immunization, oral dehydration therapy (ORT), and antibiotics exist (Jones *et al*., 2003). It is also evident that child mortality in rural areas is substantially higher than in urban areas and the reduction in child mortality is much slower in rural areas where Ghana's poor are concentrated.

The infant and under-five mortality rates also follow regional disparities between the north and south because of poverty and low health inputs such as hospitals, doctors and nurses. In the Upper West region of Ghana, infant mortality rate is twice as high as and under-five mortality rate three times as high as the Greater Accra region. Amartya Sen (1999) emphasizes that the overarching goal of development is to maximise people's capabilities; that is their ability to lead the kind of life they value most. Thus to Sen, empowering people to escape premature mortality, under-nourishment and illiteracy among others are the desirable goals of development and that this typically requires improvement in the provision of primary health care in poor countries such as Ghana. An improved health care system which delivers high quality care is not only beneficial to individual citizens and their quality of life but also one of the catalysts for economic development of the country.

The World Bank (2006) reports that 63 per cent of Ghana's children with fever receive anti-malaria drugs while only 4 per cent of children sleep under mosquito treated bed and 20 per cent of children do not receive immunization at all against the childhood killer diseases. Inoculation against childhood killer diseases (Tetanus, Diphtheria, Pertusis, Poliomyelitis, Tuberculosis and Measles) is crucial for a child's survival and this is provided freely at Child Welfare Clinics and in national immunization campaigns by the government of Ghana. To the extent that a quarter of children do not receive immunization at all is a matter of grave concern for policy makers. In 1992, coverage for the third dose of diphtheria-pertusis-tetanus (DPT) was only 43 % for children under 12 months of age.

Traditional rural and urban societies have developed long-standing medical and spiritual epistemologies for treating and preventing illness. Religious and traditional beliefs, myths and misconceptions about vaccinations have often undermined national immunization

[3] http://www.ghanaembassy.org/News_Details_ghana.cfm?EmpID=1133,(Accessed 08/12/08).

campaigns. Fear of side reactions and lack of faith in the efficacy of vaccinations are also to blame for the low patronage (Bosu, *et al.* 1997). While there is no recorded public protest against vaccination in Ghana, this problem became pronounced in Nigeria in 2003. In Nigeria, disagreement over the safety of the oral polio vaccine pitted ordinary citizens and community leaders in the predominantly Muslim north against the World Health Organization, the United Nations Children Fund and Nigerian authorities. The five northern states banned the use of the controversial vaccine on children in their respective domains on the grounds that the vaccines were deliberately contaminated with anti-fertility agents and the HIV virus. Immunization is one way of reducing child mortality rates via providing the full set of recommended vaccination to the child. The World Health Organization recommends eight immunizations in the first year of life. According to the World Bank (1993), immunization is one of the most cost effective ways to prevent major illness, particularly in environments where children are malnourished and die of preventable diseases.

Ghana has operated a cost-recovery health delivery system known as the "cash-and-carry" system since 1985, whereby patients are required to pay up-front for health services at government clinics and hospitals. However, consultation services at public health facilities which constitute about 25% of the total cost are free. The reduction of public spending on health care and the introduction of user fees has created problems of inaccessibility and inequity in health care. The proportion of government budget on health between 2001 and 2004 averaged 10.3 per cent. Public health expenditure as a per cent of GDP still remains comparatively low averaging 2.3 per cent over 1995-2002(World Bank, 2006), far below the continent's (Africa) average of 5.5 for the same period[4]. The proportion further declined to 1.9 per cent between 2003 and 2004. Nationally, per capita health expenditure is $16 per annum of which per capita public health expenditure is 31% ($5).

The WHO (2007) through its World Health Statistics indicates that Ghana's per capita expenditure on health at international dollar rate was $94.7 while total health expenditure as a proportion of GDP stood at 6.7%. The Ghana Statistical Service (GSS, 1999) revealed that only 43.8% of those who were ill had consulted a medical practitioner. This trend can be linked partly to the increasing health care user fees over recent years. To remove the

[4] http://www.who.int/whosis/whostat/EN_WHS09_Table7.pdf. (Accessed 25th May, 2009).

financial barrier to health services, the government initiated the National Health Insurance Scheme aimed at abolishing those systems and limiting out of pocket cash payment at the point of service. This scheme became operational in 2005 with access opened to subscribers who pay a premium based on their incomes and their dependents below age 18. The minimum premium for the said insurance scheme is 7.2Gh cedis (US$8). It is important to mention that certain communities had already initiated their own Mutual Health Insurance schemes prior to the introduction of the National Health Insurance (For example, Nkoranza and the East Gonja Districts). It is worth-mentioning that, under the various health policies, health care for the under five and adults above 70 years of age that patronize public health facilities is free. Thus the effect of rising health cost is less debilitating on the health status of children. The exemption policy is in operation throughout the country but there is no universality in the interpretation of the guidelines for the exemption policy.

In Ghana, just as many developing countries, traditional and western medical practices co-exist and parental demand for either or both services on behalf of their children may influence child health. In addition to the western or formal government sector, the traditional health sector, which includes herbalist and spiritual healers remain an important source of health care especially for the rural poor. Factors such as the type of problem, availability of services, beliefs about the causes of the disease, success of treatment determine how and why people resort to health care in the different sectors. According to Huq and Tasnim (2008), a significant portion of parents rely on unqualified or traditional providers for their children's health care because of low cost, easy accessibility and familiarity with the services.

While the efficacy of the traditional medicine is in doubt because they have not been subjected to scientific scrutiny in most cases, demand among rural and some urban dwellers seems high. The World Health Organization reports that in Ghana, Mali, Nigeria and Zambia, the first line of treatment for 60% of children with high fever resulting from malaria is herbal medicine at home[5]. In order, to come out with an explicit policy on health care, the study also looks at the factors influencing choice of health care providers, again verifying how public health inputs might affect the outcome.

[5] http://www.who.int/mediacenter/factsheet/ts13/em/. (Accessed on 14th June, 2007).

Despite the public nature of Ghana's health care, the greatest challenge is inadequate health inputs. For instance, the Ghana Health Service estimated in 2004 that the population-per-doctor and population-per-nurse ratios were 17,733 and 1,510 respectively. The Ghana Demographic Health Survey (2003) also attributes the deterioration in the health indicators to a number of factors including lack of access to clean water and sanitation facilities. This study posits that aside the traditional factors identified in most empirical determinants of child mortality, particular covariates such as availability of health workers and other health related infrastructure are woefully inadequate as demonstrated by high population-per-doctor and population-per-nurse ratios and lack of access to health institutions because of long distance and/or unmotorable roads.

In the rural areas especially, distance to the nearest health facility and lack of means of transport debar would-be-patients from accessing health care and thus endangering the lives of children who cannot be reached for immunization programmes aside other health needs. The provision of public services like safe drinking water, motorable roads, sanitation, immunization etc will promote child survival prospects. Environmental health threats stem mostly from traditional problems long since solved in wealthier countries such as lack of clean water, sanitation, adequate housing and protection from mosquitoes and other insect and animal disease vectors.

WHO (2002) reports that among the 10 identified mortality risks in high-mortality developing countries, unsafe water, sanitation and hygiene ranked second, while indoor smoke from solid fuels ranked fourth. Thus poverty also influences health because it largely determines an individual's environmental risks, as well as access to resources to deal with those risks. Environmental hazards claim about 11 million avoidable childhood deaths each year in developing countries (WDI, 2004). Unable to afford clean fuels, the poor largely rely on biomass fuels for cooking and heating, creating health hazards for children in the household. Inside the smoky dwellings of developing countries, air pollution is often higher than it is outdoors in the world's most congested cities.

1.3 Significance of the Study

Among the eight Millennium Development Goals (MDGs) that were adopted by the 189 members of the United Nations (UN) summit in 2000, at least four are directly related to

maternal and child health issues (Todaro and Smith, 2005). These four goals are to reduce child mortality (MDG 4), improve maternal health (MDG 5), combat diseases, such as AIDS and malaria (MDG 6), and eradicate hunger (MDG 1). The study basically contributes to the body of knowledge and research based policy interventions meant to improve child and maternal health.

Most studies investigating child health and mortality issues have concentrated on the traditional socio-economic, demographic and household factors given less attention to health inputs which are provided either by or via the government. Health inputs with public goods features have potential spillover effects on general health care seeking behaviour. Since child mortality influences a country's life expectancy, it is important to know the factors responsible for mortality decline and the factors that work as obstacles to its further decline in Ghana. The findings of this research highlight the problems facing communities suffering from child mortality. Understanding the causes, trends and consequences of child mortality will help in planning intervention strategies aimed at preventing future occurrence. For instance, strategies to raise community awareness particularly in the rural areas and others about the causes of child mortality will be crucial input in national health policy.

The study also contributes to the development of baseline data on childhood health seeking during illness and child mortality in Ghana and help track progress towards the achievement of the MDGs. By incorporating health inputs and other covariates in the analysis of under-five mortality, the study recommends appropriate policies aimed at improving the health and longevity of the country's potential future workforce.

1.4 Organization of the Study

The study is organized into nine major chapters. Chapter one presents general introduction to the study encompassing the background, the statement of the problem and significance of the study. The rest of the study is organized as follows: chapter two surveys the related literature on child mortality, health seeking behaviour and maternal health insurance both theoretically and empirically. In chapter three, an overview of the health sector particularly public health is provided to give some insight on contemporary issues related to health care delivery in Ghana. Chapter four deals with the data collection process; including country profile, study area profile, sampling design and descriptive statistics.

Chapter five involves empirical estimation of the covariates of under-five mortality using survival analysis. Chapter six investigates child health seeking during illness using multinomial choice model while chapter seven presents the results on the overall level of satisfaction associated with the choice of a given provider's health services. The factors influencing the demand for health insurance among the mothers sampled using a binary logit model is the focus of chapter eight. The chapter also explores the factors influencing the number of household members insured in the National Health Insurance scheme using Generalized Linear Model. Lastly, chapter nine summarizes the findings from the study and makes policy recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

There is vast literature on the determinants of under-five mortality and the demand for health care encompassing the entire population or a section of it using cross-sectional or panel data. Often socio-economic, demographic and biomedical factors have been found to be significant predictors of the demand for health care and health care utilization. This chapter presents the literature threefold; child mortality, health seeking behaviour in terms of choice of health care provider and demand for health insurance.

2.2 Child Mortality

Several studies have been carried out on infant and child mortality using Census, Living Standards and Demographic Health Survey (DHS) data. The literature treats the phenomenon two-fold; using cross-sectional or panel household data on one hand and cross-sectional time series or panel data on the other hand (*see* Imam, 2004; Hanmer *et al*. 2003; Fayissa, 2001; Ranis *et al*. 2000; Waldmann, 1992). However, this study is based on cross-sectional household data. The literature on the determinants of childhood mortality consistently identifies four broad categories of factors; household characteristics that have an indirect effect on mortality (e.g. maternal education, paternal education, region of residence, household income, and access to safe drinking water and sanitation); biological attributes at birth that have direct influence on health and nutrition (e.g. sex of the child, birth order, birth interval and mothers' age); health inputs before, during and after delivery that directly affect mortality but can be influenced by parental behaviour (e.g. prenatal care, institutional delivery, immunization, postnatal care and breast feeding); supply side factors that indicate the availability of health infrastructure such as community health centre, primary health centre and private/public hospitals.

Desai and Alva (1998) investigated the effect of maternal education on three indicators of child health-infant mortality, children's height for age and number of vaccinations received using Demographic and Health Survey data for 22 developing countries. The authors argued

that maternal education may be a proxy for the socio economic status of the household as well as for characteristics of the community of residence. Thus more educated women are more likely to have come from higher socio-economic strata and are likely to reside in areas with better health systems as well as water and sanitation systems.

Derose and Kulkarni (2005) using multi-level logistic analysis found community HIV rates, women's education and immunization as significant determinants of child mortality in Zambia. In Egypt, Aly and Grabowski (1990) used logit analysis to model child death probability using Egypt's World Fertility Survey in 1980. They concluded that source of drinking water and sanitation was significantly and negatively related to child mortality. Woldemicael (1988) employed logistic regression to examine the effect of some environmental and socioeconomic factors that determine childhood diarrhoea in Eritrea using data from the 1995 Eritrea Demographic and Health Survey (EDHS). The results show that type of floor material, household economic status and place of residence are significant predictors of diarrhoea.

Gangadharan *et al* (2000) used probit analysis to model child mortality in Pakistan and found that girls have a significant lower probability of dying in age group 0-1 but have a significant higher probability of dying in the age group 1-5. Thus the higher mortality of girls in the age group 1-5 reflects discrimination against girls in the form of lower health and other resource inputs. Additionally, they found mother's education beyond a certain threshold and increased duration between births to significantly reduce child mortality. Boone and Zhan (2006) employed logistic regression for analyzing child mortality in a cross-section of countries. The study found mother's and father's education as significant determinants of child mortality in poor countries.

Wang (2002) using cross-sectional demographic and health surveys and OLS concluded that at the national level, access to electricity, vaccination in the first year of life and public health expenditures can significantly reduce child mortality. In the urban areas, however, only access to electricity has a significant health impact while in rural areas, increasing vaccination coverage is important for reducing mortality.

In their study on Bangladesh, Bairagi *et al* (1999) using a duration model concluded that changes in mother's education, birth interval and birth order had little effect on mortality

decline. Duration modelling is applied by Hala (2002) to assess water and sanitation's impact on child mortality in Egypt. The results show that access to municipal water decreases the risk of child mortality but sanitation is found to have a more significant impact on mortality than water. In Malawi, Baker (1999) and Espo (2002) used indirect methods to estimate levels and trends of mortality in Malawi. The main findings are that source of drinking water and sanitation facilities are strong predictors of infant mortality. Berger *et al* (2002) analyzed the causes of under-five mortality in Zambia using Bayesian dynamic logit model for discrete time survival data and Markov-Chain Monte Carlo methods. The study showed that several variables, including the age of the mother and the breastfeeding duration exhibited distinct age-dependencies.

The hazard rate framework is utilized by Klaauw and Wang (2003), in which a flexible parametric framework for analyzing infant and child mortality is developed. Their model predicts that a significant number of under-five child deaths can be averted by providing electricity, improving the education of women, providing sanitation facilities and reducing in-door air pollution. Wang (2003), using data from the 2000 Ethiopia DHS examined the environmental determinants of child mortality by constructing three hazard models (the Weibull, the Piece-wise and the Cox model) to examine three age-specific mortality rates: neonatal, infant and under-five mortality. He found a strong and positive statistical relationship between child mortality rates and poor environmental conditions.

In another study, Jacoby and Wang (2004) examined the linkages between child mortality and morbidity in rural China using a competing risks approach. The key findings are that access to safe water/sanitation and maternal education reduce child mortality risks while use of unclean cooking fuels (wood and coal) significantly reduces the neonatal survival probability in rural areas.

Sang-Hyop (2005) estimated a household demand for immunization and the effect of immunization coverage on the probability of child survival in rural India. The author argued that mothers with high risk of child mortality may engage in compensatory behaviour in the demand for health inputs and that those who are favourable to prenatal care might engage in complementary behaviour in the demand for postnatal care (i.e. more likely to also obtain postnatal care). To address the problem of self-selection in the demand for health inputs, child mortality model was estimated jointly with the demand for immunization, demand for

delivery care, and demand for prenatal care. Child mortality was specified as a proportional hazard model; while the demand for immunization was modelled as an ordered probit. Both the demand for prenatal care and delivery were specified as random effects probit models.

Eldin and Maglab (2003) examined the impact of parent's education, health services and household standard of living measured by permanent income, on child survival in rural Sudan using household data consisting of 1400 rural residents. Child mortality was assumed to depend on the education levels of the mother and father, household's income per adult, mother's age, public programme variables related to health (such as availability of hospital beds per capita and services to improve sanitation and water-borne diseases) and rural dummies. It is argued that women's allocation of time between market and home production (upbringing and care of children) might influence the health status of children. The two-Stage Least Squares estimation technique was used with household assets used as identifiers in the regression. However, the OLS technique was also used for comparison of results. Both maternal and paternal education was found to have a significant negative impact on child mortality. However, maternal education was found to have a larger and more significant impact than paternal education.

Kravdal (2004) investigated the effects of the educational attainment of mothers and other women in the community on child mortality in India using the National Family Health Survey of 1998-1999. Child mortality was specified as a discrete–time hazard model and some of the explanatory variables considered were education of the mother, average education of women (capturing education of other women in the community) and women's autonomy variables (economic, physical, decision-making and emotional) which were incorporated as potentially mediating or confounding factors.

Kravdal (2004) also estimated logistic models for (15) health and health care indicators (including vaccination of children, whether the woman received antenatal care, received tetanus vaccination and had moderate or severe anaemia). Average education of women, mother's education, religion, wealth, urbanization, availability of health care facilities and the age of the child were some of the explanatory covariates used to model health and health care indicators. The results showed that higher mother's education and average education of women in the community are significant in reducing child mortality. Also, physical, decision-making and emotional indicators reduce the incidence of child mortality. In the case

of health and health care indicators, mother's education and average education of women also proved to be significant factors influencing their demand. The author recommended policies to enhance women's autonomy at both the individual and community level since their autonomy is crucial in reducing child mortality.

Blunch (2005) examined the impact of maternal literacy and numeracy skills, formal education and adult literacy course participation on child health inputs (vaccinations and postnatal care) and child mortality in Ghana. He adopted an Instrumental Variable (IV)-based two-stage least squares (2SLS) estimation technique to account for the potential endogeneity of maternal skills, schooling and adult literacy course participation. His preliminary results revealed that formal schooling, adult literacy course participation and literacy and numeracy skills have a positive impact on child health input demand and hence reduce child mortality. The author recommended improvement in child health knowledge through the inclusion of health topics in the curricula of adult literacy programmes.

Maitra and Pal (2005) examined the relationship between early childbearing, parental use of health inputs and child mortality in Bangladesh. The authors argue that mother's age at birth as well as hospital delivery and child vaccination are chosen by the couple (i.e. they are endogenous in the child mortality regression). Consequently, they attempted to address the potential bias resulting from endogeneity by jointly estimating child mortality, mother's age at birth and the demand for health inputs allowing for cross-correlations between the unobserved components of the residual terms in these equations.

Early child birth, institutional delivery, child vaccination and child mortality were all estimated as random effects probit models. The results revealed significant adverse selection in that women having early childbirth tended to use health inputs differently from all other women. Prior to accounting for self-selection in the choice of hospital delivery and child vaccination, hospital delivery was significant but was seen as having a harmful effect on child health.

Wang (2003) investigated the determinants of child mortality in LDCs using Demographic and Health Surveys data from over 60 low income countries. The results show that at the national level access to electricity, incomes, vaccination and public health expenditure significantly reduce child mortality. For the rural sample, vaccination is the only significant

predictor for child mortality while access to electricity is the only significant mortality determinant in the urban sample. Although pooled cross sectional data improves model performance because of the rich source of data, country specific effects are not captured.

Iram and Butt (2008) estimated the socioeconomic determinants of child mortality in Pakistan using sequential probit model. The study posits that breastfeeding protects children from early exposure to diseases and ill health and that mother's education is strongly related to neonatal mortality, infant mortality and child mortality through improved child caring practices. Proximate determinants such as prenatal care, income and environmental conditions were also found to be significantly related to child mortality**.**

Kovsted *et al*. (2002) investigated the impact of health knowledge on child health and mortality in Bissau, the capital of Guinea Bissau using duration modelling. Using the mothers' knowledge of malaria as a proxy for health knowledge and controlling for covariates, they concluded that the importance of maternal education in child health outcomes diminishes or disappears when health knowledge is introduced into the model. However, it was established that health knowledge has significant effect on both child mortality and health when instrumented for to capture endogeneity.

Earlier studies on childhood and under-five mortality in Ghana have examined socio-economic and bio-demographic factors without recourse to supply side variables such as availability of good roads and health personnel (Benefo and Schultz, 1996; Amankwah, 1996, Binka *et al*. 1995, Tawiah, 1989; Adansi-Pipim, 1985).

On the determinants of fertility and child mortality in Ghana and Cote d'Ivoire, Benefo and Schultz (1996) used OLS and Instrumental Variable Estimation. The dependent variable for the fertility equation estimated with OLS is the number of children born alive to women over age fifteen, treating child mortality as exogenous. In the child mortality estimation, child mortality is endogenous and identified by instruments measuring community health services and environment. Some of the main findings were that economic resources of households, maternal education, access to markets and food prices are significantly associated with child mortality in Ghana. In Cote d'Ivoire, households living a greater distance from a clinic experience higher mortality among their children while women's education was found to be a significant predictor of child mortality. On the issue of fertility, women's education was

proven to be the most important predictor in both countries. One important setback of the study was the omission of child characteristics which constitutes an integral biological endowment in the estimation of a child's health production function. This omission is attributable to the fact that the data source (Living Standards Survey) lacks such attributes.

Using pooled data from the 1998 and 2003 Ghana Demographic Health Surveys and a piecewise constant hazard model with gamma-shared frailty, Gyimah (2007) found at the bivariate level that children whose mothers identified as Muslims and traditional believers have a significantly higher risk of death compared with their counterparts whose mother's identified as Christians. However, the religious differences disappeared after the mediating and confounding influence of socioeconomic factors were controlled. In his previous study on ethnicity and infant mortality in Ghana, he found significant ethnic differences at the bivariate level. However, the ethnic differences disappeared after controlling for socio-economic variables (Gyimah, 2002). Although, Gyimah's paper provides an excellent contribution to the body of knowledge on child health outcomes, he did not control for supply side factors such as access to roads.

Bour (2003) studied the effect of maternal education on childhood mortality in Ghana using the Ghana Demographic and Health Survey data (1998) and World Bank data of 2000. Using graphic and linear regression models, the study confirmed that there is an inverse relationship between mother's education and child survivorship. While the study provides insight into the relationship between maternal education and child survivorship, it failed to account for the role of the public sector via public health investment. In addition, the hypothesized linear relationship employed in the study is oversimplified.

Asante (2003) using OLS found contrasting results regarding some covariates of under-five mortality including significant and positive association between income, use of safe drinking water and higher education on under-five mortality in Ghana. The unexpected outcome might be attributable to the use of inappropriate econometric model since OLS is incapable of capturing the dynamics. Additionally, maternal and child specific biomedical factors were not controlled for. The use of survival analysis in the current study, coupled with the introduction of supply side variables makes interesting comparisons with previous results.

2.2.1 Interim Summary

Generally, the literature is emphatic regarding the significant impact of place of residence, distance, maternal or parental education, access to sanitation and immunization on under-five mortality. Recent studies on mortality in Ghana have rather presented conflicting results on the relationship between household income and/or wealth on child mortality. While the use of OLS may be less appropriate for modelling under-five-mortality as in the case of Asante (2003) and Bour (2002), other studies on Ghana including Gyimah (2007) have used a more appropriate (duration) model but failed to account for key health care inducing variables such as the availability of health personnel, and accessibility via road infrastructure. This study intends to fill the research gap while simultaneously contributing to the already conflicting findings.

2.3 Health Seeking and Choice of Health Care Provider

The literature on health care-seeking behaviour during illness is diverse; encompassing experimental, descriptive analysis and empirical work normally involving the use of discrete choice models. Some of the authors have treated the phenomenon with recourse to specific ailments such as malaria (Kaellander, *et al*. 2008; Franckel and Lalou, 2008; Anyawu, 2007; Onta, 2003; Dzator Asafu-Adjaye, 2003) while others have treated health care-seeking behaviour in general and in some cases controlling for certain illnesses (Dong *et al*., 2008; Huq and Tasnim, 2008; Sudharsanam and Rotti, 2007 and Bolduc *et al*., 1996 *inter alia*).

The consumption of health care services is a complex behavioural phenomenon. As Gertler and van der Gaag (1988, 1990) rightly observed, the empirical literature on the demand for health care in developing countries contain mixed and conflicting results. Chakraborty, *et al*. (2003) posit that the utilization of health care services is influenced by the availability, quality, cost and comprehensiveness of services as well as socio-cultural structure, health beliefs and personal characteristics of the users.

Kaelander *et al*. (2008) sought to review individual case histories of children aged under-five who had died of pneumonia in rural Uganda and found that out of the children dying of pneumonia, a whopping 70% had been treated with drugs at home. Mbagaya *et al.* (2005) studied mother's health seeking behaviour during child illness in rural Western Kenya and found that fifty two percent of the children had at least one illness a week prior to the survey,

with fever contributing to the highest morbidity (48%) while 32.4% of the mothers purchased and administered drugs without seeking medical attention.

Onta (2003) conducted a descriptive and exploratory study on knowledge, home care practice and health seeking behaviour of mothers in regards to Acute Respiratory Infection (ARI) in under-five children in the Indian District of Kathmandu. It was revealed that approximately 57 % of ARI children were cured through home care practice of the mothers. Of the remaining 43% uncured children, majority of the children were taken to medical shop and a negligible proportion went to sub health post. The study concluded that literacy and experience (age of the mothers) had a significant impact on knowledge about ARI, but it had little relationship with the mother's attitude and practice regarding ARI.

Sreeramareddy *et al*. (2006) studied care seeking behaviour for childhood illness in Western Nepal using a sample of 292 mothers. They found that pharmacies (46.2%) were the most common facilities where care was sought with temple or traditional healing (0.6%) being the least. This finding is however, in contrast with this study where public health facilities (43%) were the most patronized but in agreement with the least sought health care, faith or traditional healing (see Chapter 6; Figure 6. 2). Using multiple logistic regression analysis, they found education and perceived severity of illness as the most significant predictors of care seeking behaviour. However, they did not control for the supply side. Key variables such as the distance to health facility and public spending on health care were missing.

Dong *et al*. (2008) examined the characteristics of different health care users and the likelihood of introducing community-based health insurance in Burkina Faso using a health demand model. Using a sample of 988 households encompassing all age groups, they found that two-thirds of the individuals who reported ill did not seek professional care and that health-care non-users display lower household income and expenditure, older age and lower perceived severity of illness. Empirically, economic factors particularly income and higher perceived severity of illness were found to increase the probability of using western medical care (*see also* Gotsadze, 2005).

One of the relatively earlier studies on health care seeking behaviour in Africa was undertaken by Buldoc *et al*. (1996) where the choice of medical providers in rural Benin was explored by comparing three discrete choice models; multinomial logit, independent

multinomial probit and multinomial probit models. Community dummies were used to capture the differentials in health facilities across the districts. Some of the findings were that price and travel time are important determinants of provider choice especially for Communal Health Centre but there was weak evidence that that individuals who save are more likely to demand health care. There are other studies that suggest that prices are not important arguments of the utilization of health care in developing nations. For example, Akin *et al*. (1986) and Bitran (1989) reported very small and sometimes positive price effects, most of which are statistically insignificant. Conversely, Gertler *et al*. (1987), Alderman and Gertler (1988), Gertler and van der Gaag (1988, 1990), Bitran (1990), Anyanwu (1996), Mbanefoh *et al*. (2004), Mwabu *et al*. (2003) and Anyanwu (2007) reported significant negative price effects on health care demand.

In a more recent study on Nigeria, Anyawu (2007) examined the demand for health care institutions' services in the treatment of malaria fever using conditional logit model. Using data on both children and adults, he found price, income, travel time and age *inter alia* as significant determinants of demand for health care institutions. Substantial controversy surrounds the influence of travel time on health care demand in developing countries just like the price variable. On one hand, studies have shown that travel time/distance and income are insignificant determinants of health care demand in developing countries (Heller, 1982; Akin *et al*., 1986; and Schwartz *et al*. 1988). Alternatively, Dor *et al*. (1987), Gertler and van der Gaag (1988) and Mbanefoh *et al*. (2003) show evidence of the sensitivity of health care demand in developing countries to these variables. While traditional or faith healing is considered as important health care seeking option especially for the poor and rural dwellers, Anyanwu's paper made no room for these treatment seeking options.

Furthermore, Dzator and Asafu-Adjaye (2004) studied the factors that influence malaria care seeking behaviour in Ghana and their results indicate that treatment and time costs are significant variables affecting the choice of health care provider. They also found that education and household size play an important role in malaria care seeking behaviour. Surprisingly, their finding indicate that demand for malaria care is inelastic with respective to costs, and the magnitudes of the elasticities suggest that malaria care is a necessity. Against the backdrop of poverty and the problem of health care financing, non-formal malaria treatment has gained currency in the literature (Ibeh *et al*., 2005; Deressa *et al*., 2003; and Fawole and Onadeko, 2001 *inter alia*).

Masiye and Rehnberg (2005) found a positive income elasticity for willingness to pay for malaria treatment in Zambia in addition to socio-economic constraints in the form of education of household head and household size. In another development, Hamid *et al*. (2005) studied the major factors determining the choice of health care providers in Bangladesh using descriptive analysis and multinomial logit. The finding from the empirical model indicates that access factors such as travel time, education and severity of illness are significant in the choice of modern private providers. Nguyen *et al*. (2002) also provide evidence that consumers choose the facilities in which access is easier and the payment system is flexible.

In Bangladesh, Huq and Tasnim (2008) examined the relationship between maternal education and child health care using Household Income Expenditure Survey (HEIS). They concluded that maternal education is a powerful and significant determinant of child health care status in Bangladesh. While they established that women with secondary education or better are more likely to have healthy and fully immunized children, they could not find any significant relationship between maternal education and utilization of qualified provider for any type of illness. In related studies, Bitran (1989b, 1990), Gertler *et al*. (1987) and Mwabu *et al*. (2003) found that years of education and health problems that resulted in bed confinement or work interruption influence the likelihood that a given person would seek care outside the home. Other studies have shown that socio-economic and demographic factors play an important role in health care seeking behaviour (Heller, 1982; Bitran, 1989b, 1990; Bir and Eggleston, 2002; Dong *et al*. 2008; Alam *et al*. 2009).

Human mobility is a significant public health issue especially regarding physical access to health services (Weiss and McMichael, 2004). Aside health care, transport infrastructure is a key ingredient in the development of rural areas, providing people with access to goods and services. Efficient transport enables access to markets and services, information opportunities, education and other opportunities that have long-run poverty reduction impact. For many of the world's rural poor population, mobility is key to accessing and being accessed by biomedical health services and technologies. However, the potential enabling role of mobility and transport in health care remains neglected both in terms of research and inclusion in development agenda. The bulk of the literature had focused on the health consequences of modes of transport such as motorized transport (WHO, 2002), air travel and

deep vein thrombosis (Adi *et al*. 2004; Arya *et al*. 2002), safety (Howard 2002; Wardlaw, 2004) and environmental pollution (Gualtieri *et al*. 2005) *inter alia*.

Musa (2002) indicates that construction of feeder roads providing motorized transport that connects 45 villages in the Darfur region of Sudan had remarkable impact on community health, such as increase in childhood immunization. Matin *et al* (2002) report that women experience better access to health services and improved service provision by outreach workers in areas of rural Bangladesh. Transportation barriers have been identified as one of the causes of maternal and neonatal mortalities (Cham *et al*. 2005; Terra de Souza *et al*. 2000; Thaddeus and Maine, 1994). Consequently, in modelling childhood health seeking behaviour, we introduce asphalted or tarred roads; a proxy for transport infrastructure, as one of the key explanatory variables.

2.3.1 Interim Summary

Health seeking in terms of childhood morbidity until recently has been the preserve of the biomedical Sciences. The phenomenon has been treated with less attention to socio-economic covariates. Of the existing empirical literature, education and severity of illness have been identified as significant and less controversial determinants of care seeking from qualified providers. Nevertheless, there is conflicting results regarding the empirical relationship between income, distance, travel time and waiting time on one hand and care seeking on the other.

The fundamental difference between this study and others such as Anyawu *et al*. (2007), Dzator and Asafu-Adjaye (2004) and Bolduc *et al* (1996), is that while the latter focused on the entire population, the former focuses on only children aged under-five years who can hardly make their own health seeking decisions. Also, pharmacy or purchasing over the counter-drugs and traditional/faith healing were not included as a provider option in their analysis. This study fills this gap and also controls for other socio-economic variables such as the nature of household headship, income, marital status and dependency ratio among others.

2.4 Demand for Health Insurance

Most of the work on health insurance demand is empirical and focus on the socio-economic characteristics of the insured and non-insured on one hand and insurance and health care utilization on the other hand. The papers often identify the causes of coverage or lack of it, and the consequences of being without coverage. Health insurance coverage is associated with increased access to medical care for both individuals and families (Nielsen and Garasky, 2008).

Temple (2002) studied the factors influencing the insurance decision of older Australians and found economic and demographic factors particularly income and age as significant predictors for private insurance demand**.** In Malawi, Makoka *et al* (2007) found income and education as significant determinants of private health care in a free public health care regime. Propper (2000) found that the demand for private health care was strongly influenced by income, political allegiance, and attitudes to the role of state in the provision of health care and past use of health services. The positive association between income and education on health insurance had been reported in other studies (Chatterjee, 2009; Van De Ven and Van Praag, 1981; Grossman, 1972). Generally, higher income decreases the opportunity cost associated with the purchase of health insurance. Thus increases in both income and education are expected to increase the probability of purchasing health insurance.

The effect of demographic and economic factors such as age, marital status, employment and gender on health insurance has been variously studied. Married respondents are more likely to take insurance coverage (Cameron & MacCallum, 1995) and those employed are also more likely to undertake coverage (Adler and Newmann 2002; Hoffman and Pohl, 2002; Butler, 1999; Savage and Wright, 1999).

The price of insurance or premium is another factor influencing the demand for health insurance. However, few studies have attempted to estimate the price elasticity of demand for health insurance including, Pauly and Herring (2001) and Long and Marquis (2002). In the individual market, prices are often based on individual characteristics; hence the premium paid by an insured individual is endogenous (Blumberg and Nichols, 2001). Also, in empirical analysis, a measure of price is often unavailable for the uninsured. Further, in

addition to information asymmetry on the price variable for the uninsured, there is often limited variation in price in highly regulated health insurance markets.

Health care expenditure has also been found to influence the decision to participate in a given health insurance or not (kronick and Gilmer, 1999). The relationship between health care expenditure and health insurance purchase decision of health insurance is premised on the fact that families with higher probability of requiring hospitalization will purchase health insurance.

Investigating the effect of insurance membership among farmers in rural Senegal, Juetting (2004) observed that membership bore a strong positive effect on the probability of going to a hospital, even though the magnitude, with probability of 2 percentage points was quite negligible.

Health status and/or health rating of the individual or household making an insurance decision is another factor which may influence the demand for health insurance. Often, dummy variables reflecting the state of the respondent's health are used in empirical models (Kirigia *et al*, 2005; Temple, 2002). However, barring any medical authentication, such variables may not reflect the state of health of the individuals or households as often the case in household surveys. Health expenditure or health expenditure as a proportion of total household expenditure may be used as a proxy for health status. However, health expenditure per se may not tell much about the household's health burden.

Savage and Wright (2003) examined private health insurance participation and the duration of stay in private hospitals, focusing on the identification of moral hazard behaviour and adverse selection among the insured.

The health of women and children are two policy priorities in Ghana and elsewhere and are succinctly encapsulated in the Millennium Development Goals (MDGs 4 and 5).Women in developing countries are often confronted with serious health risks either for themselves, especially during pregnancy or their children. Access to health insurance and thus health care among women is a *sine qua non* condition for maternal and child health. Lack of health insurance promotes postponement in seeking care, non-compliance of the treatment regime and results in an overall poor health outcome (Hadley, 2002).

Murray and Lopez (1996) reported that pregnancy related health risks accounted for about a quarter of diseases in 1990 for women in the fertility bracket. Africa's maternal mortality is relatively high with an estimated lifetime risk of maternal death of 1 to 16 and a maternal death ratio of approximately 1000 deaths per 100,000 lives (WHO, 2001). In Ghana, a maternal mortality ratio of 590 (World Bank, 2002) may not be alarming within Africa but still high as compared to developed countries with a ratio of 21 deaths per 100,000 live births. It is envisaged that availability of timely health care via access to health insurance will improve maternal care.

Prior to the introduction of Ghana's National Health Insurance Scheme in 2005, a number of studies had been carried out primarily to explore the possibility of replicating the pockets of existing mutual schemes onto the national scale (Nyonator and Kutzin, 1999; Asenso-Okyere *et al*, 1997; Osei-Akoto, 2003). The authors had made recommendations about strengthening the local schemes which will eventually scale-up.

Asafu-Adjaye (2003) and Asenso-Okyere (1997) examined the willingness to pay for health insurance using Contingent Valuation Methods. The studies had mainly focused on the socio economic determinants of willingness to pay and had concluded that pre-payment schemes could curtail self-medication and delays in seeking care. In China, Baernighausen *et al.* (2007) found income and health expenditure as significant predictors of willingness to pay for basic health insurance while education proved insignificant for same.

Dong *et al* (2008) studied the prospects of introducing Community-Based Health Insurance (CBI) in Burkina Faso among health-care users and non-users. They found that economic factors strongly influenced peoples' choice between professional care and non-professional care and concluded that the introduction of CBI might increase the use of medical services.

In their study on insurance ownership among South African women**,** Kirigia *et al* (2005**)** examined the relationship between health insurance ownership and the demographic, economic and educational characteristics of South African women**.** Although the paper by Kirigia *et al* (2005) is the closest to this study, there are fundamental distinctions. Firstly, the women in the sample for the current study have had at least a live birth between 2002-2007, thus the sample pertains to only women in the fertility bracket while their sample included

women aged 16-64 years. Thirdly and more importantly, supply side factors including distance to the nearest health facility were omitted or not controlled for. This study is enriched with the inclusion of variables that capture access to health information since they may influence the decision to ensure or not.

In addition, factors influencing household participation rate in health insurance using fractional logit model to the best of my knowledge has not been studied. This paper fills the research gap by including supply side variables particularly, distance to the nearest health facility and nurse-per-population**.**

2.4.1 Interim Summary

In the health insurance literature, there seem to be consensus on the importance of demographic and socio-economic variables such as age, education and income on the propensity to participate in health insurance. The previous studies had failed to include important control variables such as access to media and provider characteristics such as distance and availability of health workers. In addition, gender specific issues in health insurance had not been adequately explored. The novelty of this study also lies in the focus on women in the fertility bracket. An attempt is also made to estimate household participation rate in health insurance using fractional logit.

2.5 Summary of Chapter

While literature exists on the determinants of child mortality, health seeking and maternal insurance ownership in general in Ghana and elsewhere, there is inadequate knowledge on the empirically relationship between public health inputs and health outcomes. Even where, they have been investigated, inappropriate econometric models have been used as in the case of the Ghanaian studies. In addition, the health seeking behaviour of mothers' on behalf of their under-five children has not been sufficiently investigated. This gap in the literature may be attributable to the lack of reliable community data in national surveys (Benefo and Schultz, 1996). Most national health surveys contain fewer households making district/community analysis less representative. This study fills the gap by the use of own survey data in the Lawra, Dodowa and Ejisu-Juaben districts in Ghana. The use of own survey may be a strength and a weakness at the same time since previous studies have predominantly employed Living Standards or Demographic Health surveys.

2.6 Research Questions

Based on the empirical literature review and the research gaps identified, the central research questions could be cast as follows;

1. Does public investment via health inputs contribute significantly in inducing health care demand and reducing child mortality?
2. Does the choice of a given health care provider affect consumer satisfaction of health services?
3. What are the factors influencing the demand for health insurance among women? Does health input and income influence the demand for maternal health insurance?

2.7 Objectives

The general objective of this study is to understand the factors contributing to Ghana's under-five mortality rates and health seeking behaviour. The study explores the relationship between household's demographic, socio-economic and community characteristics on child mortality and health seeking. Community characteristics are captured by the depth of public investment; asphalted roads, nurses, distance to hospitals etc. The study is premised on the rationale that, parental health care seeking via allopathic care can help reduce the alarming under-five mortality rate. However, it is envisaged that the demand for and utilization of appropriate health care is necessitated by ownership or access to health insurance. More specifically, the study is aimed at:

1. Getting an in-depth understanding of the factors influencing child mortality and health seeking behaviour in Ghana. Thus controlling for other covariates, we examine the impact of public health investments on child mortality and choice of health care provider.
2. To investigate whether the choice of a given health care provider influences consumers' overall level of satisfaction with health care.
3. Examining the socio-economic factors influencing maternal demand for health insurance and household participation rate.
4. Provide policy intervention based on the above findings.

CHAPTER THREE

OVERVIEW OF THE HEALTH SECTOR IN GHANA

3.1 Introduction

Since Ghana's independence from British colonial administration in 1957, several policy interventions have been sought to primarily achieve economic growth and the subsequent trickle-down effect on the other sectors of the economy including the social sector of which health is prominent. Although Ghana is an impoverished country with a per capita income of about US$510[6], one of the major concerns of the government is making health care accessible and affordable to the populace. This necessitated the quest for rapid industrialization in the 1960s, control measures and state interventionist policies in the 1970s. This was eventually followed by an IMF sponsored ERP/structural adjustment programme in the 1980s through the 1990s with emphasis on market liberalization. In the last decade, the country had also subscribed to the IMF's Highly Indebted Poor Countries (HIPC) initiative and the enhanced HIPC with the view to decreasing the country's debt burden (in some instances complete write-offs) so as to release funds to competing sectors such as health, education and sanitation.

The health sub-sector is an integral component of the social sector where the quality of the labour force and the ensuing growth and capital accumulation depend (Bhargava *et al*. 2001; Chakraborty, 2004). Hence, in the quest to achieve the desired economic development, there was the need to provide modern medical institutions to adequately train qualified and efficient medical and para-medical staff to improve the health and productivity of the populace. The Korle-Bu Teaching Hospital, which is a primary health care facility, was built by Governor Gordon Guggisberg in 1923 under his 10 year Development Plan (1920-1930). It still remains the most important health edifice in Ghana with a bed capacity of 1600. The Komfo Anokye Teaching Hospital, which was built in 1954 in Kumasi, is also a colonial heritage.[7] It is the second largest hospital with a bed capacity of 1000 and the only tertiary health institution in the Ashanti Region. It is the main referral hospital for the Ashanti, Brong Ahafo, Northern, Upper East and West regions of Ghana.

[6] Source: http://siteresources.worldbank.org/DATASTATISTICS/Resources/ssa_wdi.pdf. (Accessed 28 October, 2008).
[7] The Tamale Hospital is being upgraded to the status of a third teaching hospital amidst inadequate staff and logistics.

Paradoxically, since the establishment of these institutions no health facility in the post independence era can be compared to these significant health infrastructures, although modest renovations and expansions have been undertaken over the period. While almost all the 138 Districts boast of District Hospitals and other health centres (some of which are colonial legacies as well), albeit ill equipped, access to health care still remains problematic especially for the rural poor. The most important question worth asking is what major additions have been added to the stock of health infrastructure in post colonial Ghana. The Ghana Statistical Service revealed that only around 43.8% of those who were ill had consulted a medical practitioner (GSS, 2000); indicating that access to health care remains problematic for many Ghanaians.

Among the myriad of problems facing the health sector include differential access to quality health care emanating from differences in geographical location and socio-economic groupings, financial barriers, low capital investment in health facilities, poor feeder road system and lack of communication facilities *inter alia* (NDPC, 2005). While Ghana's population per the first post independence census stood at 6.7 million in 1960 it was estimated at over 22 million in 2007, recording a significant growth of 228% over the period (IFS, 2007). Nonetheless, same cannot be said of the infrastructural development. Growth in the quantity and quality of health infrastructure has lagged behind population growth.

Health care financing in developing countries remains an albatross in achieving universal health care including that of women. sub-Saharan Africa's health care remains the worst in the world, with few countries able to spend the recommended $30 to $40 a year per capita that the WHO considers the minimum for basic health care[8]. A number of reasons including low and unstable tax revenues, cut-backs in public budgets and inconsistent health policies have rendered universal health coverage in Ghana a mirage. International agencies such as the WHO (2000) have recommended prepayment schemes, including mandatory health insurance, to be the best form of health financing. The problem of health care accessibility has been espoused by the Commission on Macroeconomics and Health, a wing of the World Health Organization (2001) to the effect that the poor are much less likely to seek medical

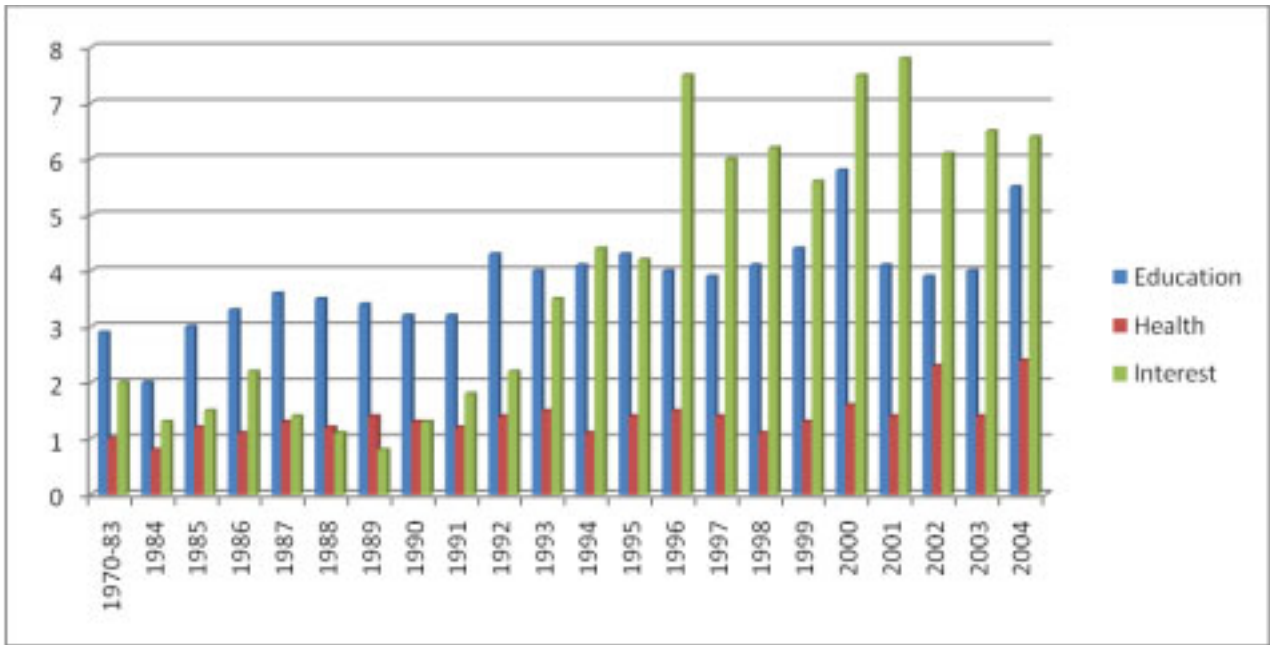
[8] www.ifc.org, (Accessed 20th November, 2008)

care even when it is urgently needed, either because of their longer distance from health providers, or their lack of out-of-pocket resources.

Prior to independence, the colonial government provided healthcare for civil servants through general taxation and non-civil servants received health care at their own expense. Immediately after independence in March 1957, health care was "freely" provided to the general public in public health facilities. This meant that there was no direct out-of-pocket payment at the point of consumption of health care in public health facilities. Financing of health in the public sector was therefore entirely through tax revenues. The sustainability of the free medical care policy became questionable as the economy began to show signs of decline in the 1970s and 1980s resulting in negative economic growth rates and triple inflation figures for some years (see Nketiah-Amponsah, 2009a). Health care equipments and supplies such as essential drugs became scarce and many health care professionals left Ghana's health sectors for better economic opportunities (Ghana Health Service, 2007b).

There was also competing demands on the same source of financing (tax revenue) culminating in the embracement of the World Bank/IMF's sponsored ERP/Structural Adjustment Programmes during the 1980s and 1990s. A key component of the ERP was health sector reform, which was intended to improve the efficiency of the health systems and the quality of care via cost recovery mechanism, in particular out-of-pocket payments with its concomitant effect of decreasing access to health care by the poor (Nyonator and Kutzin, 1999; Asenso-Okyere *et al*, 1997). The introduction of the cost recovery measures notwithstanding, public provision of health care for children aged under-five and adults over 70+ remains "free" in principle. However, such policies only remained on paper since its implementation is fraught with a lot of weaknesses including lack of funds (Ministry of Health, 2000).

Figure 3.1: Public Spending on Health, Education and Interest Payment (% of GDP; 1970-2003)



Health care delivery in Ghana is provided by both the public and private sectors, with the public sector organized according to national (2 teaching hospitals)[9], regional (10 regional hospitals), district (281 district public and other hospitals), sub-district (622 public health centres) and community about 1658 CHPS and maternity homes at the community level (Ghana Health Service, 2005). The Community Health Planning and Services (CHPS) is a major attempt to improve access and equity to essential health care and ensure that the sector contributes to the national poverty reduction effort. In fact, the CHPS is a nation-wide response to the geographical inequity in the provision of health care especially in remote rural areas. The modus operandi involves establishing health points, the so called CHPS zones within the communities with a Community Health Officer in charge.

Out of the 281 district and other hospitals, over 50% are private or mission hospitals. However, these are heavily supported by government through staff salary and other facilities. They provide both outpatient and inpatient services. At the sub district level where health centres are the highest health facilities and first line of referral to the formal health from the community clinic and maternity homes, over 98% of them are public or belong to the government. In order words, mission or private sector participation in the operation of health centres is very low.

[9] The Tamale Hospital is being upgraded into a Teaching Hospital Status.

The Ministry of Health (MOH) is the central government institution in charge of sector-wide policy formulation, financing, regulation, monitoring and evaluation using its agencies including Ghana Health Service (GHS) which is an executing agency responsible for health service delivery. Despite the strategically dispersed location of health centres in Ghana, the teaching, regional and district hospitals still have to contend with outpatient and other primary health related cases which could be managed at the district level creating congestions and long queues and thus raising doubt over the efficiency of health centres (Akazali et al. 2008). In terms of manpower, the Ministry of Health is the largest employer with almost two-thirds of health personnel in the formal sector. It is responsible for guaranteeing high level of performance in the provision of preventive, promotive and clinical care services at the sub-district, district and regional levels (GHS, 2007).

In order to improve health delivery, the government of Ghana through its three Medical Schools and Ghanaian medical students sponsored abroad continue to train various categories of health workers with the prime objective of retaining them. To provide incentive for the health workers, the government in 2002 set up a $5million revolving fund for vehicles for health workers and bought 73 cars for distribution to personnel posted to rural deprived areas in order to induce them to stay**.** In addition, special duty allowance to all health workers aside medical officers was introduced in 2000**.** There are also district specific incentives initiated at the district level. In the Lawra District, for example, the District Medical Officer and expatriate medical officers were given extra allowances ranging from 200-500 dollars a month from the Assembly's own coffers**.**

Despite the effort of the government to improve the conditions of health workers, the health sector is plagued with international migration of skilled personnel such as doctors, pharmacist, nurses and midwives. For instance, over the period 1993-2002, 3,157 health workers, representing 31% left Ghana for greener pastures leaving approximately 1.48 physicians per 100,000 people (State of the Ghanaian Economy, 2003)**.** This is against the background that Ghana receives medical aid from Cuba in the form of Cuban medical doctors who are usually posted to the remotest part of the country.

The brain drain in the health sector might be attributed to the general dissatisfaction with the conditions of service of health workers (internal customer dissatisfaction). Agyepong *et al*.

(2004) enumerated a myriad of problems including low remuneration, lack of essential equipments and inconveniences with transportation to work as some of the challenges underlying the delivery of effective health care services.

Table 3.1: Health workers trained in Ghana and brain drain of health workers (1995-2003)

Main Cadres	***1995***	***1996***	***1997***	***1998***	***1999***	***2000***	***2001***	***2002***	**2003***
General practitioners/Medical Officers	93 (56)	104 (68)	84 (59)	85 (58)	113 (68)	84 (50)	67 (60)	72 (68)	209
Dentists	10 (2)	13 (3)	9 (3)	9 (3)	12 (4)	9 (2)	7 (2)	8 (2)	11
Pharmacists	67 (29)	65 (27)	80 (35)	120 (53)	120 (49)	120 (24)	120 (58)	120 (77)	
Medical Laboratory Technologists/Technicians	31 (0)	37 (2)	38 (1)	45 (0)	46 (0)	46 (5)	45 (9)	51 (0)	62
Environmental Health Officers	100 (0)	112 (2)	108 (3)	109 (1)	139 (1)	145 (0)	135 (2)	144 (3)	130
Nurses/Midwives**	975 (195)	911 (182)	868 (174)	814 (161)	1,073	1,037 (215)	1,124 (207)	1,074 (205)	1,100 214)

Source: Ministry of Health
*Projections
** includes general nurses, midwives, public health nurses, intensive care nurses & peri-operative nurses
Figures in parenthesis are the corresponding brain drain figures for the year

Table 3.1 shows that the total number of medical doctors trained in Ghanaian medical institutions annually vis-à-vis the annual migration of same professionals has been alarming. For instance, in the year 2002, whereas the total number of trained medical doctors in Ghana was 72, the number of Ghanaian medical doctors who migrated in search for greener pastures in same year was 68, indicating a net of four (4) medical doctors retained for the year. The University of Ghana Medical School, The School of Medical Sciences of the Kwame Nkrumah University of Science and Technology and The University of Development Studies Medical School train about 150 medical officers annually. However, half of every graduating class leaves the country within the second year, and 80% leaves by the end of the fifth year (Blanchet *et al*. 2004). The trend is not different from the other health workers such as Pharmacists and nurses with poor retention rates. Anecdotal evidence has it that there are more Ghanaian medical doctors in the State of New York of the United States of America alone than the resident doctors of Ghana. It can be deduced from Table 3.1 that the number of trained medical doctors had almost tripled in year 2003 vis-a-vis 2002. This sharp increase in the number of trained medical personnel for the year may be

attributable to increased intake probably to augment the retention rate after netting out the "brain drain" component. Unfortunately, data beyond 2003 is unavailable to track current trend.

Table 3.2: Per capita Public Health Spending (2000-2006)

year	Exchange Rate (C/$)	Population	Per capita Public Health Exp($)
2000	5,455.06	19.87	5.85
2001	7,170.76	20.31	6.22
2002	7,932.70	20.76	8.20
2003	8,677.37	21.21	10.50
2004	9,004.63	21.66	13.82
2005	9,072.54	22.11	17.40
2006	9,174.38	22.57	22.78

Source: Computed from Ministry of Health (2007) data. Population and Exchange rate data were collated from IMF's IFS (2007)

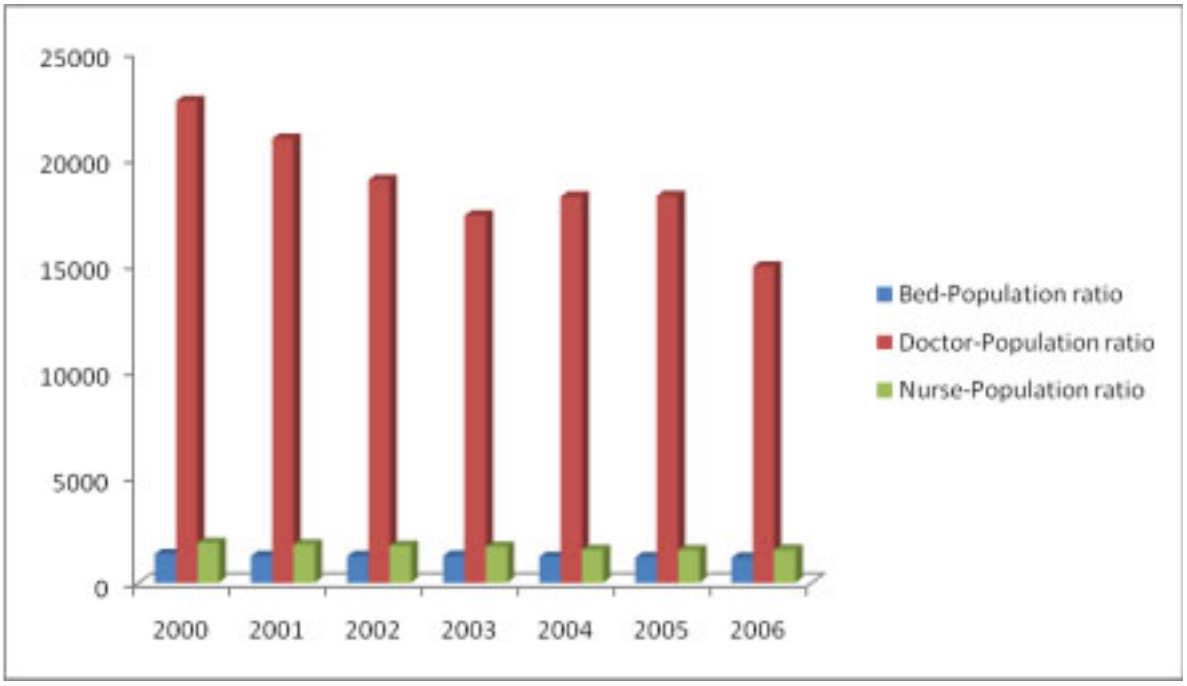
In the area of health care financing, health spending lags behind other equally important sectors such as education and interest payment (see Figure 3.1). Public spending on health care remains one of the less controversial roles of government partly due to its spillover effect on GDP. The World Bank (2004) argues that the slow progress to the achievement of the MDGs in developing countries is the lack of government health expenditure. Although, per capita public health spending has been increasing steadily over the period, 2000-2006 (see Table 3.2), it is below the level achieved by other countries in the sub-region and no match for developed countries such as Germany and Canada[10]. The WHO (2006) reports that per capita public health spending in PPP for Ghana was US$100, while that of Botswana, Mauritius and Namibia were US$635, US$581 and US$338 respectively, albeit, Ghana's was better than countries such as Burkina Faso (US$87), Nigeria (US$50) and Ethiopia (US$22) *inter alia*.

It is worth mentioning that the boost in public health spending in Ghana has been orchestrated by donor support. For instance, donor support as a proportion of public health spending amounted to 11.1%, 16.2% and 14% in 2003, 2005 and 2006 respectively (Ministry of Health, 2007). However, the WHO (2006) shows that external support for the health budget is in excess of 20%[11]. The donor support excludes projects directly initiated and implemented by the donor agencies such as DANIDA, EU and USAID.

[10] Germany and Canada had per capita health expenditures of US$3,328 and US$3,672 in 2006 (WHO, 2006). Health spending and inputs strongly correlate with health outcomes such as child mortality and life expectancy.
[11] http://www.unicef.org/infobycountry/ghana.html,(Accessed 28th April, 2009).

Concerning health workforce, as shown by Figure 3.2; bed state, doctor-population and nurse population statistics *inter alia* make interesting comparison with other countries. In 2005, the World Bank indicated that there were 0.2, 0.9 and 0.9 doctors, nurses/midwives and hospital beds respectively per 1000 population compared to 0.8, 4.1 and 2.8 for South Africa (World Bank, 2008/2009; World Bank, 2009).

Figure 3.2: Bed, Doctor and Nurse state statistics



For instance, in the year 2006, 1180 Ghanaians shared one hospital bed while one medical doctor attended to 14908 patients as compared to the WHO norm of 1 medical doctor to 7500 for sub-Saharan Africa. The problem of inadequate health personnel is further compounded by frequent industrial action precipitated by poor working conditions and low remuneration.

Aside the inadequacy of health professionals, access to the existing health care is constrained by poor road infrastructure. Improvement in road infrastructure has been a key component of Ghana's Poverty Reduction strategy. According to the Ministry of Roads and Transport, only 15.7% of the total road network (50,620km) in Ghana is paved[12]. The road sector relies

[12] . World Bank (2007). See also: http://investinghana.org/Pages.aspx?id=81 (Accessed 22-06-2009).

substantially on donor support for funding, due to inadequate internal funds. In Ghana, between 1996 and 2003, donor funds constituted approximately 40% of annual road sector budgets, creating concerns about the sustainability of road financing (GHA, 2005). In recent times, tolled highways and private sector participation in road constructions are being considered to help improve transport infrastructure.

Policy makers in Ghana and other developing countries have often failed to establish synergy between road infrastructures, availability of health workers and health care demand/outcomes. In the ensuing empirical chapters, an attempt is made to explore some of these relationships.

3.2 Policy Interventions for Improving Child Survival

Despite the general challenges facing the health sector in Ghana, the government has embarked on pragmatic policy interventions to ameliorate health conditions. As often the case with other public policies, the problem has to do with financing and implementation. This section outlines some of the policies that have been introduced to boost maternal and child health outcomes which occupy a central role in Ghana's health policy.

In 2001, the Government of Ghana in collaboration with development partners adopted the UNICEF-supported Accelerated Child Survival and Development (ACSD) approach to address the problems of malnutrition and childhood mortality. The accelerated approach is an integrated package of maternal and child health services designed to achieve significant reductions of mortality and malnutrition in children aged under-five years in areas with very high mortality rates, through a number of cost effective child survival interventions. Data from the GDHS (GSS, 2003) indicates that the decline in childhood mortality experienced in the 1980's and 1990s seems to have levelled up in the last few years. Hence, cost-effective child health interventions are needed to achieve nation-wide coverage for children and ensure greater survival rates in line with the aspirations of reducing 1990 mortality levels by 50% in 2015 as recommended by the MDGs. There are three essential elements of the interventions namely Expanded Programme on Immunization (EPI-plus), Integrated Management of Childhood Illnesses (IMCH-plus) and Antenatal Care (ANC-plus).

The EPI-plus consists of immunization, Vitamin A supplementation and de-worming. IMCI-plus comprises the management of diarrhoea through the use of Oral Rehydration Treatment (ORT), management of malaria through the use of insecticide treated bed nets (ITNs) and anti-malarial drugs, exclusive breastfeeding and complementary feeding. ANC-plus includes intermittent preventive treatment of malaria during pregnancy, iron and folic acid supplementation and the use of ITN for pregnant women.

Ghana's Ministry of Health adopted the EPI in 1978 following the launching of the programme by WHO and UNICEF in the late 1970s. As part of Ghana's primary health care programme, children are immunized against six childhood diseases namely diphtheria, measles, pertussis, poliomyelitis, tetanus, and tuberculosis. Per the WHO and UNICEF guidelines for childhood vaccination, a child is considered fully vaccinated in Ghana if he /she receives one dose each of BCG and measles, three doses of the polio vaccine, and three doses of DPT. Further, a vaccine against yellow fever is also recommended for children. BCG protects the child against tuberculosis and it is administered at birth or first visit to the clinic. DPT protects children against diphtheria, pertussis (whooping cough) and tetanus.

It is required that a child is given three doses of DPT at approximately 6, 10 and 14 weeks of age. Similarly, three doses of polio vaccine are administered at approximately 6, 10 and 14 weeks of age but a dose of polio vaccine (Polio 0) is usually given at birth or within 13 days of birth. However, in 2002, the prevalent vaccine referred to as "DPT/HepB/HiB" was introduced to replace the DPT vaccine. In addition to the DPT, the said vaccine contains Hepatitis B vaccine and a vaccine against Haemophilus influenza type B. Children are expected to receive the complete schedule of vaccinations before reaching their first birthday. Overall, there has been considerable improvement over the past fifteen years in the percentage of children age 12-23 month who have been fully vaccinated as revealed by the increase to 69% in 2003 from 47% in 1988; a 22 percentage points improvement (GSS, 2003)

Iodization and Vitamin A supplementation are part of the strategy adopted to address micronutrients deficiency for children aged 6-59 months. The strategy aims at achieving adequate supplementation to 90% of all children under-five years (UNICEF, 2002) through mass campaign during national immunization days (GSS, 2003). About 78% of children aged 6-59 months are reported to have received Vitamin A supplement in the 6 months

preceding the survey. However, iodine deficiency coverage is relatively less successful with only 23% of children under age 3 years residing in households that use adequately iodized salt.

Ghana adopted the IMCI strategy in 1999 following its launching in 1992 by UNICEF and WHO. It is an integrated approach which aims at improving the quality of both preventive and curative care provided to children under-five years of age to ensure reductions in childhood mortality. Three main components of the strategy are worth noting:

- to improve case management skills of health-care staff
- to improve overall health systems
- to improve family and community health practices.

The strategy was initially adopted in four districts but extended to 18 districts in 2003 and to 50 out of the 138 districts in Ghana.

Diarrhoea accounts for about 6% of childhood admission cases and is reported to have been caused by unsafe water supplies, inadequate sanitation and poor hygiene. Since the 1980s, the oral dehydration treatment has been adopted as a cost-effective method of treating diarrhoea. However, less than 50% of children suffering from diarrhoea are treated with ORT (GHMI, 2005). The GSS (2003) estimates that out of the 26% of children who had diarrhoea in the two weeks preceding the survey and were treated by health providers; only 39% were given oral rehydration salt. Nonetheless, about 63% were given ORS, recommended home fluid (RHF) and increased fluids. It is imperative to establish that interventions to improve access to safe drinking water, sanitation, hygiene and health education are crucial in enhancing the levels of prevention and treatment of the disease.

Malaria has been identified as the major cause of under-five morbidity and mortality, accounting for about 25% of under-five mortality (GSS, 2003; Ghana Health Service, 2007). In 1992, the Government of Ghana launched a 5-year (1993-1997) National Malaria Control Action Plan which focused on capacity building for improved disease management in health facilities. In 1998, the government of Ghana adopted the Roll Back Malaria initiative (RBM) of WHO, which is a global malaria strategy with a particular emphasis on Africa. Six core

elements have been identified in the Roll Back Malaria Partnership strategy to reduce global malaria mortality by half by the year 2020.

(i) Early detection
(ii) Rapid treatment
(iii) Multiple means for prevention
(iv) Well co-ordinated action
(v) A dynamic global movement
(vi) Focused research (UNICEF, 2002)

In line with this strategy, the government of Ghana developed a Medium Term Strategic Plan for Malaria control (1998-2002) which envisaged improving coverage of malaria control activity. The use of ITNs is a strategic intervention promoted under the National Malaria Control Programme (NMCP). The programme aims at reducing morbidity and mortality caused by malaria by 25% which could be achieved through improved case management, implementation of multiple prevention methods, focused research and improved partnership (GMHI, 2005).

Feeding practices are fundamental determinants of children's nutritional status which in turn influence their health status. The Ministry of Health recommends that mothers exclusively breastfeed their babies without even water from birth to six months (UNICEF, 2002), which can be complemented with nutritional foods for at least two years. In 1993, health care facilities in Ghana adopted the Baby Friendly Hospital Initiative (BFHI) which is believed to have influenced breastfeeding practices and delivery of prelactal feeds among children delivered in health care facilities or by medically trained health professionals. In May 2000, the Breastfeeding Promotions Regulation 2000 (L.I 1667) was enacted under the Food and Drugs Law to regulate the marketing of breast milk substitutes by baby food manufacturers. The aim of the regulation is to protect breastfeeding practices by preventing aggressive marketing of breast milk substitutes (GDHS, 2003).

3.3 Policy Options for Reproductive Health

Reproductive health entails a state of complete physical, mental and social well being and not just the absence of disease or infirmity in all matters pertaining to the reproductive system and its functions and processes. It thus involves the rights of men and women to

have access to and utilize effective, affordable and acceptable family planning methods. Under this, five areas of maternal and child health public policies namely antenatal care, delivery, postnatal care, Safe abortions and family planning are briefly discussed.

3.3.1 Antenatal Care

Antenatal care services are part of the primary health care services for pregnant women and management of the foetus. ANC services are integral part of preventive and promotive health care. In Ghana, ANC services consists of a set of professional check-ups for pregnancy complications, blood pressure monitoring, the testing of urine and blood samples, tetanus toxoid immunization, and the provision of iron supplements and anti-malarial prophylaxis tablets. Recognized providers of ANC services include Obstetricians, Medical Practitioners, Midwives, Nurses, Community Health Officers and Traditional Birth Attendants. Generally, the strategies for promoting utilization of ANC services include provision of essential obstetrics, clinic based services and outreach services. The utilization of ANC services is generally encouraging. According to the GDHS (2003), 98% urban residents and 89% of rural residents received anti-natal care services from a trained health professional during the last pregnancy for the 5 years preceding the survey. This reflects an apparent improvement compared to an overall 89% receiving antenatal care in 1998. Also 80% of women were given iron tablets and 58% received anti-malarial drugs. However, only 3% of pregnant women sleep under INTs.

Although ANC services are provided in private health facilities, government has been the largest provider of ANC services. 88% of women obtain ANC services from government facilities. Government hospitals and clinics provide ANC services to 62% of women, followed by health centres which account for about 26%. Private hospitals or clinics provide only 9% of ANC services.

3.3.2 Child Delivery

Here, two aspects of institutional delivery are considered; whether the child was delivered at home or in a public/private institutions and whether the delivery was supervised by a trained professional. An important set of short term interventions to prevent complications during and after delivery are clean delivery facilities and proper handling of the placenta to prevent

postpartum haemorrhage. The World Health Organisation (WHO) recommends that delivery should be supervised by doctors and nurses or midwives to help mitigate life-threatening complications that may arise during delivery or the post-partum period.

However, a sizable proportion of babies are still delivered at homes under the supervision of Traditional Birth Attendants (TBAs) or elderly women of their respective communities. Only 46% of births occur in health facilities with public health facilities comprising 36% while only 9% occur in private health facility. This represents a slight improvement compared to 43% of children delivered in health facilities over the period 1993-1998. Supervised delivery by trained professional/personnel is still relatively low. Medically trained providers assisted only 47% of deliveries while TBAs assisted 31% and relatives or friends assisted 19%. There are also wide variations in institutional deliveries according to demographic and socio-economic characteristics of women.

According to the GDHS (2003), first births are more likely to be delivered by a medically trained provider than those of second or higher order. About 80% of urban births received medical assistance from medically trained providers as against 31% of rural births. A large percentage of births in Greater Accra (81%), receive delivery assistance from medically trained professional than those to less educated or poorer households. Increasing the proportion of births supervised by trained health professionals therefore demands increasing investment in delivery services so as to cover basic essential and emergence obstetric care to cater for life-saving interventions and preventive services provided by well-trained primary health care physicians as well as non-physician providers (GMHI, 2005).

3.3.3 Postnatal Care

The postnatal care, another component of the safe motherhood programme begins at the end of delivery and ends six weeks after delivery. These services are meant to treat complications that might have occurred during delivery that affect the health conditions of both the mother and the new born. Overall, postnatal care ensures the maintenance of the physical and psychological well-being of mother and child. Due to the high incidence of maternal and neonatal deaths in the first few days following delivery, it is imperative that postnatal care be provided during this period. In 2003, about 25% of women who had non-institutional delivery received postnatal care within two days after delivery. This marked a

significant improvement when compared to 4.3% in 1998. The survey revealed little variation in postnatal care use by mothers' age and rural-urban residence.

3.3.4 Prevention and Management of Safe Abortions

Unsafe abortions have also been considered significant cause of maternal mortality and morbidity. In Ghana, induced abortion is prohibited except in circumstances where the pregnancy is self-threatening or caused by rape (UNICEF, 2002). In a study of 1,196 women conducted in four regions in Ghana, it was revealed that 7 out of every 10 women had an abortion in their reproductive lives some of which were unsafe abortions (UNICEF, 2002; GMHI, 2005). As a consequence, health experts recommend scaling-up of health investment so as to increase access to abortion management and post abortion care.

3.3.5 Family Planning

Family planning services include methods and practices to space births, limit family size and prevent unwanted pregnancies (GHS, 2003). Pregnancy by choice and not by chance is considered a necessary condition for women's health. Effective family planning may prevent rapid successive conceptions which may enhance the health status of both the mother and child. Attempts have been made by various family planning programmes to increase utilization rates of modern methods by adopting strategies to ensure availability of commodities, among other measures. However, utilization rates are still very low as only 25% of currently married women reported using any family planning method as against 22% in 1998. Worse still, about 19% of married women in 2003 reported using any modern method of family planning as against 13 in 1998.

3.4 Chapter Summary

It can be concluded that significant progress has been made in the area of maternal and child health care since independence. For instance, under-five mortality declined from a level of 220 deaths per 1000 live births in 1957 at the time of independence to 111 deaths per 1000 live births in 2003 (GHS, 2007). However, declines in child mortality have either slowed or stalled over the past decade, making it improbable to realize the target of reducing child mortality by two-thirds by 2015. Additionally, childhood vaccination has also witnessed a

phenomenal increase over the past few years. Nevertheless, there are still challenges which could be surmounted with pragmatic public health policies**.**

The predominant problems militating against the health of children include lack of access to safe drinking water. It is estimated that only one-third and 11 per cent of the rural populations have access to safe drinking water and sanitation respectively[13]. Consumption of unsafe drinking water is often a recipe for Guinea worm; of which Ghana reported the worst case the world over in 2004 and diarrhoea. While only 30% of HIV cases are reported in Ghana because of the fear of stigmatization, of the under-reported cases involving children aged 0-14 years, predominantly through mother-to-child, only 8% of the eligible children with HIV/AIDS have access to Anti-Retroviral Therapy (ART).

Health statistics is a crucial input in the health care system, nevertheless, birth and death registrations continue to be low in Ghana. For effective maternal and child care planning, there is the need to intensify birth and death registration. On the maternal side, utilization of institutional delivery is still low and constrained by some cultural and religious epistemologies (Nketiah-Amponsah and Sagoe-Moses, 2009; Addai, 1998). Thus health education, formal and informal should be intensified to increase the utilization of maternal and child health services.

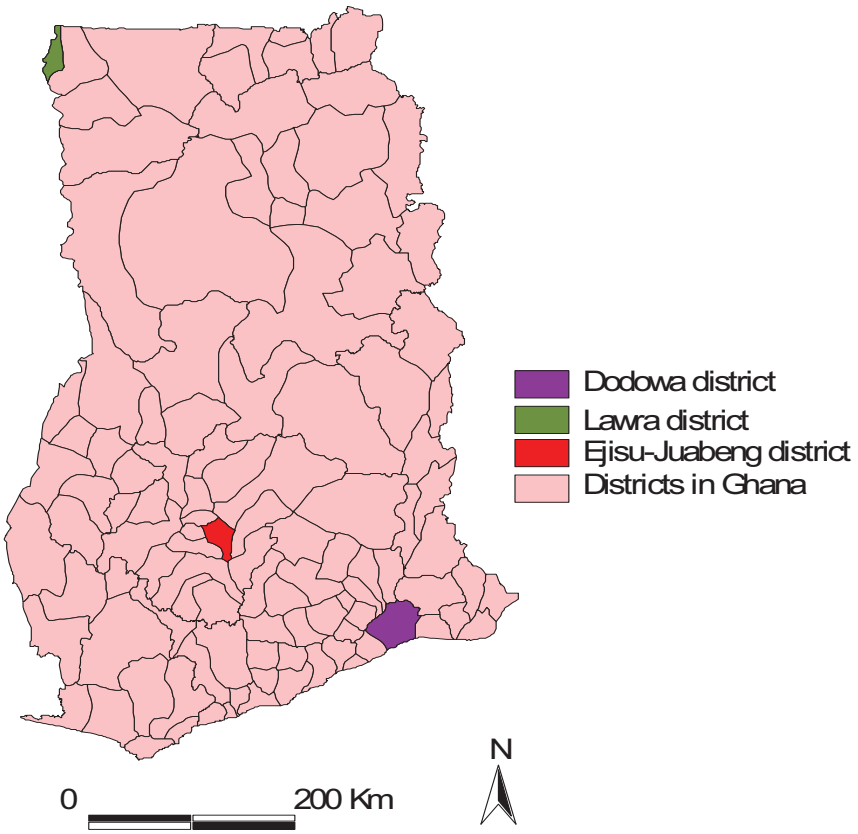
[13] http://www.unicef.org/infobycountry/ghana.html, (Accessed 28th April, 2009).

CHAPTER FOUR

BRIEF PROFILE OF GHANA AND THE STUDY SITES

4.1 Profile of Ghana

Historically, Ghana gained its independence from British colonial rule on 6 March 1957, the first country in sub-Sahara Africa to have achieved this feat. On July 1 1960, Ghana became a republic or a sovereign state in the British Commonwealth of Nations. Ghana practices the regional administration system of governance after initial post independence agitation for federal system became abortive.



Administratively, Ghana is divided into ten (10) regions which are further divided into 138 administrative districts to ensure efficient and effective administration at the local levels. The districts are further divided into sub-districts and units. Each of the district assemblies is headed by a nominated and approved District Chief Executive (DCE). The division of the

country into regions, districts, sub-districts and units correlates with the health sector division in the provision of health services such that health centres are the highest health care facilities at the sub-district level.

At the time of independence, Malaysia, Mauritius, Singapore and South Korea were broadly on par with Ghana in terms of per capita income. While these countries have long since reached and in some surpassed middle income status, Ghana has a partly per capita GDP of US$538 and is heavily aid-dependent and highly indebted to external creditors (WHO, 2002). The country spends a total of US$252 million (4.2% of the GDP of US$ 6 billion) annually on health. About 53.5% of this expenditure is incurred by government and 46.5% by the household through out-of-pocket expenses. The total per capita expenditure on health at an average exchange rate is US$11 (UNDP, 2003). In terms of poverty dynamics, the proportion of Ghanaians living in poverty declined from 52% in 1992 to 40% in 1999, and further declined in 2005/2006 to 28.5% of the population. Similarly, extreme poverty has declined from 37% in 1992 to 27% in 1999 and currently estimated at 18% (Ghana Statistical Service, 2007).

In terms of demography, Ghana's population was estimated to be about 21 million for 2007 with an annual growth of 1.3% (GSS, 2003). The population density per square mile is estimated at 227. The Ghana Demographic and Health Survey in 2003 report that total fertility rate declined from an average of 5.5 live children born per woman in 1993 to 4.2 children in 2003. Malaria is the most prevalent disease among both children and adults throughout the country. In 2003, infant and under-five mortality rates were estimated to have worsened to 64 and 111 deaths respectively per 1000 live births compared to 57 deaths and 108 deaths in 1998 (GSS, 2003).

In the following sub-sections, the three Districts from where data was collected for the study are briefly profiled (Lawra, Ejisu-Juabeng and Dangme-West). The Districts were carefully chosen to reflect different ecological zones and to capture differences in economic well being.

4.1.1 Lawra District

The Lawra District is one of the seven districts in the Upper West Region of Ghana with its capital at Lawra. It is located in the Western corner of the region between Latitudes 2^o 25' W and 2^o 45'W and Longitudes 10^o 20' and 11^o 00'N. It is bordered to the East and South by the Jirapa/Lambussie District and to the North and West by the Republic of Burkina Faso. The district occupies a total land area of about 1051.2 square km, constituting about 5.7% of the region's total land area of 18,476 square kilometres. The District lies within the Guinea Savannah Zone which is characterized by short grasses and few woody plants. The rural settlements of the district are mainly agrarian while the relatively urban settlements engage in trading and other income generating activities beside agriculture. There are also few public servants who are predominantly migrant employees. The District has a population of 87,525 (2000 PHC) constituting 15.2 % of the entire regions population. It has two hospitals, and 12 other health facilities.

4.1.2 Ejisu-Juabeng District

The Ejisu-Juabeng District is situated in the Ashanti region with its capital at Ejisu. The District shares boundaries with the Kumasi Metropolitan Area and Kwabre District to the east, Sekyere East and Asante Akim North Districts to the West and the Bosomtwe -Awima-Kwanwoma and Asante Akim South Districts to the south. It lies within Latitude 1^o 15' N and Longitude 6^o 15'W and 7^o 00'W. It has an area of 678km^2, constituting about 10% of the entire Ashanti region and a population of 124,176 (PHC, 2000). The District's economic activity is dominated by agriculture, small scale industries and services. In particular, there is a thriving traditional textile industry (Kente) in Bonwire. In year 2000, the district had one government hospital and six other health facilities.

4.1.3 Dangme West District

The Dangme-West District is one of the six districts in the Greater Accra region with its capital at Dodowa. The District is bounded on the north by the Akuapim Ridges; to the south by the Gulf of Guinea; to the east by River Volta, South Tongu and the Dangme East District and to the West by the Tema Municipal Assembly. It is situated in the South-eastern part of Ghana, lying between latitude 5^o 45' South and 6^o 05' North and Longitude 0^o 05' East and 0^o 20' West. The District has the largest land surface area (about 1,700 square kilometres) in the region. The 2000 National Census put the district population at 96,809

while the District assembly currently projects the population at 106,000. In terms of economic activity, most of the inhabitants are subsistence farmers and fisherman. In addition, there are petty traders and handful of trained artisans, craftsmen and a few civil servants who are mainly migrant employees of government ministries, departments and agencies. The District has four Health Centres, six community clinics which also function as Community Health and Planning Service (CHPS) compounds. In addition there are five private facilities delivering services.

4.2 Data

The study uses mainly primary data from a sample survey conducted in three Districts (Lawra, Dangme West and Ejisu-Juaben) in Ghana between October 2007 and January 2008. The primary data is complemented by secondary data collected between August 2007 and March 2008. With respect to the primary data, a cross-sectional survey of 531women aged 15-49 (with a total of 773 children) who had given birth between October 2002 and October 2007 in the three Districts were randomly interviewed using validated structured and pre-tested questionnaires based on the mortality rates of the Districts.

In order to minimize possible recall bias on child deaths and health history, we considered live births in the last five years preceding the survey. The limitation of the analysis to children born in the last (past) five years is informed by three principal reasons. Firstly, more detailed information on these children is available (for example, reported size at birth, place of delivery, immunization history and prenatal care received by mother inter alia). Secondly, the information provided is current status information that we are only certain pertains to the most recently born children. It is probable that information about where the family is currently living may not pertain to older children because the family may have moved since that older child's birth. Lastly, the socio-economic conditions of the parents might have changed significantly vis-à-vis the previous ten years or so.

The choice of the three Districts was informed by the poverty and mortality trends as well as the need to capture the ecological zones of Ghana. In the 2003 GDHS survey, the Upper West Region had the highest mortality rate (Lawra District), the Ashanti region (Ejisu-Juaben), moderate and the Greater Accra Region (Dangme West), the least mortality rates. Due to the absence of a complete list of households in each District and due to the specificity

of the subjects under study; women and children, a three stage stratified random sampling technique was employed where the first stage was the District, the second locality/village and the household being the third stage.

When we have heterogeneous populations and the heterogeneity has an impact on the important features being studied such as child mortality and health seeking behaviour, then simple random sampling and systematic sampling methods may be less appropriate. One method which is applicable under such situations is the stratified random sampling technique. Since this study focuses on women and child health issues, the differential impact of demographic, household, community and environmental characteristics can be adequately captured by dividing the population into sub-population or strata and apply random sampling to the sub-populations/strata based on the different sizes of the populations. The use of this technique allows the researcher to get members of the different sub-populations adequately represented in the sample.

The sampled births between 2002-2007 were recorded with the outcomes, dates, place and type of birth assistance among others. For children who died before age 5 at the time of the survey, information on age at death, date, place of birth etc were collected. The child's characteristics were matched with the parents', environmental, household and community characteristics**.**

To ensure data accuracy, quality and reliability, the enumerators who were largely graduate students and had had survey experiences in private and national projects were retrained and the questionnaires thoroughly discussed prior to the field survey. Information on child vaccination/ birth weight and ante/postnatal attendances were copied from the Child Health and Maternal Health Record Cards respectively. Where such health record cards were missing or unavailable, we depended on oral recall interspersed with cross-checks to ensure that the right responses were obtained.

Since the focus of this research is on women and children, we ignored women who have never been pregnant or given birth. The large sample size is to increase the robustness of the empirical estimation. The sample size was calculated with recourse to Cochrane (1977) since the total population of women who had given birth over the past five years in the three

districts is unknown. However, we are guided by the 2003 Ghana Demographic Health Survey (GDHS), and thus employing the sample size for estimated proportion approach;

$$n = \frac{t^2 p(1-p)}{e^2}, \qquad Pr\ (|p\text{-}P| \geq d) = \alpha$$

Where;

n = the sample size

t = the number relating to the degree of confidence anticipated in the result; in this case a 95% confidence interval ($t=1.96$ which is the abscissa of the normal curve).

p = an estimate of the proportion of people falling into the group in which we are interested (child mortality)[14]. α = probability of type I error, or level of significance. e = proportion of error we are prepared to accept (sampling error; 5% anticipated error).

Using the above formula, *255*, *163* and *113* (women aged 15-49 who have ever given birth) were interviewed in the Lawra, Ejisu-Juaben and Dodowa Districts respectively. The actual data collection was preceded by strata identification and household listing (from which a requisite random sample was chosen). The survey includes questions on household and Child demographic characteristics, mortality history, vaccination history, antenatal and postnatal care, and participation in health insurance and household expenditures inter alia.

As part of the requirements for conducting surveys on human subjects in Ghana and elsewhere, the research proposal was subjected to the scrutiny of the Ghana Ethical Review Committee and subsequent approval was granted for the survey (Decision-*GHS-ERC-06/11/07)*). The Child Health Coordinator of the Reproductive & Child Health Unit of the Ministry of Health was part of the study team as a professional advisor. Additionally, the mothers sampled for the study were requested to show their willingness to participate in the study. After obtaining informed consent the health interviewers carried out the interview and recorded the requisite information in the questionnaire.

[14] Using the GDHS (2003), $p = 0.21$ (in the Upper West Region: Lawra/Nandom), $p = 0.12$ (in the Ashanti Region: Ejisu-Juaben) and $p = 0.08$ (in the Greater Accra Region: Dodowa District). Given that there has been a significant improvement in health care between 2003 and 2007, the mortality cases are expected to be lower than the proportions experienced in 2003.

4.3 Descriptive Statistics

Table 4.1 Baseline Characteristics of the Sample (mothers and children)

Variable	**Observations (N)**	**Number (%)**
Rural	531	350(66.0)
Urban	531	181(34.0)
Mother's Age		
Age 15-19	531	28(13)
Age 20-24	531	133(30)
Age 25-29	531	162(29)
Age 30-34	531	100(15)
Age 35-39	531	68(8)
Age 40+	531	43(5)
Sex of Child		
Boy	773	367(47.5)
Girl	773	406 (52.5)
Children's Age		
Age 0-1	773	275(35.6)
Age 1-2	773	157(20.3)
Age 2-3	773	126(16.3)
Age 3-4	773	125(16.2)
Age 4-5	773	90(11.6)
Education		
None	531	159(30.0)
Primary	531	86(16.2)
Junior Secondary/Middle	531	193(36.3)
Secondary	531	85(17.9)
Marital Status		
Never Married	531	36(6.8)
Married (Husband with 1 wife)	531	382(71.9)
Married (Husband with 2 or more)	531	73(13.7)
Divorced	531	8(1.5)
Separated	531	19(3.6)
Widowed	531	14(2.6)
Occupation		
Agriculture	531	117(22.0)
Non-Agriculture	531	348(65.5)
Unemployed	531	66(12.5)
Female Headed Households		
(Yes)	531	137(25.8)
(No)	531	394(74.2)
Mean Household Size	531	4.7

Insured		
(Yes)	531	292(55)
(No)	531	239 (45)

Source: Author's own compilation from survey, Maternal and Child Health Survey 2007/2008

A total of 531 women aged between 15 and 49 years old, with children born during the last five years preceding the survey were included in the analysis. In terms of spatial distribution, 66% of the households live in rural areas while 34% live in urban areas of 5000 and above inhabitants, which is consistent with the national distribution (GSS, 2000). Table 4.1 provides baseline information on the women surveyed in order to highlight their demographic and socio-economic characteristics. Of those (Table 4.1), 13% were less than 20 years old, 30% between 20-24 years old, 29 % between 25-29 years old 28% between 30-49 years.

Female headed households constitutes about 26% of the sample, albeit, lower than the nationally representative GDHS of which a third (34%) of households were headed by women (GSS, 2003). Hitherto, socio-cultural and economic barriers had placed household headships in the domain of men but the trend seems to be changing with the increasing economic empowerment of women. Among the causes of female-headed households are male migrations, the death of adult males, including husband or partner and family disruption. The data indicates that 7% of the women had never married while 3% had lost their husbands through death. Yet still, approximately 8% of them had divorced or separated. It is evident that, female headed households are more hit by poverty relative to men. The mean income of female headed households was US$1440 compared with US$1549 by male headed households. Norton *et al*. (1995) have shown that once household size is controlled for, female headed households in Ghana implies higher poverty.

Regarding occupational distribution of the women, 22% of them were engaged in agriculture related activities while 66% were engaged in non-agricultural ventures with the remaining 12% unemployed. Of those engaged in non-agricultural activities, 2% were student-mothers, 22% engaged in professional trades such as sewing and hair-dressing while 43% were engaged in commerce. In terms of educational attainment, 30% were illiterates or had no formal education while 16.2% had primary education and less than 20% had received secondary education or higher. In responding to the question of whether the mother owns

health insurance or not, 55% of the respondents affirmed that they own health insurance with the remaining having no form of health insurance. The survey also indicates that approximately 14% of the women are married to men who have two or more wives; indicating that polygamy is still prevalent in our socio-cultural setting.

In the area of household amenities, approximately, 60% of the households have access to electricity while 5% own cars or trucks (see Figure 4.1). In terms of access to flush toilet facilities, only 5% have such access implying that sanitation is still a major challenge in curbing environmentally related childhood morbidities such as diarrhoea and cholera. In addition, less than 20% of the households have piped water in their dwelling. Concerning cooking fuels, only 13% of the households had access to clean and low polluting fuels[15]. Although this study cannot be said to be nationally representative, the findings are not different from the national outcome as captured in the socio-economic characteristics of household in the Ghana Demographic Health Survey (GSS, 2003).

Figure 4.1: Socio-economic Characteristics of the Households

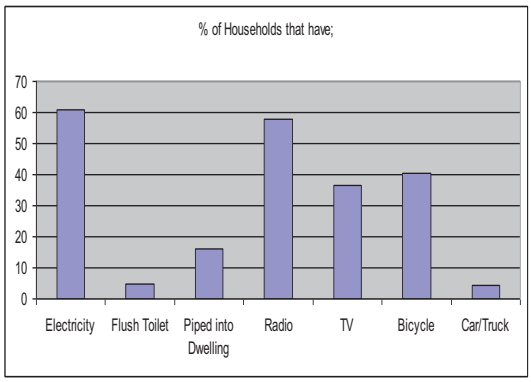
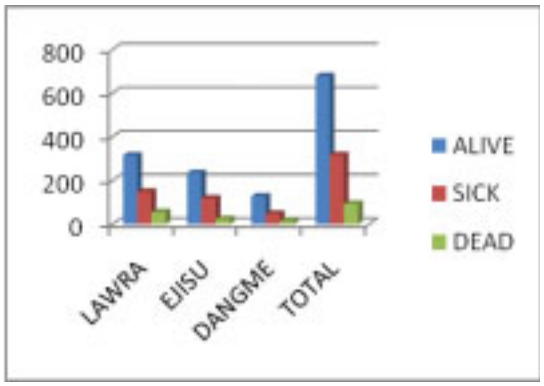


Figure 4.2: Child status by District



Source: Maternal and Child Health Survey 2007/2008

Figure 4.3 highlights the distribution of the children by status; the number of living children at the time of the survey, morbidity incidence and the mortality rate. Since the three districts were chosen to reflect the ecological zones in Ghana, we find that morbidity and mortality follow ecological zones with the savannah zone being the worst hit followed by the coastal zone. Overall, morbidity was highest in the Ejisu-Juabeng district where 50.6% of the surviving children had fallen sick four weeks preceding the survey as compared to 47.2% and 38.3% in the Lawra and the Dangme districts respectively. The Lawra district recorded

[15] Use of Liquefied Petroleum Gas, Electric Stove and Kerosene & oil are regarded as low polluting and clean cooking fuel (in this case 13%), while use of Charcoal, firewood and animal waste are high polluting and unclean cooking fuels.

the highest mortality rate of 14.8% as compared to 10.5% and 9.3% in the Dangme West and Ejisu-Juabeng districts respectively.

Overall, the mortality rate of 12.2% is comparable to the national rate of 111 per 1000 children (GSS, 2003). Concern about child health and welfare seeking are important ingredients in health care and health outcomes. Consequently, the parents were asked about who takes health and welfare related decision for the children. Figure 4.3 provides the results for decision making in which mothers make 27% of the health related decision whiles fathers are responsible for about 16% with both parents accounting for 54%. By inference, mothers make sole health related decisions 11 percentage points more than fathers. In the context of sub-Sahara Africa, women are traditionally responsible for raising children, taking care of their health and well-being and producing food consumed by the family (Franckel and Lalou, Mwenesi *et al*., 1995; Castle, 1993). This is however, at variance with the findings from the survey where barely 22% of the women are engaged in agriculture.

The probable explanation for the low patronage in agriculture among women might be due to their engagement in other petty economic activities such as petty trading and the seasonality of the agricultural sector. Thus women who practice agriculture as their primary economic activity alongside petty trading are more likely to mention trading as their profession. Nevertheless, men hold the moral and economic power and that the father usually decides on and controls the child's treatment (Molyneux *et al*, 2002). Be that as it may, decision-making seems distinct from care-giving during the health care process, given that both functions involve differently the parents of the sick child.

Figure 4.3: Child welfare Decision Making

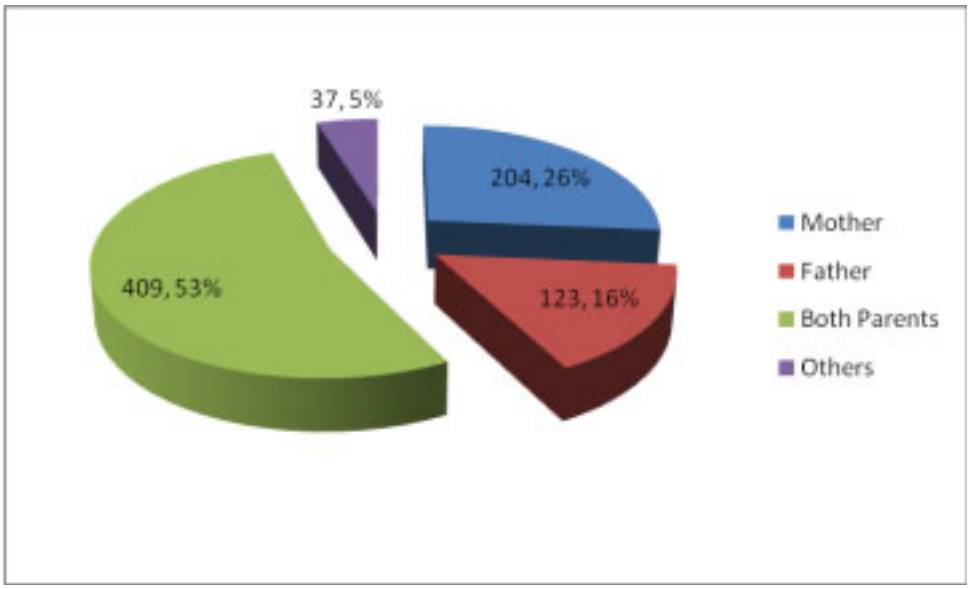


Figure 4.3 shows that mothers make welfare decisions such as feeding, clothing and health seeking conditional on childhood morbidity more than their partners. However, most welfare related decisions are made by both parents (53%), with friends and relatives contibuting marginally (5%).

Table 4.2: Child Welfare Decision making and Choice of Health Care Provider conditional on being sick.

	Private	**Public**	**Faith Healing**	**Pharmacy**	**Self-Treatment**	**Total**
Mother	9	31	4	19	22	85
Father	2	17	1	7	2	29
Both Parents	23	83	18	33	34	191
Other	1	6	0	3	2	12
Total	35	137	23	62	60	317

Source: Maternal and Child Health Survey 2007/2008

In cases where the mothers make decisions about the child's welfare and choice of health provider, they tend to demand more of public health care followed by self treatment and pharmacy services respectively (Table 4.2). Alternatively, where the father is the sole decision make, public health care remains consistent as the highest sought after health provider followed by pharmacy services. Interestingly, in the situation where both parents

make the decision, the outcome is coterminous with the mother's sole decision, however, the demand for faith healing and traditional medicine increases.

Table 4.3: Household and District Health Expenditures

District	Per capita Household Income	Per capita Household Health Expenditure	Per capita District Health Expenditure
LAWRA	$295	$13	8.4
EJISU-JUABENG	$350	$12.5	3.5
DANGME	$438	$14	0.7

Source: *Maternal and Child Health Survey 2007/2008*

Table 4.3 indicates that the government or the District Assemblies tend to spend more in areas where health related issues are more pressing, i.e. high morbidity and mortality prone areas. However, time series or panel data is needed in order to evaluate the impact of such expenditures on child morbidity and mortality over time. From Figure 4.2, we realized that mortality was comparatively high in the Lawra district and thus inducing comparatively higher expenditures to counteract the phenomenon. However, such generalizations must be done with caution since the three Districts are a small proportion of the over 138 administrative districts in Ghana.

Data on district health expenditures were extracted from the end of year financial reports made available by the District Financial Officers during the data collection exercise. Evidence gathered indicates that the expenditures on health care in totality from the coffers of the district assembly as part of the decentralization exercise is woefully inadequate. In the Dodowa district for example, approximately 70 cent ($0.7) per person was expended by the district assembly in the 2006/2007 fiscal year. It is worth mentioning that such expenditures exclude direct health expenditures made by the central Government and other NGO's in the districts which could not be captured due to data constraints.

Per capita household annual expenditure and health expenditure averaged $361 and $13.2 respectively in the three districts. Except the Dodowa district, average income per household member is less than US$1 a day indicating that income poverty is still prevalent in Ghana, although the national average has reduced from 52% in 1992 to 40% in 1999 and a further drop to 28.5% in 2006 (GSS, 2007)[16]. This is against the backdrop that the per capita income

[16] . In our sample, 62% of the households had a per capita expenditure of less than US$1 a day. However, an expenditure of less than a dollar a day should not be construed as poverty since equivalent scale had not been used, thus adults and children were treated equally. In addition, the domestic poverty line is always less than US$ 1 a day (the international poverty line.)

for the country is estimated at US$538. There is not much variation between the districts per capita household health expenditures but much variation could be observed in the per capita district health expenditures. It must be however, indicated that the three districts may not reflect the country's general economic situation. In all, Ghana's combined household and public health expenditures are far less than the recommended $34 to $40 a year per capita that the WHO considers the minimum for basic health care expenditures.

CHAPTER FIVE

COVARIATES OF UNDER-FIVE MORTALITY: CROSS SECTIONAL EVIDENCE

5.1 Introduction

As alluded to in Chapter one, slow progress has been made in reducing child mortality in Ghana. According to the 2003 Ghana Demographic Health Survey (GDHS), one in every nine children dies before reaching age 5 and nearly 3 out of 5 of these deaths occur during the first year of life. The 2003 infant mortality rate was 64 deaths per 1000 live births, while child mortality reached 111 per 1000 live births respectively, over the preceding 10-year period. There are also wide regional and rural/urban disparities (GSS, 2003).

The phenomenon also has far reaching impact on poverty at both the micro and macro levels. The UNICEF (2007) considers under-five mortality rate as the best indicator of human development due to the fact that it measures an end result of the development process rather than an "input". Further, the under-five mortality rate is known to be an outcome of a wide variety of inputs- the nutritional health and the health knowledge of mothers; the level of immunization; utilization of antenatal care services and household income *inter alia*. Similarly, under-five mortality[17] is considered a good indicator of child mortality because it provides the best means of capturing mortality risks during the most vulnerable years of childhood (Ahmad et al, 2000).

It is envisaged that lower childhood mortality and more assurance of surviving offspring will lead to a reduction in the need to have many pregnancies to achieve the desired number of surviving children. This may further reduce the pressure on women to start childbearing at an early age, which will offer them the opportunity for increased educational attainment and higher future family income (Wilhelmson and Gerdtham, 2006). Usually, high infant and under-five mortalities are compensated for by increased fertility with its concomitant effect on increased household dependency ratio, low educational investment and eventually low human capital formation and productivity.

[17] .The probability of dying between birth and the exact age of 5 years expressed per 1000 live births.

At the macro level, the inverse relationship between under-five mortality and maternal mortality on one hand and low productivity and low life expectancy *inter alia* is well documented (Rajkumar and Swaroop, 2007; Gupta and Mitra, 2004; Bloom *et al*. 2004; Ruger *et al*., 2001).

As already intimated, Ghana's under-five mortality is alarming and hence there is the need to examine and unravel the factors promoting or retarding it so that policies could be formulated to arrest the menace. Although, under-five mortality is primarily determined by biomedical factors, the problem of inaccessibility of health care due to poor roads and inadequate health workers are also to blame.

5.2 Conceptual and Theoretical Framework

There is a substantial literature on child health outcomes, as measured by both mortality and morbidity, which mostly adopt the Mosley-Chen (1984) proximate determinants framework. The proximate determinants model was originally developed to study factors affecting child mortality, and is based on the idea that all social and economic determinants of child mortality operate through a set of biological or proximate determinants to affect a child's probability of survival. Thus, the model combines social, economic and biological factors in explaining child mortality. All the social and economic determinants of child mortality-"the distal" determinants operate through these proximate determinants and are grouped by Mosley and Chen into individual, household and community level variables.

The conceptual framework of this study is based on the premise that the prevalence of child morbidity and mortality is due to inadequate health inputs which are attributable to inadequate public investment resulting in poor health delivery. This is demonstrated by higher population-per-doctor and population-per-nurse ratios, low physical infrastructure and low public health spending *inter alia*. Hence we posit that child mortality is premised on health production function with a vector of variables; socio-economic, demographic, biomedical, cultural and public investments. Grossman (1972) developed a microeconomic theoretical health production function, which can be specified as;

$$H = F(X) \qquad (5.1)$$

Where H is a measure of individual health output and X is a vector of individual inputs to the health production function F. The elements of the vector include: nutrient intake, income, consumption of public goods, education, time related to health procedures, initial individual endowments like genetic makeup and community endowments such as the environment. In this model parents are assumed to produce health the way a firm produces goods or services. They choose their health behaviour to maximize overall household utility (in this case child health) given resources and time constraints.

A parent is an efficient producer to the extent she maximizes output (healthy child) and minimizes cost. For instance a household's derived demand for modern health care or other health behaviours could increase because the cost of those behaviours fell or because their quality improved. In this study, X is categorized into five broad groups namely child characteristics C, parent characteristics P, household characteristics S, environmental E, and community characteristics D, which is reflected by the degree of public investment. Hence the health production function can be rewritten as;

$$h = F(C, P, S, E, D) \tag{5.2}$$

In its scalar form, equation 5.2 can be rewritten as

$$h = f(c_1, c_2, \ldots c_l, p_1, p_{2,} \ldots p_n, s_1, s_2, \ldots s_k, e_1, e_{2,} \ldots e_m, d_1, d_2, \ldots d_i) \tag{5.3}$$

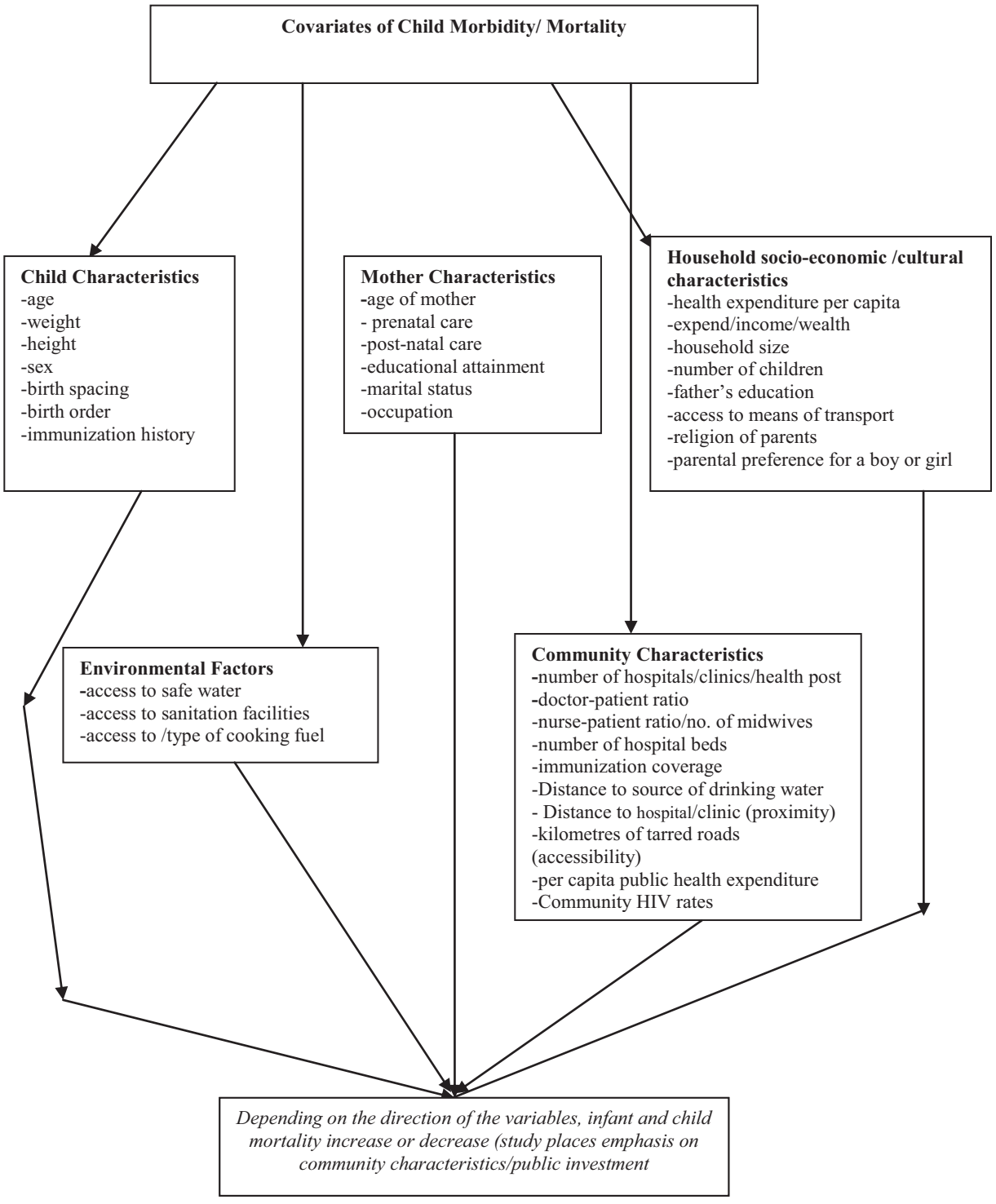
Where h is individual's health status in this case child health outcome, $(c_1, c_2 \ldots c_l) = C$; $(p_1, p_{2,} \ldots p_n) = P$; $(s_1, s_2, \ldots s_k) = S$; $(e_1, e_2, \ldots e_m) = E$; $(d_1, d_2, \ldots d_i) = D$ and l, n, k, m and l are the number of variables in each sub-group, respectively. Using calculus, (5.3) can be transformed into its explicit form and given as;

$$h = \Omega \prod C_i^{\alpha_i} \prod P_j^{\beta_j} \prod S_k^{\gamma_k} \prod e_q^{\delta_q} \prod d_{r_r}^{\psi_r} \tag{5.4}$$

where α_i, β_j, γ_k, δ_q, and ψ_r are elasticities. From equation (5.4), we observe that Ω estimates the initial health stock as postulated by Grossman (1972). It thus measures the health status that would have been observed in the absence of health depreciation, or health improvement due to changes in socio-economic, environmental and community factors used in the

production system. Similarly, ($\Omega \prod C_i^{\alpha_i} \prod P_j^{\beta_j} \prod S_k^{\gamma_k} \prod e_q^{\delta_q} \prod d_{r_r}^{\psi_r}$-1) *x100*% will estimate the percentage change in the health status due to socioeconomic, environmental and community variables.

From the foregoing, we can summarize the conceptual framework for childhood mortality by the chat below.



Source: Own Conceptual framework

5.3 Econometric Model

5.3.1 Theoretical Model

The study focuses on children that are born alive and model their mortality probabilities until reaching age 5. The high level of under-five mortality in Ghana is an argument for basing our analysis on a five-year cohort measure of child mortality. In addition, due to the small sample size, treating the phenomenon from the point of view of under-five mortality is more appropriate. In this chapter the unit of analysis is the child, so characteristics of the child are included. We incorporate information on each child; the sex of the child, the birth order of the child and vaccination history *inter alia*.

The model for estimating under-five mortality is based on survival analysis, whose main concepts are the hazard function and the survivor function. Survival analysis examines and models the time it takes for events to occur, in this case under-five mortality. Hazard rate models are applicable to the problem of child mortality as this class of models straightforwardly accounts for problems like right-censoring. Censoring is an event that occurs at some time (for instance, child mortality) and thus the data consists of a measured spell length together with the information that the spell was censored or not. Hence, standard regression procedures are inefficient because they do not use all the information or data in the sample. The Ordinary Least Squares regression is less appropriate in that the dependent variable of interest, survival or failure time is hardly normally distributed; precipitating a serious violation of an assumption of multiple regression. In addition, survival times usually follow an exponential or weibull distribution. Also, there is the problem of censoring, leading to the exclusion of some vital information. More specifically, estimation procedures that ignore the censored nature of the data will produce biased and inconsistent estimates.

The theoretical model follows closely the work of Wooldridge (2002). The length of a spell for a subject (person, firm, duration of an elected government etc.) is a realization of a continuous random variable T with a cumulative distribution function, failure function $F(t)$, and probability density function, $f(t)$. The failure function is given as:

$$F(t) = \Pr(T \leq t) \tag{5.11}$$

Where T is the length of a completed spell and t is the elapsed time since entry to the state at time 0. The survivor function is derived from the failure function and is given as

$$S(t) \equiv 1 - F(t), \tag{5.21}$$

Thus,

$$\Pr(T>t) = 1 - F(t) \equiv S(t) \tag{5.31}$$

The survivor function $S(t)$ and the failure function $F(t)$ are each probabilities and therefore inherent the properties of probabilities. The survivor function lies between zero and one, and is a strictly decreasing function of t. The survivor function is equal to one at the start of the spell ($t = 0$) and is zero at infinity.

Closely related is the concept of hazard rate, which is given as:

$$\theta(t) = \frac{f(t)}{1 - F(t)} = \frac{f(t)}{S(t)} \tag{5.41}$$

There is a one-to-one relationship between a specification for the hazard rate and the survivor function, which after some manipulation is given as:

$$S(t) = \exp[-H(t)] \tag{5.51}$$

$$\text{where } H(t) = \int_0^t \theta(u)du = -Ln[S(t)] \geq 0 \tag{5.61}$$

is the integrated hazard function.

It is essential to note that, irrespective of the functional form chosen for (t), one can derive $S(t)$ and $F(t)$ from it (and also $f(t)$ and $H(t)$), and vice versa.

5.3.2 Empirical Model

The objective is to estimate the hazard ratio of the probability of a child dying within the next day after surviving for t days, as a result of child, parental, household, biomedical, environmental and community characteristics. In the context of child mortality, the hazard

function is often referred to as the mortality rate or the intensity function (Ridder and Tunali, 1999; Armitage and Colton, 1998). Hence, the mortality rate at age *t* can be interpreted as the intensity at which a child dies at this age, given that the child survived until age *t*. We focus on children who are born alive and model their mortality probabilities until the age of five[18].

5.3.3 Weibull Model

The literature contains an abundance of choices for parametric models one of which is the Weibull model. The Weibull distribution is widely employed for survival analysis. The hazard function of the Weibull model without unobserved heterogeneity is defined as

$$h(t|x) = \alpha t^{\alpha-1} * \lambda = \alpha t^{\alpha-1} \cdot e^{(\beta_0+\beta_i x_i)} . \quad (5.12)$$

Computationally, the parameters λ and α in the Weibull distribution are estimated by Maximum Likelihood. α is a scale parameter with α<1 indicating that the hazard falls continuously over time (monotonically decreasing), while α>1 indicates that the hazard is monotonically increasing and constant if $\alpha = 1$(Greene, 2000). The Stata software also estimates the log of α (for computational reasons) and provides a test of the hypothesis that the log of α is equal to zero, which is analogous to testing for $\alpha = 1$. For observed duration data, $t_1, t_2, ..., t_n$ the likelihood function can be formulated and maximized to incorporate censored and uncensored observations. Converting the survival model into a general parametric likelihood yields:

$$L(\beta) = \prod_{i=1}^{n} \left\{ \left[f(t_i|x_i,\beta) \right]^{c_i} * \left[S(t_i|x_i,\beta) \right]^{1-c_i} \right\} \quad (5.22)$$

Where $\beta = (\lambda, \alpha)$, and $c_i = 1$ denotes right uncensored observations and $c_i = 0$ represents censored observations (Cleves, *et al*, 2002). To arrive at the maximum likelihood with respect to the parameters of interest, β, we maximize the log-likelihood function:

$$\ln L(\beta) = \sum_{i=1}^{n} \left\{ c_i \ln \left[f(t_i|x_i;\beta \right] + (1-c_i) \ln \left[S(t_i|x_i,\beta) \right] \right\}. \quad (5.32)$$

The procedure for obtaining the values of maximum likelihood estimation requires taking derivatives of $\ln L(\beta)$ with respect to β, the unknown parameters, setting these equations

[18] . It would have been more insightful to analyze the phenomenon in terms of neonatal mortality (0-1 month), postneonatal mortality (2-11 months), child mortality (12-59 months) and finally under-five mortality (0-59 months) separately. However, due to data limitation, the analysis is constrained to under-five mortality.

equal to zero, and solving for β (see Klein and Moeschberger, 1997). Since the log function is monotone, maximum of (5.12) and (5.22) occur at the same value of β. Nevertheless, maximizing (5.32) is computationally simpler relative to (5.12).

5.3.4 Introduction of Unobserved Heterogeneity into the Weibull Model

The model without unobserved heterogeneity assumes that the hazard function is fully specified given the baseline hazard function and the values of the covariates, implying there are no other factors influencing survival (Hosmer and Lemeshow, 1998). In studies on human subjects such as under-five mortality, there may be variables other than the measured covariates that significantly affect the distribution of survival time. This condition is often referred to as heterogeneity of the subjects in that some units are more prone to experience events or failures even if they face the same values for all covariates. One drawback of heterogeneity is that it leads to a downward biased estimate of duration dependence. Thus to produce unbiased estimates, we incorporate unobserved heterogeneity into the model.

Among the pioneer publications on the inclusion of heterogeneity in the model is the work by Vaupel *et al*. (1979) that employed the concept of frailty to denote differences in survival time among apparently similar individuals. Thus, frailty is a random component designed to account for variability due to unobserved individual-level factors that are otherwise unaccounted for by the other predictors in the Weibull model. The basic principle underlying frailty model is to incorporate an unmeasured "random" effect in the hazard function to account for heterogeneity in the subjects under investigation.

After incorporating unobserved heterogeneity on estimated mortality, the hazard function with the inclusion of frailty can be formulated as:

$$h(t|x_i,u) = \alpha t^{\alpha-1} * e^{(\beta_0+\beta_i x_i+u)} \tag{5.42}$$

Where u represents unobserved heterogeneity, the differences between observations are introduced via a multiplicative scaling factor. Aalen (1994) notes that the advantages of using a fully parametric model such as the Weibull regression with frailty include its computational simplicity and the possibility to describe explicitly the effect that frailties

have on hazard ratios overtime. This is against the setting that the most "frail" individuals tend to fail early in the follow-up, and the average hazard ratio tends to decrease over time. The same procedure to obtain the values of maximum likelihood estimation as employed in the case without heterogeneity is applicable.

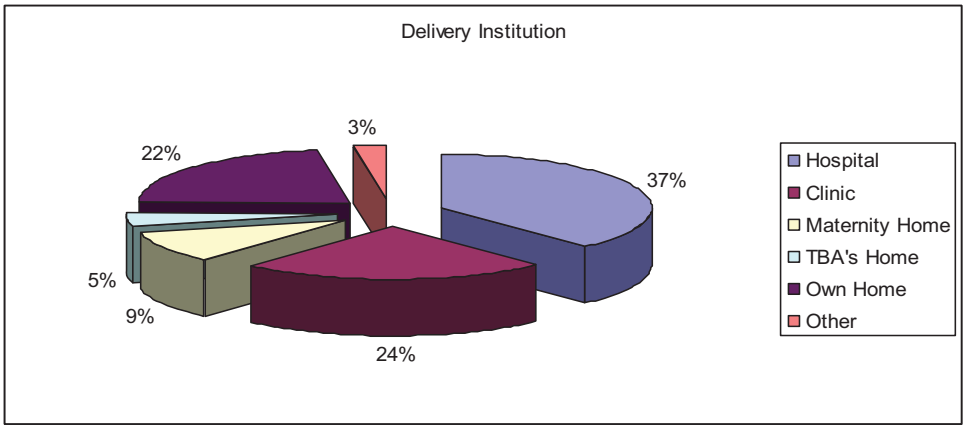
An important statistical assumption is that the frailty is independent of any censoring that may take place. The choice of the statistical distribution of the frailty remains important in hazard modelling (Klein and Moeschberger, 1997) and since the hazard cannot be negative; the distribution must have positive values. The most frequently used model assumes that the frailties represent a sample from a gamma distribution with mean equal to one and variance parameter, ϑ (Hosmer amd Lemeshow, 1998). If the value of the frailty in (5.42) exceeds one, the subject is said to have a larger than average hazard and considered more "frail". Conversely, if the magnitude of the frailty is less than one, the subject is less "frail" than an average subject.

5.4 Results and Discussion

5.4.1 Descriptive Statistics

Prior to the discussion of the empirical results, we briefly describe the data qualitatively. Figure 5.1 depicts the place of delivery of the children under-study.

Figure 5.1: Choice of Delivery Institution



Source: Maternal and Child Health Survey 2007/2008

Hospital delivery accounted for the highest (37%) with "others" (friends or relatives' home) being the least (3%). Overall, 70% of the deliveries took place in health institutions supervised by medical personnel of which 6% was via caesarean. 30% of the deliveries

occurred outside appropriate health institutions with no professional supervision. Approximately, 29% of the children were of first order births while 10% were of higher order birth[19]. In terms of birth weight, about 7% of the children were of low birth weight (less than 2.5kg). In the 2003 GDHS, 2 percent of all births weighed less than 2.5 kilograms at birth. However, there was substantial missing data given that information on only 28% of children born in the five years preceding the survey was known (GSS, 2003). Generally, preterm births, multiple births, poor nutrition and medical problems of the mother are some of the reasons for low birth weight.

Regarding the utilization of ITNs, approximately 68% of the children had access to ITNs. This figure seems relatively high given that just about 15% of children had slept under ITNs in the 2003 GDHS[20]. The huge difference could be partly explained by the time lag between the GDHS and this study coupled with the fact that the GDHS was nationally representative while the current study looks at only 3 Districts. In addition, the GDHS captured only children who slept under ITN the previous night before the survey while the current study considered two weeks prior to the survey. Although there has been an increase in the utilization of insecticide treated bednets at least for the three Districts being studied, it is still behind the Roll Back Malaria Campaign (RBM) which aims to have 80% of pregnant women and children under-five years sleep under ITNs by 2010.

In terms of under-five mortality, 94 out of the 773 children had died over the period 2002-2007. Of the 94 deaths, 40% occurred in the first year of live. Verbal autopsy was used to characterize the causes of death in which malaria accounted for 37% with 18% attributable to diarrhoea. Due to the complexity of diagnosing other diseases due to lack of adequate clinical expertise on the side of the interviewers and respondents, the remaining causes of death were relegated to "other" (25%) while 20% of the causes of deaths were unknown. Since malaria and diarrhoea accounted for the highest childhood morbidity (see Chapter six: Figure 6.1), it is logical that same may account for the leading causes of under-five mortality.

[19] . Children beyond the fourth birth order.

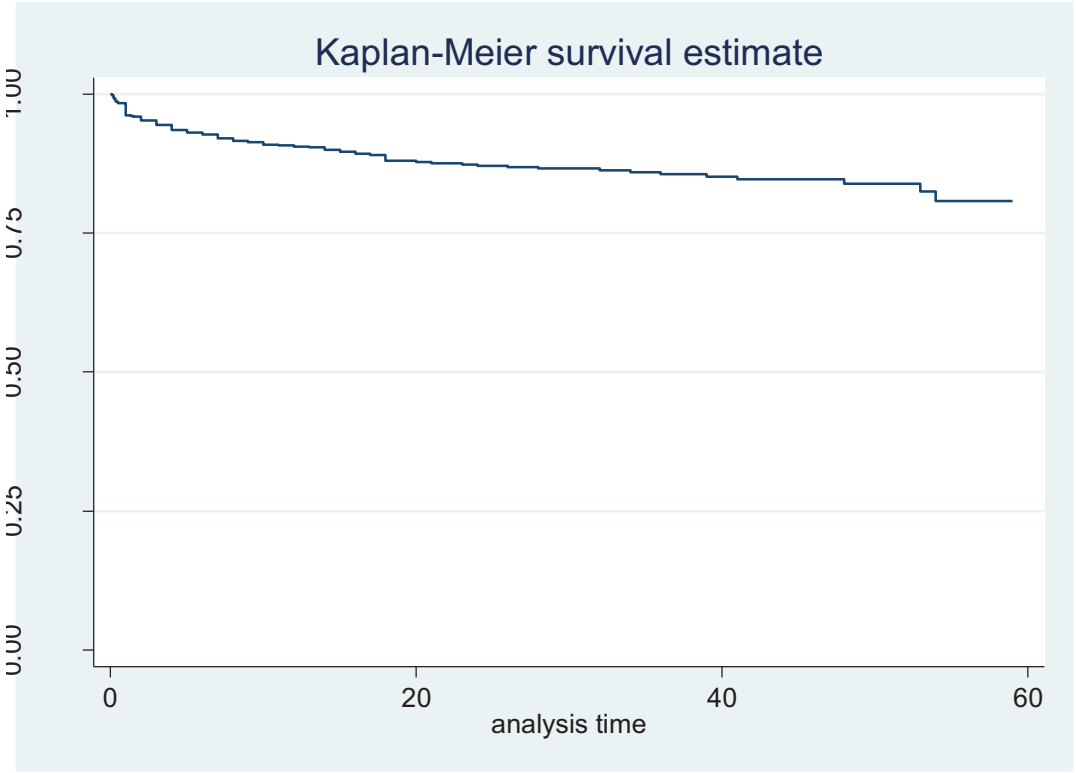
[20] An insecticide treated net (ITN) is a long lasting net that does not require any treatment, a pre-treated net obtained within the last six months, or a net that has been soaked with insecticide within the past six months (GSS, 2003).

The mean distance to the nearest health facility, population-per-nurse and asphalted roads were 5 kilometres, 1240 and 64 kilometres respectively (see Table 5.1). The mean time (distance in minutes) to the nearest health facility was 67 minutes. It is estimated that approximately 40% of Ghanaians have physical access to health, where access is defined for persons living in households with a health facility less than 30 minutes away (GSS, 2003). In this study, approximately 37% of the households live less than 30 minutes away from the nearest modern health facility. Physical access alone is not sufficient for health care utilization since a proportion of the population with physical access may be constrained by inability to pay for user charges (GHS, 1999). In some instances, socio-cultural norms may serve as a barrier to health care utilization. The mean years of parent's education was 10 years while the mean household size was approximately 5 persons.

Using the Kaplan Meier non-parametric estimator; we obtain an overview of the survival prospects of the children in the sample[21]. The Kaplan and Meier (1958) is a non-parametric estimate of the survivor function s(*t*), or the probability of survival past time *t*.

[21]. The Kaplan-Meier estimator is given as follows: $\hat{S}(t) = \prod_{j/t_j \leq t} (\frac{n_j - d_j}{n_j})$, i.e. the probability of survival past time *t*, or the probability of falling pats time *t* where n_j is the number of children at risk at time t and d_j is the number of failures at t_j

Figure 5.2: Kaplan Meier survival estimate of Under-five Mortality in Ghana



The shape of the Kaplan-Meier indicates that the hazard associated with under-five mortality falls modestly as the child approaches the terminal age (60 months, see Figure 5.2). It must be noted however, that the impact of the covariates on the hazard of under-five mortality is not incorporated in the Kaplan Meier. Table 5.1 gives the descriptive statistics of the variables employed in the empirical estimation and expected signs.

Table 5.1: Descriptive statistics of the variables used in the Weibull Model

Variables	Mean (SD)	Expected Sign
Population-per-nurse	1240.58(314.04)	-
Asphalted road (km)	64.08(62.99)	-
Distance to the nearest health facility (km)	4.84(5.72)	+
Sex of child (Girl=1)	0.53(0.49)	+/-
Child is twin (1=Yes)	0.06(0.24)	+
Low birth weight (1=Yes)	0.07(0.24)	+
Child sleeps under ITN (1=Yes)	0.69(0.46)	-
Total childhood vaccinations	7.14(2.35)	-
First order birth (1=Yes)	0.29(0.45)	+/-
Birth order > 4 (1=Yes)	0.09(0.29)	+
Antenatal care (number of times visited)	5.37(2.05)	-
Mother's age	26.65(6.55)	-
Mother's age squared	53.31(13.11)	+
Parent's mean years of education	10.12(6.70)	-
Household size	4.89(2.06)	+/-
Log of household income	7.14(0.56)	-
Piped into residence (1=Yes)	0.15 (0.35)	-

Source: Authors' own computation

Table 5.2 : Mortality Estimation by Weibull Model

Variable	Weibull Model without Heterogeneity				Weibull with Unobserved Heterogeneity			
	Coefficient	Rob.std. err	Hazard Ratio	Rob. Std err	Coefficient	Std error	Hazard Ratio	Std. error
Population-per-nurse	-0.0010**	0.004	0.9990**	0.0004	-0.0011**	0.0005	0.9989**	0.005
Asphalted road (km)	-0.0030	0.0020	0.9970	0.0020	-0.0053**	0.0027	0.9946**	0.0027
Distance to the nearest health facility	0.0192	0.0171	1.0194	0.0174	0.0329	0.0229	1.0334	0.0236
Sex of child (Girl=1)	0.5762***	0.2361	1.7793***	0.4202	0.4777	0.3073	1.6123	0.4955
Child is twin (1=Yes)	1.1325***	0.3409	3.1032***	1.0580	1.5291***	0.5156	4.6143***	2.3792
Low birth weight (1=Yes)	0.2877	0.4164	1.3334	0.5553	0.4936	0.5647	1.6382	0.9251
Child sleeps under ITN (1=Yes)	-0.8976***	0.2355	0.4075***	0.0960	-0.9435***	0.3183	0.3892***	0.1239
Total childhood vaccinations	-0.5430***	0.0409	0.5810***	0.0237	-0.9259***	0.1239	0.3961***	0.0490
First order birth (1=Yes)	-0.4552	0.3358	0.6343	0.2130	-0.8349**	0.4316	0.4339**	0.1872
Birth order > 4 (1=Yes)	1.2440***	0.4560	3.4694***	1.5822	0.9388	0.5948	2.5570	1.5209
Antenatal care (No. of times visited)	-0.2253***	0.0511	0.7982***	0.0408	-0.2980***	0.0793	0.7423***	0.0589
Mother's age	-0.1081	0.5317	0.8974	0.4772	-0.0621	0.6669	0.9398	0.6268
Mother's age squared	0.2193	1.0627	1.2452	1.3233	0.1226	1.3338	1.1304	1.5078
Parent's mean years of education	-0.0103	0.0169	0.9897	0.0167	-0.0101	0.0198	0.9899	0.0196
Household size	-0.3334***	0.0945	0.7164***	0.0677	-0.3227***	0.1216	0.7242***	0.0880
Log of household income	0.3127	0.2705	1.3671*	0.3699	0.6044	0.3490*	1.8302*	0.6387
Piped into residence (1=Yes)	0.2021	0.3222	1.2240	0.3944	-0.1069	0.4359	0.8985	0.3917
/ ln_α	-0.0384	0.0778			0.4319	0.1271***		

Variable	Weibull Model without Heterogeneity				Weibull with Unobserved Heterogeneity			
	Coefficient	Rob.std. err	Hazard Ratio	Rob. Std err	Coefficient	Std error	Hazard Ratio	Std. error
/ ln_*the*					0.7392	0.3980**		
α	0.9623	0.0749***			1.5402	0.1958***		
$1/\alpha$	1.0391	0.0809***			0.6492	0.0825***		
Theta(ϑ)					2.0942	0.8335***		
No. of sample 771								
No. of death 92								
Log likelihood -274.8681								
LR $Chi^2(17)$ 297.82***								

1. ***: Significant at 1%, **: Significant at 5%, *: Significant at 10%. .

2. Group variable is residence (rural or urban)

3. Goodness of fit: Based on the results of the Log-Likelihood ratio test, we reject the null hypothesis that all coefficients except the intercept are 0 at the 1% level.

4. More importantly, the Log-Likelihood ratio test of theta=0: chibar2(01) = 20.82, prob>=chibar2=0.000, indicating that there is unobserved heterogeneity and the Weibull model with gamma frailty is appropriate.

5. To avert the problem of endogeneity, number of children was excluded as a covariate.

5.4.2 Discussion of Econometric results

Table 5.2 presents the Weibull model reporting both coefficients and hazard ratios[22]. Hazard ratios exceeding one increase the hazard of failure while those less than one decrease the hazard. The advantage of using the Weibull model lies in its additional parameter, α for testing the hypothesis that $\alpha = 1$. This hypothesis may be evaluated using a Wald test or the confidence interval formed from its estimate and associated standard error. Stata estimates the Wald test and confidence interval for the log form of α and similar statistics for the parameter estimates itself. The Wald test for α is not reported because, based on properties of other similarly bounded parameters such as the odds ratio, one would expect tests and estimates based on the log form to have better statistical properties (Hosmer and Lemeshow, 1998).

In the model without unobserved heterogeneity, α =0.96 and significant at 1% indicating a negative time dependence; i.e. given the covariates, the hazard falls continuously. Nevertheless, when frailty is introduced to capture variability due to unobserved individual-level factors otherwise unaccounted for by the covariates in the model, the magnitude of α and the coefficients in the model changes. The estimate of the shape parameter with the inclusion of unobserved heterogeneity is 1.54, suggesting an increasing hazard rate of mortality over time.

The frailty model is assumed to follow a gamma distribution with mean 1 and variance equal to theta (ϑ). The estimated value of ϑ *is* 2.0942. A variance of 0 (i.e. ϑ *=0) w*ould indicate that the frailty component does not contribute to the model and that the model with unobserved heterogeneity is more appropriate. A likelihood ratio test for this hypothesis indicates that there is unobserved heterogeneity among the subjects (see Table 5.2).

With the exception of household income, and first order births, the other variables had the expected sign and seven of them were significant at the conventional 5% level[23]. Controlling for other socio-economic and biomedical covariates, we find convincing empirical evidence that health inputs proxied by nurse-per-population and infrastructure proxied by tarred roads are important predictors of under-five mortality. These variables have the expected inverse

[22] Due to missing data in the covariates, the model is based on 771 of the 773 subjects. The overall models are significant at the 1% level.
[23] See Appendix-Table 3 for the results of the alternative, semi-parametric Cox-Proportional hazard model. The results are quite comparable to the Weibull model.

relationship and significant at the conventional level with hazard ratios of less than one. This suggests that increasing infrastructure and health personnel has the tendency to reduce under-five mortality in Ghana. This finding is consistent with Cham *et al*. (2005), World Bank (2004) and Terra de Souza (2000) who found that transportation barriers account for substantial maternal and neonatal mortalities in developing countries[24]. Similarly, Magnani *et al*. (1995) noted that significant lower child mortality was associated with the presence of community dispensary in rural Niger.

Girls are more likely to fail compared to boys but this variable is only significant in the model without unobserved heterogeneity. Thus the effect is attenuated by the inclusion of unobserved heterogeneity. A child born twin has a lower survival prospect compared with single born due to gestational and other biological complications. This is because multiple pregnancy and delivery are associated with higher risk for morbidity and mortality for both mother and child relative to singleton births (Becher *et al*. 2004; Justesen and Kunst, 2000; Guo, *et al*. 1993). This finding is also corroborated by other studies in Africa such as (Mutunga, 2007). In the model without heterogeneity, children of higher birth order are less likely to survive while in the model with unobserved heterogeneity; children of the first order birth are more likely to survive.

The use of insecticide-treated bednets is one of the most vital strategies for combating malaria. Studies have shown that under-five mortality rates could be reduced by about 25 to 30 per cent if all young children in malaria prone areas were protected by treated bednets at night[25]. This variable is significant and inversely related to under-five mortality. The hazard ratio for childhood utilization of ITNs is less than 1 indicating that, the usage of ITNs decreases the likelihood of under-five mortality. This result is consistent with Binka (1998) on his study on impregnated bednets and child mortality in rural Northern Ghana and Oindo *et al*. (2009) on their study on the characteristics of households experiencing under-five mortality in Kenya. Additionally, the number of childhood vaccinations received is significantly and inversely related to under-five mortality. Bryce *et al* (2005) and Hussain *et al* (1999) confirm that immunization remains one of the most cost-effective health interventions in reducing child mortality. The result is also consistent with a more recent study in Bangladesh (Mondal *et al*. 2009). Azmat (2009) also found strong empirical

[24] Per capita public spending was initially included in the model but this was highly correlated with road infrastructure, the latter is preferred because it might not have changed much over the past five years over which under-five mortality is investigated.
[25] http://www.unicef.org/health/index_interventions.html, (Accessed on 19th November, 2008).

evidence that immunization reduces under-five mortality. Immunization coverage in Ghana has increased significantly over the past one and half decades. For instance, immunisation against measles for children aged 12-23 months increased by 25 percentage points between 1990 and 2006 (World Bank, 2008/2009). Hence, it is expected that continuous improvements in immunization coverage and a marked increase in use of ITNs are expected to greatly influence mortality rates in ensuing years.

Maternal use of pre-delivery bio-medical health inputs captured by the number of antenatal care visits significantly increases the prospects of childhood survival. Good medical coverage during and after pregnancy contributes significantly in lowering under-five mortality. Use of antenatal care services reduces the hazard of child mortality by 21% compared to the average hazard. This finding is consistent with Yousif (2006) who reported that women who had good antenatal coverage are more likely to have healthy live-born babies as compared to those with moderate or no antenatal care. Sankar *et al*. (2008) found that self reported antenatal care visits exert a significant beneficial impact on infant health (see also Reichman, *et al*. 2006; Kumar, 2005).

In the literature, maternal education has been found to contribute significantly in reducing under-five mortality in that education exposes the parents to information about nutrition, use of contraceptives to space birth and knowledge about childhood illness and treatment. This study uses the mean educational attainment of both parents as an indicator of educational attainment. The rationale for this measurement approach is based on the fact that there is a spillover effect on spousal education. Although this variable had the expected sign it was insignificant at least over the range of data used. This is against the backdrop that several studies have found robust inverse relationship between education and under-five mortality (Jahan, 2008; Devlieger *et al*. 2005; Kovsted *et al*. 2002; Bairagi *et al*. 1999; Desai 1998). The result is however consistent with Mturi and Curtis (1995) who found that neither maternal education nor partner's education play a significant role in infant and child mortality after controlling for other factors.

Maternal age and its squared; used to account for the possible non-linearity in the effect of the mother's age at the time of child death on mortality had the correct sign but were insignificant. Thus there is no discernible "U"-shaped relationship between maternal age and under-five mortality at least over the range of the data being investigated.

With regard to household size, children born in lager households have higher survival prospects. This implies that there might be some socio-cultural benefits in larger household sizes that increase the survival prospects of young children. Interestingly, household income is positively related to under-five mortality, albeit weakly (at the 10% level). Asante (2003) rather found a robust positive relationship between household income and under-five mortality in Ghana using a cross section of children aged under-five years. This puzzling result is difficult to explain but it is probable that the effect of income on under-five mortality seems to be disappearing over time or it might be probable that the impact is asymptotic and thus more pronounced in large samples such as Demographic Health Surveys. In two-cross-section of developing countries, Mcguire (2006) could not find a significant relationship between private health spending and under-five mortality. He argues that the insignificant relationship between greater health spending and lower mortality could be attributed to the fact that health spending or income serve mainly as a proxy for overall affluence, which may affect mortality levels in ways not accounted for by health spending.

Similarly, Mustafa (2008) found inconsistent results regarding the relationship between socio-economic status (proxied by wealth index) and infant mortality in Kenya (*see also* Mturi and Curtis, 1995). In a related study in Malawi, Doctor (2004) attributed the positive association between rich households and child mortality to the high AIDs related mortality in those households. However, it is premature to attribute the positive relationship between income and mortality in Ghana to AIDs related mortality since further research is required to make such a generalization.

Finally, access to safe water, proxied by piped water in residence had the hypothesized inverse relationship but the effect was less robust. In contrast, Asante (2003) found a significant positive relationship between safe/potable water and under-five mortality in Ghana.

5.5 Limitations

One potential problem of the mortality estimation is endogeneity**.** Endogeneity occurs when one or more covariates in the model are choice variables and correlated with the unobservable variables captured by the error term. Endogeneity could result in downward

bias of the estimated parameters of the variables which are endogenous and the other covariates. Covariates that were potential candidates of endogeneity such as total number of children per woman and BMI were dropped from the model because of lack of good instruments. Another problem worth noting is the possibility of mortality selection. This problem may arise when estimating health outcomes because the children, who enter the health survey, are surviving children and thus may not be a random sample of the children born. It is imperative that the results are interpreted with these limitations in mind.

5.6 Chapter Conclusion

We found compelling evidence that health inputs with public goods nature are crucial in mitigating the increasing phenomenon of under-five mortality in developing countries. We established unequivocally that increasing the number of nurses available to the population will significantly reduce the child mortality menace. In addition, infrastructure proxied by tarred roads had the hypothesized sign and significant. However, the magnitude of the coefficients and hazard ratios are negligible and this might suggest that current levels of infrastructure and health personnel are insignificant to cause a substantial reduction in under-five mortality. Thus public health policies should be geared towards increasing both physical infrastructure and human capacity. To this end, improved working conditions via higher remuneration and health care logistics, are prerequisites for curbing the current exodus of health personnel for greener pastures.

There is the need to emphasize the utilization of maternal and child health inputs such as antenatal care, ITNs and vaccinations rather than the traditional reliance on increased household income as a panacea to under-five mortality**.** This stems from the fact that even in the midst of increased household income, the utilization of maternal and child inputs can be a behavioural issue rather than based on economic rationality. A point in case is the boycott and protest against oral polio vaccine in the predominantly Muslim northern states of Nigeria in 2003[26]. Against the backdrop that childhood immunization and antenatal care services are rendered freely in public child welfare clinics and maternal health facilities in Ghana, public

[26] . Muslim clerics and preachers alleged that the vaccines were contaminated by anti-fertility substances, cancer-causing substances and HIV. (http://medilinkz.org/news/news2.asp?NewsID=5974, Accessed March 13, 2009).

policy should aimed at lessening external cost such as travelling cost and its associated opportunity cost to induce the demand for these “goods”.

CHAPTER SIX

MOTHER'S HEALTH SEEKING BEHAVIOUR FOR CHILDHOOD ILLNESS FOR CHILDREN AGED UNDER-FIVE

6.1 Introduction

In the previous chapter (Chapter Five), we investigated the factors influencing under-five mortality in Ghana. This chapter is motivated by the fact that access to appropriate health care reduces child mortality. Besides, prompt and appropriate health seeking is vital in the management of childhood illness, thereby avoiding the risk of mortality. The World Health Organization estimates that seeking timely and appropriate intervention could reduce child deaths and infections by 20% (Sreeramareddy *et al*, 2006). Other studies such as Hildenwall *et al*. (2008) and Bazzano *et al*. (2008) argue that seeking allopathic care (western care) has the tendency to reduce fatal outcome including mortality (see also Agu and Nwojiji 2005).

Generally, good health is a *sine qua non* condition for robust socio-economic development and that every nation devises policies to achieve optimal health outcome. Thus a healthy workforce results in increased productivity and higher national and per capita incomes, which reflects in the overall living standards of the people. The Millennium Development Goals provide an important platform for the realization of national and global health objectives including universal access to health care for children aged under-five years. The first intervention needed to curb the increasing menace of under-five mortality in developing countries is timely management of childhood illness.

Ward *et al*. (1996) describe health seeking behaviour as the sequence of remedial actions that individuals undertake to rectify perceived ill health. Health care-seeking behaviour is that action taken by an individual in response to a stimulus (such as the perception of a symptom) that he or she decides is indicative of a condition needing evaluation by a health professional. This behaviour is influenced by physical, personal, and psychological characteristics and also by socio-cultural and environmental factors (Gilliland, *et al*.1999:95).

Health care-seeking involves a series of stages or phases, it commences with the patient becoming aware of a need and ending with medical assessment and treatment if warranted.

In the context of this paper, parents, particularly mothers would have to make such decisions on behalf of their children since children aged under-five can hardly be aware of their health status. Hildenwall *et al*. (2008) prescribed three essential steps for avoiding fatal outcome during childhood morbidity: care takers must recognise illness, decide to seek care and reach an appropriate source of care and then receive appropriate treatment.

It has been noted that beside inadequate health facilities in many areas, especially in less developing countries, certain disease-specific and non-disease-specific cultural beliefs may influence health care-seeking behaviour (Feyisetan, *et al*. 1997:221). Although structural-environmental issues such as access to care and poor emergency medical service may play a role in treatment delay, the most conspicuous component of delay for acute problems occurs before the patient contacts the health care system(Gilliland *et al*. 1999:96).

Diseases among young children are the major causes of morbidity and mortality predominantly in the developing countries of the world. Particularly, malaria remains the major cause of morbidity and mortality in sub-Saharan Africa, claiming more than one million lives each year, the vast majority of whom are young children normally residing in remote rural areas with poor access to health services (Connor *et al*, 2007).

The health risk posed by malarial diseases as the leading cause of death in under-five children in Africa is amplified by Black *et al*. (2003). In fact, Bryce et al (2005) reported that about 94% of deaths due to Malaria worldwide occur in Africa. In Ghana, malaria is the leading cause of morbidity and mortality in both children and adults. In 2007, malaria accounted for 38.6% of outpatient attendance, a 5 percentage point reduction compared to year 2006 (GHS, 2007). Overall, malaria was responsible for over 18% of deaths reported at health facilities.

Since young children are vulnerable and cannot make their own decisions regarding health seeking and management of illnesses, it is incumbent on parents to make timely and welfare enhancing decisions on behalf of their children. As succinctly captured by the UNICEF (2007), children regard their parents and caregivers but not politicians and heads of developmental agencies (such as NGOs) as the most important actors in household welfare decisions. Parental health seeking behaviour during childhood illness is gaining momentum with new paradigms. Bio-medical knowledge is no more considered the most important

factor in health seeking. As William and Jones (2004) noted, it is not peoples' lack of knowledge that determines their health care seeking behaviour in the event of fever for instance, but economic, socio-political and social statuses *inter alia* are equally important.

The principal objective of this chapter is to ascertain the health care seeking behaviour of mothers when their children under five years suffer from common childhood illnesses such as diarrhoea, fever and cough. For effective policy interventions, it is imperative to investigate the factors influencing the utilization of appropriate and inappropriate health care. While socio-economic and demographic factors in general, have been accorded attention in health seeking behaviour both theoretically and empirically, this paper investigates further the impact of supply side variables, particularly access to roads, distance to hospitals and availability of health inputs(hospital bed-per population). Hence, we test the hypothesis that supply side factors have no effect on the demand for health care.

6.2 Health care Demand Model

A model for the demand for health care was first proposed by Gertler *et al*. (1987) in Peru and since other studies have followed suit with analogous health care demand models (Dor *et al*, 1987; Bitran, 1989; Anyawu, 1996). In recent times, Mbanefoh *et al*. (2004) and Anyawu (2007) have explored health care demand models to investigate the demand for health care in Nigeria. The health care demand model employed for this study is the choice of a health care provider for children under-five years, given that they fall sick. It is adapted from the previous models above and borrows extensively from Anyawu (2007). In essence, individuals are confronted with a discrete choice decision; each of which has a different potential impact on their health.

It is a static model in which individuals derive utility from their health status and from the consumption of non-health goods and services. Individuals' health status is inversely related to ill health. Consequently, ill individuals must decide whether or not to demand health care, noting that the benefit of consuming health care outweighs the cost of medical care. While the consumption of medical care improves health, the cost of medical care reduces the consumption of other goods. The efficacy of the treatment option sought depends on the providers' skills, individual's characteristics (e.g. medical problems, state of health, general health status, and ability to follow the recommended treatment plan) and a stochastic term

that captures the notion that the efficacy of health care is not deterministic. The consumer's expectation of this effect is his perceived 'quality' of health care.

In order to consume health care services, the individual has to incur both monetary and non-monetary costs. The monetary costs are the out-of-pocket payment made to the provider and the payments made for transportation to the health care facility. Conversely, non-monetary costs include access costs such as travel, service and waiting time. Moreover, the patient is assumed to choose the health care alternative that yields the maximum expected utility. It is however, worth mentioning that sometimes health professionals limit the actual choices patients can make by the treatments they offer to patients in hospitals, outpatient treatments, nursing homes, hospice and other clinical settings (Kaufman, *et al*. 2006). Notably, the monetary costs affect the individual's utility since they reduce the amount of income available to purchase non-health goods and services. Additionally, time or non-monetary costs affect utility in that they reduce the individual's time available for leisure or for income-producing activities.

Let the utility function be:

$$U_{ij} = U(H_{ij}, E_{ij}, T_{ij}, S_{ij}) \qquad (6.1)$$

There are *i* individuals facing *j* alternatives, where $j \in n$, $n = \{1,2,\ldots,N\}$. U_{ij} is the direct conditional utility obtained by individual *i* when consuming provider *j's* health services, given that he has a health problem. H_{ij} is the individual's expected health status after receiving treatment from a given provider *j*. E_{ij} is the expenditures on consumption of goods and services (other than medical services) after paying provider *j*. We can assume that the utility function is stable in time and does not change with new information. The usual assumptions about the utility function apply here: $U_H > 0$, $U_{HH} < 0$, $U_E > 0$, $U_{EE} < 0$.

Now individuals are assumed to operate under a budget constraint. That is, their total expenditures on health and non-health goods and services must not exceed available income. Let Y_{ij} be income available to individual *i*, $P1_{ij}$, the price that individual *i* must pay provider *j* per unit of health care, HC_{ij} the quantity of health care services purchased, *NP*

the unit price of a composite of non-health goods and services, and E_{ij} the amount of these goods and services consumed by individual *i*. Finally, S_{ij} is a set of taste and preference shifters.

Hence, the following budget constraint must hold.

$$Y = (P1_{ij} * HC_{ij}) + (NP * E_{ij}) \quad (6.2)$$

An individual with a health problem must choose provider *j* and the amount of health care services HC_{ij} which will maximize utility as specified in equation (6.1) subject to the budget constraint in Equation (6.2).

In addition, we assume that the quantity of health care to be consumed (HC_{ij}) is determined by the provider and unknown at the time of the first visit. It is further assumed that the quantity of health care that patients expect to obtain is fixed across providers and close to one (visit). Therefore, to simplify the notation, we can normalize the budget constraint in prices, using the price of non-health goods and services (*NP*). Thus, Equation (6.2) becomes:

$$Y_{ij} = P_{ij} + E_{ij} \quad (6.3)$$

Where

$$P_{ij} = \frac{P1_{ij}}{NP}, \quad Y_i = \frac{Y1_i}{NP}$$

Since P_{ij} is the price that individual *i* will pay provider *j* and Y_i his income, then the level of consumption expenditure conditional on choosing provider *j*, is given as:

$$E_{ij} = Y_i - P_{ij} \quad (6.4)$$

With $E_{ij} \rangle 0$ required to ensure feasibility; that is income is required to be at least as large as the price of the alternative. Were the quantity of health treated as an endogenous variable, individuals with a health problem would face two decisions; which provider, and how much health care to obtain from the chosen provider, given its price and time cost.

Substituting Equation (6.4) into Equation (6.1) yields a utility function shown in Equation (6.5) that relates utility to the person's income, to the prices of goods and services, to the health status, leisure time and taste and preference.

$$U_{ij} = U(H_{ij}, Y_i - P_{ij}, T_{ij}, S_{ij}) \quad (6.5)$$

Gertler *et al*. (1987) defined health care quality as a relationship between a person's health status before obtaining health care, H_{io}, and after obtaining health care from provider *j*, H_{ij}. For example, quality can be defined as the difference between health status after and before treatment:

$$Q_{ij} = H_{ij} - H_{io} \tag{6.6}$$

Making H_{ij} the subject in equation (6.6) gives us a relationship between post-treatment health status, pre-treatment and quality of care:

$$H_{ij} = H_{io} + Q_{ij} \tag{6.7}$$

Alternatively, health care quality Q_{ij}, is assumed to be a function of individual and provider characteristics, element of public health investment/community characteristics and a set of taste and preference shifters, that is :

$$Q_{ij} = Q_{ij}(X_i, G_i, Z_j, S_{ij}) \tag{6.8}$$

Where X_i, G_i, Z_j and S_{ij} denote individual characteristics, level of public health investment, provider characteristics and individual's taste and preferences.

Thus, expression (6.7) can be re-formulated as:

$$H_{ij} = H_{io} + Q_{ij}(X_{ij}, Z_j, S_{ij}) \tag{6.9}$$

Substituting for H_{ij}, as specified in Equation (6.9) into Equation (6.5) above and completing the specification, we obtain an expression for individual's indirect utility, which can be estimated empirically.

$$U_{ij} = U[H_{io} + Q_{ij}(X_i, Z_j, S_{ij}), Y_i - P_{ij}, T_{ij}] \tag{6.91}$$

To specify the utility maximization problem for the choice of health care, suppose the individual (the child's mother) faces *j* feasible alternatives. Thus, the unconditional utility maximization problem is:

$$U^* = \max(U_o, U_i, \ldots U_j) \tag{6.92}$$

Where U^* is maximum utility. The solution to the utility maximization problem gives the health care alternative that is chosen. When stochastic terms are added, the probability that an alternative is chosen can be interpreted as the demand function in a discrete choice model specified in this chapter.

It should be noted that the dynamics of health production are not taken into account in this analysis since the data used is cross sectional. However, in the real world, inputs chosen in previous periods, and health in the last period, influence current health. These assumptions imply that in a dynamic model both lagged and expected future values of exogenous variables would enter the reduced-form demand model. Empirically, several covariates enter with current and past values (e.g. food prices) while others are time-invariant (e.g. parental education). Yet, other covariates are assumed to change slowly over time (e.g. health care availability). The tender age of the children in the sample (0-5 years) and hence the short time-period over which their existing stock of health is based, makes these assumptions and the static nature of the utility function tenable.

For the empirical estimation, an indirect utility function quadratic in consumption is used.

$$V_{ij} = H_{ij} + \alpha_o(Y_i - P_{ij}) + \alpha_1(Y_i - P_{ij})^2 + \alpha_2 T_{ij} + \alpha_3 S_{ij} + e_0 \qquad (6.93)$$

Where V_{ij} is the utility that caregiver (mother) *i* derives from consuming health provider *j*'s services and e_0 represents a random error term and accounts for unobserved explanatory variables. Since consumers' taste is unobserved but only reflected in the choice of a provider, it is also relegated to e_0. Substitution for H_{ij} from Equation (6.9) into Equation (6.93), we get the expression for individuals' utility;

$$V_{ij} = H_{io} + Q_{ij}(X_i, Z_j) + \alpha_0(Y_i - P_{ij}) + \alpha_1(Y_i - P_{ij})^2 + \alpha_2 T_{ij} + e_0 \qquad (6.94)$$

Individuals with a health problem choose the provider from which they can obtain the highest utility. Since an individual's income and pre-treatment health status do not vary by provider, Equation (6.94) reduces to:

$$V_{ij} = Q_{ij}(X_i, Z_j) = \alpha_0 * P_{ij} - 2\alpha_1 * Y_{ij} + \alpha_1 * P_{ij}^2 + \alpha_2 * T_{ij} + e_0 \qquad (6.95)$$

In Equation (6.94), neither H_{io} nor Q_{ij} are observed and since H_{io} appears in the utility function for all the choices and its value does not vary by alternative, it does not influence which alternative is preferred and thus can be ignored.

Also, let quality (marginal product) be a linear function of the individual's characteristics, X_i (including measures of health status, severity of illness and demographic characteristics), level of public health investment G_i, and provider characteristics, Z_j;

$$Q_{ij} = \beta_{0j} + \beta_{1j} X_i + \beta_{2j} G_i + \beta_{3j} Z_j + e_1 \qquad (6.96)$$

Noting that the error term e_1 represent unobserved individual characteristics, such as severity and complexity of illness that may affect the providers' marginal productivities relative to public health care. Hence, Equation (6.95) becomes

$$V_{ij} = \alpha_0 P_{ij} + \alpha_1 (P_{ij}^{\ 2} - 2 Y_i * P_{ij}) + \alpha_2 * T_{ij}) + \varpi_i X_i + \phi_i G_i + \delta_i Z_j + e_2 \qquad (6.97)$$

Where ϖ, ϕ, and δ are vectors of parameters and X_i, G_i, and Z_j are vectors of individual, public health investment and provider characteristics, respectively.

Note that the linear consumption term represents only price, whereas the consumption squared term includes both a price-income interaction term and a squared price term. Therefore, our specification includes a price term and a price income interaction term, access cost term and vectors of individual and provider characteristics plus variables representing the level of public health investment. In particular, if α_1 is not significantly different from zero, income does not influence the choice (that is, the utility function exhibits a constraint marginal rate of substitution of health for consumption). Prices do not affect the choice of health care if both α_0 and α_1 are not significantly different from zero.

6.3 Econometrics model (Discrete Choice Model)

On the specific choice of health care provider; whether a child is taken to a public health facility, private provider, pharmacy/over-the-counter drugs, faith healer/traditional and self treatment/doing nothing, multinomial choice model is employed. The multinomial logit models discrete outcomes which take on more than two values. Following McFadden (1973), it is assumed that a decision maker faces multiple choices and that there is an

associated random utility function for each choice. Considering the following random utility function:

$U_{ij} = V_{ij}(\beta' x) + \varepsilon_{ij}$, where i= 1, …, N individuals; j=1,..., J alternatives

where V_{ij} is a deterministic utility function and ε_{ij} is an unobserved random variable. Thus the individual chooses the alternative providing the highest level of utility. The model is derived with the assumption that the covariance structure has an independent Type I extreme value distribution with a cumulative distribution function of the form $\exp(-\exp(-\varepsilon_{ij}))$. The probability of choosing an alternative j among J alternatives is written as

$$\text{Prob}(IN_i = j) = \frac{e^{\beta'_j x_i}}{\sum_{k=1}^{4} e^{\beta'_k x_i}}, j = 1,2,3,4$$

The multinomial logit has properties similar to that of the binomial logit model except that in the case of the binomial, one probability is estimated for each individual whereas in the multinomial model, *m-1* probabilities are estimated for each individual, where *m* is the total number of choices.

The model also assumes that all the alternatives are dissimilar or, equivalently the random components of the utility function are independent (often referred to as independence from irrelevant alternatives (*IIA*) assumption). When the IIA property holds, the odds-ratio of any two alternatives is independent of any other alternatives in the choice set (Greene 2003, 724).

The IIA assumption follows from the initial assumption that the disturbances are independent and homoscedastic. If a subset of the choice set is truly irrelevant, omitting it from the model altogether will not change parameter estimates systematically (Hausman and McFadden, 1984). Exclusion of these choices will be inefficient but will not lead to inconsistency. However, if the remaining odds ratios are not truly independent from these alternatives, then the parameter estimates obtained when these choices are included will be inconsistent. Thus before any interpretation could be inferred from multinomial logit output,

this all important specification issue must be resolved. The Hausman's specification test statistic is:

$$\chi^2 = \left(\hat{\beta}_s - \hat{\beta}_f\right)' \left[\hat{V}_s - \hat{V}_f\right]^{-1} \left(\hat{\beta}_s - \hat{\beta}_f\right)$$

Where s denotes the estimators based on the restricted subset, f indicates the estimator based on the full set of choices, $\hat{V}_s$ and $\hat{V}_f$ are the respective estimates of the asymptotic covariance matrices. The statistic has a limited chi-squared distribution with K degrees of freedom. To check the specification robustness, we examine the full model with four distinct choices of dependent variable against another logit model omitting one choice from the dependent variable. The null hypothesis (H_o) is that differences in coefficients are not systematic.

In the empirical model, we account for the child's demographic characteristics where we controlled for age and sex of the child. Secondly, we include maternal and household socio-economic characteristics-education, income etc. Finally, publicly induced supply side variables namely, kilometres of asphalted road, hospital-bed per population and other community factors have been captured.

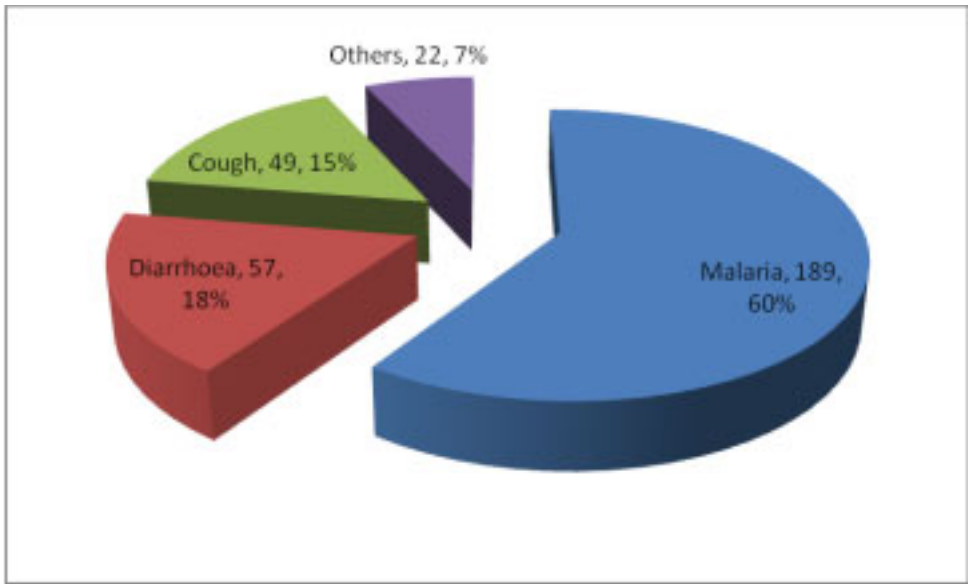
For the purpose of clarification, the health seeking behaviour of the mothers is with recourse to any type of care that was sought or administered within 48 hours from the recognition of the illness. Appropriate or formal care refers to care sought from qualified medical practitioners in public health facilities and private hospitals/clinics. Conversely, inappropriate care entails other types of health care such as purchasing drugs from pharmacy, home remedies and traditional or faith healers.

6.4 Descriptive Statistics

This section reviews some of the descriptive characteristics associated with parental health seeking behaviour for children under-five years. In all, 61% of the households have access to electricity while 16.4% had piped water in their residence. In terms of sex distribution of the children sampled, 53% of them were girls while 47% were boys. The sex distribution of the

sampled births mimics national sex distribution of the population in which women account for 52% while men account for 48% (Ghana Health Service, 2005).

Figure 6.1: Which Illness did Child Suffer?



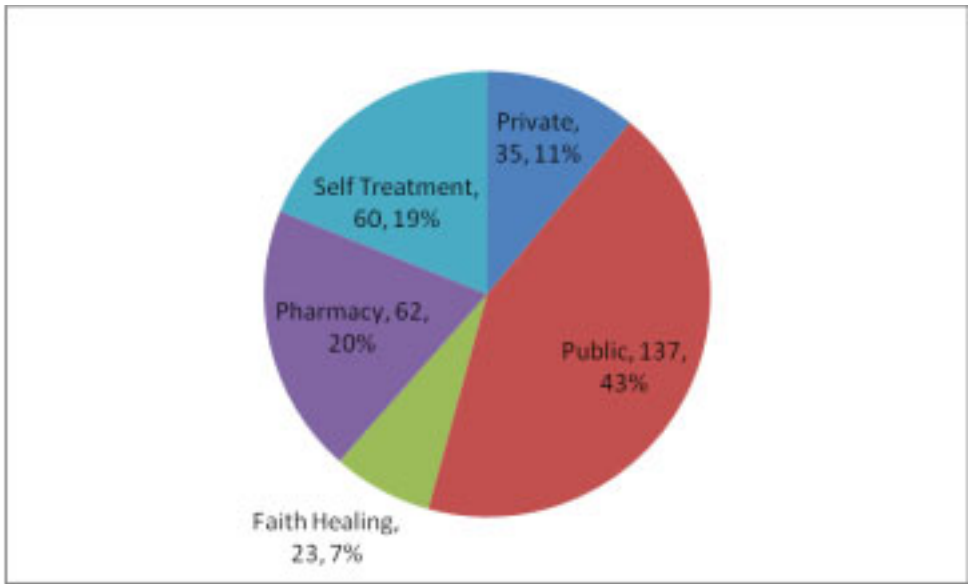
In the survey, 60 % of the children reported malaria fever four weeks prior to the survey while 15% reported diarrheal diseases[27]. Cough accounted for 7% while all the other diseases accounted for 18% of childhood illness (see Figure 6.1). In its annual report, the Ghana Health Service (2007) reported that malaria, acute respiratory infection and diarrhoea were the leading causes of morbidity in children aged under-five.

Households which demanded modern health care for their children had a mean income of US$1553.832 with a standard deviation (STD) of US$767.396 as compared to households that demanded inappropriate health care of US$1398.589 (STD=US$739.027)[28] over the period September 2006 and October 2007. This is against the backdrop that the mean income for the entire sample of households whose children reported sick was US$1491.637 (STD=US$758.814). The mean years of schooling for the mothers was 6.3 years while their fathers had an average of 8 years of schooling. The average household size for the entire sample was 5.1 while mean dependency ratio was 1.3. The average age for the children who reported ill four weeks prior to the survey was 25.3 months (STD=16.0). In terms of health

[27] . To simplify the analysis we overlook the concept of "Cormobidity" i.e. the simultaneous presence of two (2) medical problems. Thus, only the main disease suffered is characterized. This is imperative to minimize the mistakes arising from verbal autopsy.
[28] Following the redenomination of the Ghanaian currency at the beginning of July 2007, the GH¢ by the end of December was exchanged at GH¢ 1 to the US$1.

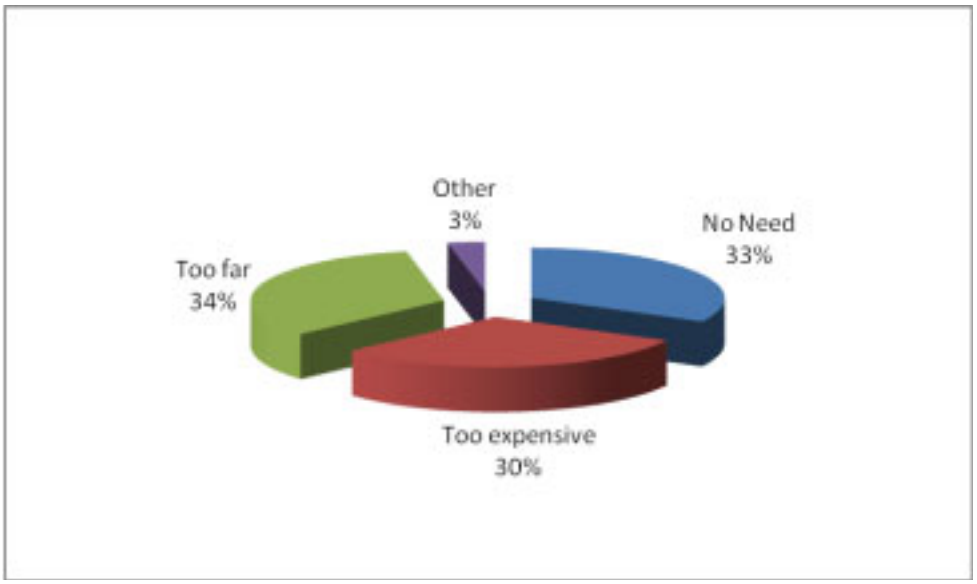
insurance ownership, 56% of the mothers had health insurance while 44% had no health insurance or any form of medical aid.

Figure 6.2: Choice of Health care Provider



The choice of health care institution sought when the children reported ill is provided in Figure 6.2; where over 40% of the children were taken to public health institutions while only 11 % received private health care. Strikingly, approximately 46% of the parents relied on unqualified providers for their children's health care. Unfortunately, the mothers and caregivers who seek inappropriate care as the first line of action resort to allopathic care when the health of their children has already deteriorated, increasing the risk of childhood mortality.

Figure 6.3: Why not use appropriate health care?



In the case of parents who used inappropriate medical care such as self treatment or "doing nothing" about the child's illness, 34 % of them indicated that they could not access modern medical care because of long distance to the nearest health facility while 33% of them responded that there was no need for medical care because they perceived that the illness was not severe. Yet, 30% of them assigned high cost of medical treatment for their inaction, implying that poverty is an important barrier to health care accessibility.

6.5 Empirical Results and Discussion

This is one of the few studies looking at health care demand and health service utilization in Ghana and perhaps the first regarding children under-five years using multiple logistic regressions to identify the socio-economic and community characteristics of users.

Table 6. 1: Results for Multinomial Probit Model (reference category is Public health care)

Variable	Private	Faith Healing	Pharmacy	Self Treatment
Asphalted road (km)	0.0092(0.0034)***	-0.0005(0.0028)	0.0010(0.0026)	-0.0034(0.0032)
Hospital bed-per-population	0.0004(0.0002)***	-0.0002(0.0001)	0.00001(0.0002)	-0.0002(0.0002)
Distance to the nearest Health facility (km)	0.0748(0.0328)**	0.0097(0.0449)	0.0154(0.0299)	0.1056(0.0361)***
Distance to Public Transport (km)	-0.0236(0.0247)	-0.2012(0.1153)*	0.0118(0.020)	0.0360(0.0561)
Distance to Food market	-0.0060(0.0373)	-0.0115(0.0373)	-0.0275(0.0356)	-0.1323(0.0417)***
Distance to Source of Drinking Water	0.1783(0.1170)	0.3555(0.1905)*	0.4882(0.1597)***	1.1237(0.2511)***
Sex of Child (Boy=1)	0.6665(0.2920)**	0.2786(0.3125)	0.3574(0.2954)	0.4459(0.3979)
Residence (Rural=1)	-0.5530(0.3804)	-0.2120(0.3694)	0.0731(0.4087)	-0.3384(0.5307)
Mother's Educational attainment	0.0265(0.0419)	-0.0098(0.0336)	-0.0463(0.0314)	-0.0682(0.0442)
Log of Household income	-1.7278(0.7512)**	-0.7096(0.7835)	-0.5975(0.7781)	-2.4059(1.3520)*
Log of Household income squared	0.2370(0.1015)**	0.1231(0.1130)	0.0944(0.1035)	0.2961(0.1815)*
Household Health care savings (1=Yes)	0.5394(0.3901)	-0.2186(0.4125)	-0.0307(0.3649)	0.3087(0.5494)
Age of Child (1-2)	-0.7589(0.3977)**	-1.3002(0.6146)**	-0.1965(0.3440)	0.0180((0.4752)
Age of Child (2-5)	0.5314(0.3565)	0.2487(0.3554)	0.2105(0.3427)	0.3030(0.4413)
Mother is insured (1=Yes)	0.1616(0.3907)	-0.3627(0.4090)	-0.4390(0.3137)	-1.7131(0.4360)***
Cost of treatment	0.0623(0.4444)	-0.0612(0.0382)*	0.0907(0.0848)	-0.4916(0.1423)***
Cost of treatment squared	-0.0009(0.0004)**	0.0002(0.0001)	-0.0082(0.0054)	-0.0013(0.0080)
Mother is married (1=Yes)	-0.8733(0.4453**	0.1158(0.3968)	-0.1705(0.4100)	-2.6530(0.7359)***
Waiting Time	-0.0028(0.0016)*	-0.0044(0.0017)***	-0.0158(0.0025)***	-0.0351(0.0057)***
Household Head (1=Female)	0.6485(0.4437)	0.1356(0.4155)	0.1453(0.3931)	-2.1528(0.7502)***
Dependence Ratio	0.1453(0.2203)	-0.1562(0.2527)	0.1764(0.1761)	0.1168(0.2168)
Diarrhoea (1=Yes)	-1.2691(0.4839)***	-1.1824(0.5102)**	0.1374(0.4712)	-1.9350(0.6397)***
Malaria (1=Yes)	-0.7355(0.3559)**	-1.2173(0.3511)***	-0.4761(0.3677)	-0.9229(0.3948)***
Constant	1.2974(1.6240)	1.8925(1.4545)	1.7575(1.6456)	10.6068(2.9236)***
Number of Observations =315 *Log Pseudolikelihood =-269.82* *Wald chi-square (92)= 284.90**** *Prob > chi-square = 0.0000*				

Robust standard errors in parenthesis. *** = (sig. at 1%), **=(sig. at 5%) and *(sig. at 10%).

Tables 6.1 and Appendix-Table 4 present the results for the multinomial probit and multinomial logit models respectively. The multinomial logit model is well fitted with Pseudo R^2 0.41. The likelihood ratio test for the two models indicates that the independent variables are jointly significant at the 1% level and the models are well fitted.

The calculated values of the Hausman test statistic for evaluating the validity of the multinomial logit model (for the five provider options) are provided in Appendix-Table 5 with the respective degrees of freedom. Four of the options passed the IIA assumption

(Private, Public, Pharmacy and Self Treatment) while "faith healing" failed the test, although the negative chi-square has been viewed as a strong indication that IIA holds (Baum, 2006) but lacks general acceptance. For the avoidance of doubt, we disregard the multinomial logit results and discuss the results from the multinomial probit model which relaxes the IIA assumption by allowing the errors to be correlated across alternatives[29]. The multinomial probit model has been employed in a number of health care demand studies (Akin, *et al*. 1995; Ohkusa and Masako, 2002).

We controlled for the initial health endowment of the child by introducing dummies for three age categories, one of which (0-1) is the reference category. The finding indicates that children aged between 1 and 2 years are less likely to be taken to traditional healers or faith healers as compared to children aged between 0 and 1 year. Generally, child morbidity and mortality decrease as the children advance in age. In terms of gender, the boy child is more likely to receive appropriate health care via private providers relative to the girl child. This might imply probable sex discrimination and a preference for male child in households.

The income variable has a positive and statistically significant impact on private medical care. This is against the backdrop that initial income levels are inversely related to private medical care. However, as income increases, more of private medical care will be demanded, implying that the relationship between income and health care demand is non-linear but quadratic in nature. Aside the demand for private medical care, there is no significant statistical relationship between income and the other provider choices (faith healing, pharmacy services and self treatment).

This might imply that private health care is a normal good and thus an increase in household income will increase its demand. For instance, a 1% increase in household income increases

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[29]. The multinomial probit model relaxes independence and assumes that the ε_{ij} have a multivariate normal distribution, $N(0, \Omega)$. The probability of observing an individual choosing alternative *j* is given by:

$$P_{ij} = \int_{-\infty}^{A_1} \int_{-\infty}^{A_2} \dots \int_{-\infty}^{A_{j-1}} \phi(u;\Omega)du,$$

Where $A_k = z\alpha_k^* + x_k^*\beta.$ $\alpha_k^* = \alpha_j - \alpha_k$, $x_{ik}^* = x_{ij} - x_{ik}$ and Ω is the covariance matrix of the different error terms. This requires computation of the area under the multivariate normal density $\phi(.)$, such that the utility associated with *j* is greater than the utility from all the alternatives $j \neq k$. The estimator identifies the α_k^*s, the difference in levels of indirect utility relative to the base alternative.

the probability that the child receives private health care by 2 percentage points[30]. Similar findings have been reported by Bolduc et al (1996) on his study on choice of medical providers in Benin. The result is also consistent with the findings by Dzator and Asafu-Adjaye (2004) for Ghana and Anyawu (2007) for Nigeria. Previous studies such as Dor *et al*. (1987) and Mbanefoh *et al*. (2004a) Dong *et al*.(2008), Hidayat (2008) and Steinhardt *et al*. (2009) have also reported statistically significant relationships between income and the demand for appropriate health care (allopathic care).

None of the studies reviewed so far (Anyawu, 2007; Dzator and Asafu-Adjaye, 2004; and Buldoc et al, 1996 *inter alia*) on health seeking had examined the impact of publicly induced health inputs on the demand for medical care. This might be attributable to the fact that, most national health surveys do not concurrently contain supply side variables. Two variables namely, bed-population ratio and kilometres of asphalted roads are introduced as proxies for public health investment (infrastructure) alongside other community characteristics such as distance to the nearest health facility. The two variables of interests were found to be significant predictors for the demand for modern medical care, in particular private health care. Public health investments such as the construction of asphalted roads that exhibit "public goods" characteristics (non-excludability and non-rivalness in consumption) increase the demand for health care (Matin, 2000; Ensor and Cooper, 2004). Bed-population ratio, which is a proxy for health input is statistically significant in explaining the demand for private health care. Aside health seeking, public health inputs have been found to influence other decision making processes. There is empirical evidence that the decision to undertake inter-district migration in Ghana is induced by the depth of health inputs, particularly number of clinics per 1000 population (Tsegai, 2005).

Habibov and Fan (2008) find that low quality of health care service, lack of public infrastructure and long distance of travel to the nearest health facility reduce the utilization of prenatal health care in Tajikistan. Similarly, Wiseman *et al*.(2008) find that availability of community infrastructure significantly influences the demand for modern health care. Thus, policy interventions meant to increase spending on infrastructure will increase the demand for private health care and reduce the existing pressure on public health delivery. In Ghana, poor feeder road systems, poor location of facilities, lack of communication facilities and low capital investment in health facilities coupled with organizational and management

[30]. Marginal effects for the variables are not reported but available on request.

constraint reduces access to modern health care (National Development Planning Commission (NDPC, 2005).

Statistically, distance to the nearest health facility (travel time) increases the demand for private medical care and self treatment. The positive statistical relationship between distance and private health care might imply that consumers disregard long distances and the associated opportunity cost to demand private health care because of the perceived quality. Conversely, the longer the travel distances to formal health institutions such as a hospital, clinic etc, the greater the likelihood of self treatment. Similarly, community characteristics such as distance to source of drinking water are significantly and inversely related to self-treatment. This finding provide some insight into policy formulation in that as the government increases access to health care in remotest parts of the country, demand for self treatment will fall as compared to the demand for public health care.

While private health care is perceived to be of high quality, the dual problems of poverty and accessibility deny many Ghanaians the opportunity of seeking private health care. This is against the setting that an estimated 44.8 % of Ghanaians lived on less than US$1 a day while a whopping 78.5% lived on less than US$2 (UNDP, 2005). This is consistent with the survey findings where households' annual mean per capita income was GH¢322.5, which is less than the World Banks recommended US$1 a day. The construction of passable roads will reduce the travel cost of health care including opportunity cost and make health care more accessible and affordable. Thus where public health investment is lacking or inaccessible, parents will tend to demand self treatment whose safety and efficacy in treating childhood ailments are questionable. This has serious implications for policy in that to increase access to modern medical services, public health investment must increase.

What is surprising is that the demand for faith healing, pharmacy services and self treatment do not respond to supply side variables. Although faith healing and self treatment had the correct negative association, they were woefully insignificant. The explanation for this might be that these alternatives are less capital intensive in terms of medical logistics and can be easily sited in even remotest parts of the country with little difficulty.

The effect of price on provider choice during childhood illness is unambiguously inverse**.** The price has a negative and significant impact on the choice of private health care, self

treatment and faith healing which is the a priori expectation. Ceteris paribus, the higher the cost of treatment, the lower will be the demand. Earlier studies in Ghana had confirmed the inverse relationship between treatment cost and health care utilization and often the cause of delayed treatment (Waddington and Enyimayew; 1989 and 1990; UNDP, 1997). In Nigeria, Anyawu (2007) found treatment cost (price) to be inversely and significantly related to the demand for public health services while Dzator and Asafu-Adjaye (2004) found a significant and positive association between price and demand for pharmacy services for Ghana. Although in the model, the initial price of treatment had a positive sign in the case of pharmacy it is insignificant.

Ownership of health insurance among mothers was a significant predictor for the demand for self treatment. Insurance ownership had a negative and significant relationship with the demand for self treatment. Thus pre-paid health schemes provide the incentive for mothers to demand modern medical care, particularly public health services, the reference category[31].

Waiting time was found to be consistently negative and significant in the demand for health care, albeit weakly in the demand for private health care. The negative association implies that as the time spent waiting increases, parents will demand less health care for their children, especially if the opportunity cost of waiting is relatively high. This is against the backdrop that parents especially the mother has to allocate her time schedule among competing tasks, both economic and non-economic. In studies where this variable was found to be positive and significant, it was used as a proxy for the quality of health care, in which case, the delay is to enable the doctor examine the child or the patient properly. Conversely, longer waiting times have been perceived as a reflection of poor quality of health care and a cause of poor utilization (Haran and Dovlo, 1994)

Female headed households had a negative and significant relationship with the demand for self treatment. However, no significant statistical relationship was reported for the other alternatives. Dependency ratio was found to be insignificant predictor for the demand for health care. This finding is in contrast with the a priori expectation that higher dependency ratios increases the demand for self-treatment and lowers that of private and public health care. In addition, there was a negative and significant relationship between married women

[31] .This conclusion is based on an exploratory regression which is not reported in this study.

and the demand for self treatment. Interestingly, maternal education had no discernible significant impact on the demand for medical care.

We controlled for disease type by introducing two dummies for children who reported diarrheal and malarial diseases four weeks prior to the survey. We found that malarial fever and diarrhoea treatment are inversely related to faith healing while diarrhoea is negatively and significantly related to self treatment**.** In an exploratory estimation (base category is self-treatment), these variables were found to be positive and statistically significant predictors for the demand for public medical care. Since these two diseases are among the leading morbidity and mortality cases in Ghana, their treatment in appropriate medical facilities provide some hope for the future.

6.6 Limitation

The survey relied upon respondents to recall the amount spent on health care and also used respondent self-assessment. The reliance on self-recall of morbidity is somewhat problematic. Hence, the data for the study did not capture bio-medical variables such as the perceived severity of the illnesses reported which might influence significantly the demand for a particular choice of health provider. These variables are thus captured by the stochastic error term. Even, when such outcomes are captured, their reliability is questionable since severity may depend on the mother's familiarity with that illness, symptoms and its early detection. Thus in the absence of professional diagnosis, variables capturing severity of illness could be misleading.

6.7 Conclusions

This chapter provides insight on maternal health seeking behaviour for under-five children during illness. The study finds that maternal ownership of health insurance or any form of medical aid is a significant predictor for the demand for formal or modern medical care, particularly public health care. Thus to ensure that children aged under-five have access to universal health care, developing countries such as Ghana should operationalize to the fullest the recently introduced National Health Insurance Schemes. While it is imperative to unambiguously implement the free health care policy for children aged under-five, whether or not their parents hold health insurance, it is equally essential to actuarially determine the insurance premium, to save the scheme from future collapse.

The findings show that private health care and public health investments are complementary. This is buttressed by the statistical robustness of the proxy for health infrastructure (kilometres of asphalted road) and health input (bed-ratio) variables. Thus, attempts to increase access to health care for both children and adults should involve increasing public spending on health care and other health related infrastructure such as roads. The effect of distance to the nearest health facility on the choice of health care provider is ambiguous. While distance positively and significantly influences the demand for self-treatment, it also increases the demand for private health care. This might imply that consumers disregard longer distances to demand private health care because of the perceived quality otherwise they might resort to self-treatment.

In addition, income was found to exert a non-linear effect on the demand for private allopathic health care. Thus as income increases, more of private health care is demanded. Other control variables that were found to significantly influence the choice of health care providers were waiting time, distance to source of drinking water, age and sex of child, cost of treatment and marital status among others.

CHAPTER SEVEN

DOES CHOICE OF A GIVEN HEALTH CARE PROVIDER AFFECT CONSUMER SATISFACTION OF HEALTH SERVICES?

7.1 Introduction

This chapter is necessitated by the difficulty in getting proxies for quality of health care in the demand for health care model in Chapter six. It is envisaged that the quality of care will influence the choice of a given provider's service. Hence, this chapter focuses on the overall satisfaction that consumers gain from consuming health care services from a given provider. Quality of health care services is an issue of increasing importance to health care stakeholders; governments, health authorities and consumers (Lapsley, 2000) especially in deprived and rural communities where health care is worse than urban areas due to medical staff shortages and difficulty in accessing health services. Increasingly, patients' satisfaction is recognized as essential component in the evaluation of health care quality (Brady and Cronin, 2001; Niraj *et al*. 2001; Donabedian, 1988, 1992; Derose, 2001) and that the quality of health care services should not be confined to clinical effectiveness or economic efficiency but should incorporate social acceptability as an important quality objective (Donabedian, 1992; Maxwell, 1984; Calnan, 1997).

Monitoring and evaluating consumer satisfaction with health care is a crucial input to improving the quality of health care system and changes in the system as well as providing feedback for health care professionals and policy makers (Bara *et al*. 2002). Measures of consumer satisfaction with health care delivery can provide an important assessment of quality of health care not adequately captured by other health service statistics such as patient throughput, waiting times, consultation times and proximity (Williams and Calnan, 1991; Sitzia and Wood, 1997). In fact, Donabedian (1980, 1988) has suggested that patient satisfaction is a major quality outcome in itself (see also Derose, 2001).

The extent to which health care users are satisfied with their local providers may be a key factor underpinning their health behaviour and health care utilization (Hadorn, 1991, Rankin *et al*. 2002). It is envisaged that timely, accessible, appropriate health interventions,

continuous and effective health services are essential elements to ensure health care quality (Cambell, 2000).

The Institutional Care Division (ICD) of Ghana Health Service (GHS) has direct responsibility of ensuring health care quality among other charges. The need to improve health care quality was given prominence in the Health Sector 5-year Programme of Work (1997-2001) and the second 5-year Programme of Work (2002-2006)[32]. A qualitative analysis of satisfaction with medical services was conducted in 1997 and 2003 as part of the Core Welfare Indicator Questionnaire. It was found that satisfaction had increased from 57% in 1997 to 78.6% in 2003 indicating a 21 percentage point increase. However, the level of satisfaction was not scaled but simply defined for persons who consulted health practitioners and experienced no problem with the health system (GSS, 1997 and 2003).

Previous studies on parental satisfaction with health care for children aged under-five regarding the services of a given health provider is virtually non-existent. Although the kids are the patients in question, they cannot make their own satisfaction evaluation, and thus the mothers or caregivers make such judgment. Previous studies have investigated patients' socio-economic and demographic characteristics in relation with satisfaction partly because of the ease with which this data can be collected (Hall *et al*.1990). The literature shows that characteristics such as age, educational attainment, health status and amount of information conveyed by the health provider are significant predictors of health care satisfaction (Agha and Do, 2009; Chahal *et al*. 2004; Hall, *et al*. 1990; Cohen, 1996). It is also documented that provider empathy especially with delivery care is associated with higher levels of satisfaction (Bazant and Koenig, 2009). Yet other studies postulate that fees, drug availability and waiting times are the main causes of dissatisfaction among health care consumers (Baltussen *et al*. 2002; Basset *et al*. 1998).

The principal objective of this chapter is to examine the extent to which the choice of a given provider influences satisfaction with health care. Consequently, we model the overall level of satisfaction associated with the consumption of a particular providers' health services using a 5 point Likert scale from (1) very dissatisfied to (5) very satisfied. The satisfaction levels were elicited by asking the respondents, in this case the mother or care-givers to score

[32] .Strategies adopted to improve quality of care included: provision of more resources for health care; improved and expanded human resource development; strengthening of health care management and introduction of quality assurance (QA) programmes (GHS, 2007).

their overall satisfaction from 1-5. The self-developed Likert-scale has been used variously to measure health care satisfaction (Adams, *et al*. 2008; Chahal, *et al*. 2004, Hoerger *et al*. 2001, Derose *et al*., 2001).

7.2 Empirical Estimation and Hypothesis

Econometric analysis has been applied extensively to consumer or customer satisfaction related to health care delivery (Qatari and Haran, 1999; Fredrik and Jostein, 2000, Derose *et al*. 2001; Hoerger *et al*. 2001 Bara *et al*. 2002; Margolis *et al*, 2003, Chu-Weininger and Balkrishnan, 2006.)

Due to the ordinal nature of the dependent variable; the level of satisfaction associated with the use of an alternative health care which takes on the values 1-5, with 1 being the least and 5 the best, the appropriate model is the ordered logit model (Hoerger, *et al*. 2001; Derose, *et al*.; Bara *et al*. 2002). The selected link function is logit over probit because of the computational advantages of the ordered logit model (Van Beek, *et al*. 1997). This model takes into consideration the ordinal nature of the satisfaction variable and estimates the probability that a consumer will choose each satisfaction rating based on personal and provider characteristics which in our model are a series of dichotomous (dummy) variables. In our quest to obtain the marginal effects after the *ologit* estimation, we omit one of the categories (very dissatisfied) since none of the parents who utilized private health care chose the option “very dissatisfied”.

We posit that the level of satisfaction is suggestive of the quality of health care. This is imperative due to the problem of finding an appropriate proxy for quality of health care in the provider choice model previously estimated (see Chapter six). There are other quality indicators, such as nurse and physician satisfaction, mortality and morbidity outcomes and other factors such as ratings of inappropriate health system use. However, due to data limitation, the analysis is restricted to the overall level of satisfaction. In the empirical estimation, we test the hypothesis that there is no significant difference between the levels of satisfaction associated with the choice of a health care provider such as private versus public health providers.

The assumption of the ordered logit model is that there is a continuous latent variable Satisfaction or Utility (y^*), which is unobserved and *y* which is observed. The variable y is an ordinal version of y^* (satisfaction or utility) which has threshold points. The value on the observed variable y depends on whether it crosses a particular threshold or not. Let y_1, y_2, y_3, y_4, y_5 denote the categories of the variable.

Hence, the ordered logit model is based on the following latent specification (Greene, 2000):

$$y^* = \alpha_0 + \sum \alpha_i x_i + \varepsilon$$

$$y = 1 \text{ if } y_i \leq U_{1,}$$

$$y = 2 \text{ if } U_1 < y \leq U_{2,}$$

$$y = 3 \text{ if } U_2 < y \leq U_3,$$

$$y = 4 \text{ if } U_3 < y \leq U_4,$$

$$y = 5 \text{ if } y > U_4.$$

Since the *U*'s are free parameters, there is no significance to the unit distance between the set of observed values of y. The *U*'s merely provide the rankings. The model is estimated using maximum likelihood. In ordered logistic, an underlying outcome measurement is modelled as a linear function of the independent variables and a set of cut points. Thus the probability of observing outcome *i* corresponds to the probability that the estimated linear function, in addition to the random error, is within the range of the cut points estimated for the outcome.

Prob (outcome$_j$ = *i*) = Prob ($\kappa_{i-1} < \alpha_1 x_{1j} + \alpha_2 x_{2j} + ... + \alpha_k x_{kj} + \varepsilon_j \leq \kappa_i$)

ε_j is assumed to be logistically distributed. The coefficients α_1, α_2,…, α_k are estimated together with the cutpoints κ_1, κ_2,…, κ_{k-1}, where *k* is the number of possible outcomes. κ_0 is taken as -∞ and κ_k is taken as +∞. Standard goodness-of-fit tests for logit models include *t* tests for the estimated coefficients, Chi-square and Likelihood ratio tests on the hypothesis that all parameters are zero, and the Pseudo R^2 which fits the non-linear logit procedure.

7.3 Results and Discussion

From the descriptive statistics in Table 7.1, satisfaction with the health care system in general was 63.4% of those surveyed, while 11.1% were dissatisfied and 25.6% were neither satisfied nor dissatisfied (somewhat satisfied). The satisfaction level is generally high, though not as high as reported in other international literature (Bara *et al*, 2002, Fitzpatrick, 1991) given that the health system in Ghana is fraught with inadequate medical personnel and logistics (Agyepong *et al*. 2004). One might argue that where there are limited or no alternatives, health care users tend to be content with the status quo. In terms of specific providers, the Table indicates that overall, subscribers of private health care are more satisfied than those who demanded alternative services. This is buttressed by the fact that none of the parents indicated that they were "very dissatisfied" with private health care. The highest level of dissatisfaction is associated with parents who utilized the services of pharmacy services/over-the-counter drugs. The qualitative response also indicates that highly educated mothers are less satisfied with health care services. Only 13.9% of mothers with secondary education or better indicated that they were very satisfied with the health service delivery (see Table 7.2).

Table 7.1: Level of satisfaction by Provider Choice

Health Facility	Very Satisfied	Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied
Private	12(33.4%)	13(37.1%)	9(25.7%)	1(2.9%)	0(0.0%)
Public	29(21.2%)	68 (49.6%)	29(21.2%)	7(5.1%)	4(2.9%)
Faith Healing	8(34.8%)	6(26.1%)	6(26.1%)	2(8.7%)	1(4.3%)
Pharmacy	16(25.85%)	24(38.7%)	15(24.2%)	3(4.8%)	4(6.5%)
Self Treatment	7(11.7%)	18(30.0%)	22(36.7%)	2(20.0%)	1(1.7%)
Total	72 (22.7%)	129 (40.7%)	81 (25.6%)	25(7.9%)	10 (3.2%)

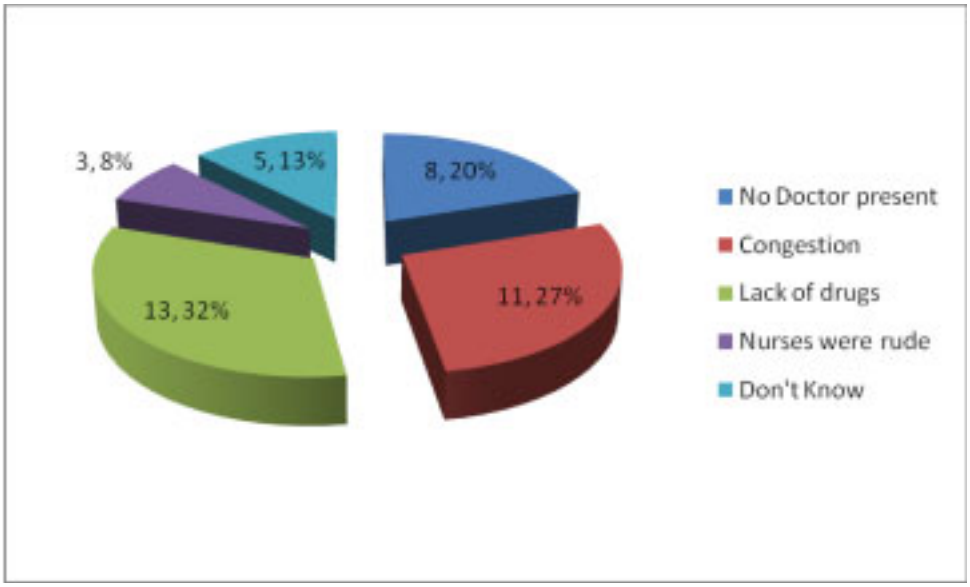
Source: Maternal and Child Health Survey 2007/2008

Table 7.2: Maternal Education by overall Satisfaction level

Level of Education	Very Satisfied	Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied
None	16(22.2%)	46(35.6%)	30(37.1%)	5(20.0%)	6(60%)
Primary	11(15.3%)	18 (14.0%)	9(11.1%)	7(28.0%)	0(0%)
Junior High/Mid.	35(48.6%)	44(34.1%)	24(29.6%)	8(32.0%)	4(40%)
Secondary+	10(13.9%)	21 (16.3%)	18(22.2)	5(20.0%)	0(0%)
Total	**72**	**129**	**81**	**25**	**10**

Source: Maternal and Child Health Survey 2007/2008

Figure 7.1: Reasons for Dissatisfaction with Health Care Providers



Source: Maternal and Child Health Survey 2007/2008

Figure 7.1 catalogues the reasons regarding dissatisfaction with public and private health care providers (modern medical care). Overall, lack of essential drugs at the health facility was the main reason for customer dissatisfaction followed by congestion. The problems of drug availability and congestion are common phenomena with public health care in developing countries and often cited as one component of inefficiency in the health system (Masiye, 2007; Osei *et al*. 2005). Approximately, 13% of the dissatisfied health care consumers could not assign a specific reason.

Prior to the discussion of the regression results, a non-parametric test (Kruskal Wallis test)[33], was conducted to ascertain if there is a statistically significant difference among the five health care providers in terms of consumer satisfaction. The results indicate that with or without ties, there is a statistically significant difference among consumers regarding the choice of health care providers (see Appendix-Table 6).

[33] The Kruskal-Wallis test (distribution free) is employed when you have one independent variable with two or more levels (in this case health care providers) and an ordinal dependent variable (in this case, a 5-point Likert Satisfaction scale). It tests the null hypothesis that the different samples in the comparison were drawn from the same distribution with the same median. The null hypothesis is rejected with $P<0.05$ or better.

Table 7.3: Summary Statistics of the Variables used in the Regression Analysis

Variable	Mean	Std. Dev
Private Health care	0.1104	0.3138
Public Health care	0.4322	0.4961
Pharmacy	0.1956	0.3972
Traditional/Faith Healing	0.0723	0.2598
Residence (Rural=1)	0.6561	0.4757
Age of Child (1-2)	0.2523	0.4350
Age of Child (2+)	0.4574	0.4989
Sex of Child (Girl=1)	0.5394	0.4992
Birth order	2.7981	1.7745
Price of Treatment	3.9964	16.5909
Price of treatment Squared	290.361	4130.82
Log of household income	7.1813	5.2724
Marital Status (1=Married)	0.7476	0.4350
Mother's Age (20-24)	0.2839	0.4516
Mother's Age (25-29)	0.2871	0.4531
Mother's Age 30-34)	0.1640	0.3708
Mother's Age (35-39)	0.0726	0.2596
Mother's Age (40+)	0.0599	0.2377
Primary Education	0.1419	0.3495
Junior High/Middle	0.3659	0.4829
Secondary+	0.1640	0.3708
Watches TV (1=Yes)	0.4637	0.4994
Read Newspaper (1=Yes)	0.0694	0.2545
Listens to Radio (1=Yes)	0.7697	0.4216
Distance	4.9367	5.6435
Waiting Time	108.7508	104.9607
Malaria (1=Yes)	0.5962	0.4914
Diarrhoea (1=Yes)	0.1545	0.3606

Source: Maternal and Child Health Survey 2007/2008

Table 7.4: Results of Provider Choice and Satisfaction Level Based on Ordered Logit

Variable	Coefficient	Robust St. Err
Self Treatment (ref.cat.)	-	-
Private Healthcare	1.5545***	0.4729
Public Healthcare	1.1978***	0.3737
Pharmacy	0.7011*	0.3742
Traditional/Faith Healing	1.0201	0.6458
Residence (Rural=1)	-0.4865*	0.2738
Age of Child >1 (Ref. Cat.)	-	-
Age of Child (1-2)	0.4461	0.3027
Age of Child (2+)	-0.3620	0.2788
Sex of Child (Girl=1)	-0.4518**	0.2263
Birth order	-0.1427	0.0944
Price of Treatment	0.0159	0.0206
Price of treatment Squared	-0.0001	0.0001
Log of household income	0.2655	0.2311
Marital Status (1=Married)	0.6789**	0.2960
Mother's Age ≥19 (ref. Cat)	-	-
Mother's Age (20-24)	0.7813**	0.3457
Mother's Age (25-29)	-0.0293	0.3675
Mother's Age 30-34)	0.4816	0.4250
Mother's Age (35-39)	-0.9755	0.7664
Mother's Age (40+)	-1.0941	0.8251
No education (ref. Cat.)	-	-
Primary Education	-0.2928	0.3950
Junior High/Middle	-0.094	0.3095
Secondary+	-0.6362*	0.3570
Watches TV (1=Yes)	0.7407***	0.2840
Read Newspaper (1=Yes)	0.0806	0.5303
Listens to Radio (1=Yes)	-0.2579	0.2928
Distance	-0.0351*	0.0197
Waiting Time	-0.0035**	0.0014
Malaria (1=Yes)	-0.2224	0.3146
Diarrhoea (1=Yes)	-0.4142	0.4069
Threshold 1	-2.8430*	1.6270
Threshold 2	-1.3977	1.6006
Threshold 3	0.4105	1.6131
Threshold 4	2.6027*	1.6246
Number of Observations = 317 Pseudo R-square = 0.11 Log Pseudolikelihood = -385.40 Wald chi-square (28) = 120.42*** Prob > chi-square = 0.0000		

. *** = (sig. at 1%), **=(sig. at 5%) and *(sig. at 10%).

Table 7.5: Results of Provider Choice and Satisfaction Level Based on Ordered Logit (Reporting Marginal Effects)

Variable	Very Satisfied	Satisfied	Somewhat Sat.	Somewhat Dis
	dy/dx	*dy/dx*	*dy/dx*	*dy/dx*
Self Treatment (ref.cat.)	-	-	-	-
Private Healthcare	0.31326 (0.110)***	-0.05293(0.062)	-0.19211(0.044)***	-0.05071(0.013)***
Public Healthcare	0.18911(0.060)***	0.06457(0.026)***	-0.17299(0.051)***	-0.05909(0.021)***
Pharmacy	0.11927(0.071)*	0.02342(0.014)	-0.10150(0.051)**	-0.03044(0.014)**
Traditional/Faith Healing	0.19389 (0.146)	-0.00695(0.060)	-0.13690(0.070)**	-0.03716(0.017)**
Residence (Rural=1)	-0.07642 (0.045)*	-0.02835(0.015)*	0.07279 (0.040) *	0.02353(0.013)*
Age of Child >1 (Ref. Cat.)	-	-	-	-
Age of Child (1-2)	0.07153(0.051)	0.02336(0.013)*	-0.06645(0.043)	-0.02096(0.013)
Age of Child (2+)	-0.05371 (0.041)	-0.02685(0.022)	0.05492(0.042)	0. 01882(0.015)
Sex of Child (Girl=1)	-0.06846 (0.034)**	-0.03087(0.017)*	0.06816(0.033)**	0.02289(0.012)*
Birth order	-0.02136 (0.014)	-0.01028(0.007)	0.02170(0.014)	0.00731(0.004)
Price of Treatment	0.00238(0.003)	0.00115(0.001)	-0.00243(0.003)	-0.00082(0.000)
Price of treatment Squared	-0.00001(0.000)	-0.00005(0.000)	0.00001(0.000)	-0.00004(0.000)
Log of household income	0.09136 (0.034)	0.01914(0.017)	-0.04039(0.035)	-0.01359(0.011)
Marital Status (1=Married)	0.09136 (0.034)***	0.65782(0.039)*	-0.10212(0.043)**	-0.04002(0.021)*
Mother's Age ≥19 (ref. Cat)	-	-	-	-
Mother's Age (20-24)	-0.10520 (0.042)***	-0.07521(0.04)*	0.11687(0.050)**	0.04618(0.024)**
Mother's Age (25-29)	-0.00436 (0.054)	-0.00214(0.027)	0.00445(0.055)	0.00151(0.019)
Mother's Age 30-34)	-0.06497 (0.051)	-0.04674(0.051)	0.07307(0.063)	0.02815(0.028)
Mother's Age (35-39)	-0.11091(0.063*	-0.12383(0.126)	0.13764(0.085)*	0.06936(0.072)
Mother's Age (40+)	-0.11907 (0.061)**	-0.14494(0.410)	0.14924(0.078)**	0.08144(0.082)
No education (ref. Cat.)	-	-	-	-
Primary Education	-0.04098 (0.051)	-0.02603(0.042)	0.04468(0.060)	0.01633(0.024)
Junior High/Middle	-0.01397 (0.045)	-0.00698(0.023)	0.01432(0.047)	0.00487(0.016)
Secondary+	-0.08296 (0.040)**	-0.06606(0.047)	0.09558(0.052)*	0.03879(0.026)
Watches TV (1=Yes)	0.11300 (0.046)***	0.04861(0.020)***	-0.11047(0.042)***	-0.03752(0.015)***
Read Newspaper (1=Yes)	0.12328 (0.082)	0.00533(0.031)	-0.01220(0.079)	-0.00401(0.025)
Listens to Radio (1=Yes)	-0.04035 (0.048)	-0.01545(0.014)	0.03883(0.043)	0.012550(0.013)
Distance	-0.00526 (0.003)*	-0.00253(0.001)	0.00534(0.003)*	0.00179(0.001)*
Waiting Time	-0.00053 (0.000)***	-0.00025(0.001) **	0.00054(0.000)***	0.00018(0.000)**
Malaria (1=Yes)	-0.03376(0.048)	-0.01519(0.020)	0.03371(0.047)	0.01121(0.015)
Diarrhoea (1=Yes)	-0.05655 (0.050)	-0.03914(0.046)	0.06301(0.061)	0.02383(0.026)

***** = (sig. at 1%), **= (sig. at 5%) and * = (sig. at 10%).** ***Standard errors in parenthesis***

Tables 7.4 and 7.5 provide the empirical results for the consumer satisfaction model (ordered logit), reporting coefficients and marginal effects respectively. The control variables in the empirical estimation which encompass socio-demographic, economic, and provider characteristics have been chosen with recourse to general empirical literature. A negative sign on the coefficient means that a higher value of the variable increases the odds of a lower value of the outcome (*very dissatisfied*). For example, a negative coefficient on the variable "sex of child" means that parents of girls (sex=1) have higher odds of dissatisfaction of

health services as compared to boys. For continuous variables, a positive sign of the linear predictor ensures that higher values of the coefficients leads to increased probability for the higher categories (say very satisfied).

According to our econometric estimation, after controlling for a range of variables reflecting socio-economic and demographic factors, subscribers of private health care are more satisfied as compared to public, pharmacy services and traditional or faith healing (self-treatment is the reference group). This finding is inferred from the magnitude of the coefficients and the associated marginal effects. This might imply that the quality of private health care is relatively higher than public, pharmacy services and faith healing. The high quality of private health care relative to public is consistent with other studies such as Agha and Do (2009) who concluded that private facilities were superior to public sector facilities regarding physical infrastructure and availability of services. However, the difference between the two sectors is unnoticed in terms of technical quality of care provided (*see also* Jofre-Bonet, 2001). Boller *et al*. (2003) confirm that private providers of antenatal care in Tanzania were significantly better than public ones with regard to all attributes of quality they investigated. Our finding is in line with other studies which have demonstrated that private health providers can deliver more adequate health services than the public sector (Walker *et al*. 2001; Aljunid, 1995).

Yet there are other studies that contend that within the private health care delivery, industrial or urban dwellers are more satisfied than those living in a more distant and marginalized settlement (Bazant and Koenig, 2009).

Control variables that were found to be significant were sex of the child, maternal age and education (Chahal, *et al*. 2004), marital status and previous knowledge of health issues (proxied by access to television). Higher educated mothers are found to be less satisfied with their children's health care services. This might be attributable to the fact that they are more critical about health services provided in general coupled with the fact that they are more knowledgeable about social health issues and their "rights" (Agha and Do, 2009; Chahal, *et al*. 2004; Bara, *et al*. 2002).

Provider characteristics particularly distance (Baltussen *et al*. 2002) and waiting time were found to be inversely and significantly related to consumer satisfaction. The longer the

distance to the nearest health facility, the lower the level of satisfaction associated with the choice of a given provider's services. Stated differently, proximity to health facilities increases satisfaction while longer distances reduce health care satisfaction. Similarly, longer waiting times at the respective health facilities are associated with lower levels of satisfaction.

Table 7.5 provides information on the estimated marginal effects of each of the satisfaction scales. The demand for private health care increases the level of satisfaction by 31 percentage points while that of public health increases the level of satisfaction by 20 percentage points. Thus parents who demand private health for their children are 12 percentage points more likely to be very satisfied than their counterparts who subscribe to public health care. Therefore, we reject the null hypothesis that private and public health care confer the same level of satisfaction.

The relatively low level of consumer satisfaction of public health care vis-à-vis private health care might be attributable to the general job dissatisfaction and lack of motivation among public sector health care providers. Agyepong *et al*. (2004) highlighted the workplace obstacles that caused dissatisfaction and de-motivated staff in Ghana's public health sector. Among the obstacles the authors mentioned in order of importance were low remuneration; lack of essential equipment, tools and supply to work with; delayed promotion; difficulties and inconveniences with transportation to work; staff shortages and housing among others. The authors concluded that given the workplace obstacles that de-motivate staff and negatively influence their performance, the public sector can hardly provide high quality care.

Parents who subscribed to pharmacy services are more likely to increase their satisfaction level with health care by 12 percentage points while faith/traditional healing was statistically insignificant, thus conferring the least level of satisfaction. Prior knowledge of health care and marital status is also associated with higher levels of satisfaction while mothers with at least secondary education are more likely to be dissatisfied. All the health provider options had a statistically significant and inverse relationship with dissatisfaction ("somewhat dissatisfied").

7.4 Limitation

It must be noted however, that measuring satisfaction can be problematic, partly due to the multifaceted nature of the concept including the very act of defining satisfaction (Collins, *et al*. 2003, Verbeek *et al.* 2001). Normally, satisfaction levels do not always equate solely to quality care. Other factors influencing satisfaction include consumer perception, attitudes, expectations and experiences; their physical and psychological health; personal and societal values; and consumer knowledge of and exposure to health services (Carr-Hill, 1992; Hordacre *et al*. 2005). In order to appreciate consumer satisfaction with various aspects of health delivery, it is recommended that future research in the areas of childhood health seeking examine specific attributes such as the friendliness of medical personnel, privacy, waiting time, consultation time and professionalism *inter alia*.

7.5 Conclusion

The paper provides empirical evidence that parents who send their children to private and public health facilities are more likely to be very satisfied compared to their counterparts who seek health care from faith healers, pharmacy services and self treatment. However, consumers of private health services are approximately 12 percentage points more likely to be very satisfied than subscribers of public health care. This confirms the notion in Ghana and elsewhere that private health delivery is synonymous with quality care. Qualitatively, lack of essential drugs, congestion at the health facility and absence of doctor at the time of visit is the reasons for dissatisfaction with health care providers.

CHAPTER EIGHT

DEMAND FOR HEALTH INSURANCE AMONG WOMEN AND HOUSEHOLD PARTICIPATION RATE

8.1 Introduction

In Chapter six, we investigated the factors influencing the choice of a health care provider where the utilization of the services of faith healing, buying over-the-counter drugs and self treatment were classified as inappropriate health care. At least, we found robust empirical evidence that maternal ownership of health insurance significantly ($p<0.001$) reduces self-treatment. Besides, insurance ownership is positively associated with private medical care and inversely related to faith healing and pharmacy/buying over-the counter-drugs, albeit insignificant[34]. We posit that ownership of health insurance, will improve maternal and child health via utilization of allopathic health care and consequently curb the alarming child mortality rate.

In recent times, health insurance has been identified as an important health policy to encourage the demand for allopathic care in developing countries. It is a key health policy which promotes the utilization of appropriate health care and reduces out-of-pocket spending (Ekman, 2007). Empirical research has provided ample evidence to buttress that access to health care is enhanced by adequate health insurance coverage and that it is a predictor of the physical well-being of the insured (Bindman *et al*. 1996; Starfield, 1995).

However, Ghana has operated a cost-recovery health delivery system known as the "cash-and-carry" system since 1985; whereby patients are required to pay up-front for health services at government clinics and hospitals. While this led to increased revenue to supplement central funding and in some cases improved basic supplies, the policy generally led to a sharp and sustained decline in health care utilization in all facilities (Waddington and

[34] In an exploratory estimation (when the reference category in the MNP model was changed to self-treatment), insurance ownership was significantly and positively associated with public health care (another proxy for appropriate health care). Though, private health care had the expected sign, it was insignificant. This might be attributable to the fact that at the inception of the insurance scheme in 2005, only public health institutions were licensed under the NHIS. Some private health facilities were recently licensed under scheme.

Enyimayew, 1989). Thus health care financing has remained problematic for many would-be-patients especially in emergency and accident cases where deposits are required before care. The reduction of public spending on health care and the introduction of user fees has created problems of inaccessibility and inequity in health care.

To remove the financial barrier to health services, the government passed the National Health Insurance Act (Act 560) in 2003 aimed at abolishing "the cash and carry" system and limiting out of pocket cash payment at the point of service. The aim of the scheme is to spread the risks of incurring health care costs over a group of subscribers. The more the subscribers, the greater the pool of funds to support members when they require health care. It is also aimed at enabling Ghanaians get access to universal, equitable and acceptable quality health care. The scheme became operational in 2005 with access opened to subscribers who pay a premium based on their "incomes" and their dependents below age 18. The act stipulates that:

"Every person resident in Ghana other than a member of the Armed Forces of Ghana and the Ghana Police Service shall belong to a health insurance scheme licensed under this act."

Thus membership of a health insurance scheme is mandatory but nothing is being done to enforce it since its inception. Under this act, three types of health insurance are identified under the National Health Insurance Scheme (NHIS) namely District Mutual Health Insurance (DMHI), Private Mutual Health Insurance (PMHI) and Private Commercial Health Insurance (PCHI). The National Insurance Act (560) makes it mandatory for 2.5% of workers' (formal sector) social security contributions to be put into the National Health Insurance Fund as their contribution to the scheme. In addition, the individual and household contributions are supplemented by a 2.5% Health Insurance Levy on selected goods and services. As of December 2007, the National Health Insurance (NHIS) has registered 9.5 million people from both the formal and informal sectors, representing 47 per cent of the country's population (The Mirror, 2007). The insurance package covers about 95% of diseases in Ghana notably Malaria, Diarrhoea, Upper Respiratory Tract Infection, Skin Diseases, Hypertension, Diabetics and Asthma *inter alia*[35].

[35] Notable diseases excluded under the scheme are Optical aids, Hearing aids, Orthopaedic aids, Dentures, Beautification surgery, Supply of AIDS drugs, Chronic Renal Failure and Heart and Brain Surgery. It is assumed that these constitute only 5% of the diseases in Ghana.

It is worth noting that, under the "cash and carry system", health care for the under-five and adults over 70 years of age who patronize public health care facilities is "free". Be that as it may be, such free health care for the aged and under-five had been fraught with inconsistent policies and lack of funds to operationalise it (Ministry of Health, 2000). The exemption policy is in operation throughout the country but there is no universality in the interpretation of the guidelines for the exemption policy.

The funds for the exemption policy are usually allocated to the Ministry of Health in its annual estimates. The total funds provided for exemption in 1997, 1999 and 2000 were ¢3.2 ($1.6 million), ¢7.0 ($2.4 million) and ¢10 ($3.4 million) billion cedis respectively. The allocation of ¢12.6 billion ($2.3 million) in 2001 was fourfold the amount allocated for 1999 (Ghana Health Services, 2005)[36]. Despite the laudable nature of the exemptions policy it is fraught with some weaknesses.

Atim (2001) reports that government reimbursement to the respective regions and districts is often delayed. There is also the problem of uneven implementation leading to considerable variation within districts and between regions in the impact of the exemptions to target groups and health facilities. In addition, there is inadequate supervision and monitoring. On the demand side, there is inadequate information to the public about the exemptions. Perhaps the greatest contention on the effectiveness of this policy is the definition of "pauper". Besides, parents sometimes present their children over five years old in a bid to benefit from free health care. There are also reported cases of adults below 70 years presenting themselves for free medical care thus undermining the effectiveness of the policy and a diversion of focus from the target groups.

Women and their under-five children are relatively more vulnerable to health risk as compared to their male counterparts. It is highly hypothesized that participation or demand for health insurance initiated by women and particularly mothers will provide a safe haven in terms of health care delivery and consistent health care for their children. This chapter is motivated by two concerns. Firstly, what are the socio-economic and household characteristics of women who participate in health insurance and secondly to investigate the determinants of household insurance participation rate. To devise policies to enhance the

[36] The dollar equivalent was calculated using the average exchange rate for the respective years; (1997 = ¢2,000; 1999 =¢2,900; 2000 =¢2,900; 2001 =¢5,500).

utilization of health services among women, it is imperative to empirically ascertain the triggers of insurance participation and the factors that retard it so that counter policies could be formulated.

8.2 Conceptual Framework

Grossman (1972) posits that demand for health services is derived from demand for health and thus demand for health insurance is derived from demand for health services. In Besley (1991) framework, demand for health, health services and health insurance are premised on conventional economic theory of demand. Thus health is a commodity traded-off against other goods such as smoking. Individuals maximize their utility given a budget constraint of which health is a component contributing to utility. Better health is achieved by investing in goods that improve health.

Health insurance has important implications for the health and productivity of a country's workforce. An efficient and equitable health care system is an important instrument to break up the vicious cycle of poverty, ill health and pre-mature deaths. Among the earliest conceptualizations of health insurance is that of Erhlich and Becker (1972) who saw health insurance as a financial product that mitigates out-of-pocket expenditures and provides access to health care services, thereby improving the health statues of the insured. Greene and Trieschmann (1984) view health insurance as that insurance that provides indemnification for expenditures and loss of income resulting from loss of health. On the part of Atkinson and Dickson (2000), it is a policy that provides cover for hospital and other health care related expenses.

In a related definition, Conn and Walford (1998) describe health insurance as a way of paying for some or all of the costs of health care while Skipper (2000) considers it as any form of insurance whose payment is contingent on the insured incurring additional expenses or losing income because of incapacity or loss of good health. As a mechanism that pools the risks and resources of large groups of people together, health insurance offers benefits for the different constituents that it serves. Health insurance gives the individual contributor the assurance that he or she would have access to routine health care when the need arises and to plan for the unusual health costs. In recent times, health insurance remains a key factor in assuring individuals access to health care as each participant is protected from

financially disruptive medical expenses that may result from an illness or accident. For health care providers, it serves as a reliable source of payment while on the part of employers; health insurance can be used as a bait to induce current and would-be employees.

The twin problems of moral hazard and adverse selection can cause an otherwise efficient health insurance scheme to collapse. Moral hazard refers to the tendency for insured individuals to increase their consumption of health care (Arrow, 1985). On the demand side, two types of behavioural change may result from insurance; ex-ante and ex-post moral hazards. Ex-ante moral hazard refers to the reduced consumption of preventive care, or changes in lifestyle induced by ownership of health insurance, increasing the probability they will require more expensive curative services. For example, if as a result of being insured, an individual feels less concerned about the financial implications of falling ill, they may decide to forego certain preventive and health enhancing interventions. Reducing consumption of immunizations or increasing the consumption of cigarettes for example may significantly increase the risk of illness.

Cutler and Zeckhauser (2000) contend that ex-ante moral hazard is not a serious problem in that the full costs of not taking care of one's own health can never be fully compensated for by insurance as in the case of death or disability. Ex-post moral hazard refers to the increased consumption of health services once an individual has already fallen sick. On the supply-side, moral hazard may occur in the form of supplier-induced demand, where providers for example, may conduct more diagnostic tests on a patient than might otherwise be considered necessary with the view to increasing cost of medical care. The problem of adverse selection describes the tendency for only those who will benefit from insurance to buy it. Unhealthy people are more likely to purchase health insurance because they anticipated large medical bills.

The decision to insure or not has been widely considered in theoretical literature pertaining to insurance in general and in health insurance in particular (Arrow 1963; Propper 1989; Besley 1991; Besley, Hall *et al*. 1998; ; Beasley, Hall *et al*. 1999). The decision to insure is one of discrete choice, to purchase health insurance or not. A comparison of expected utility under insurance to expected utility under no insurance will inform the insurance decision (Besley, Hall *et al*. 1999; Propper 2000). The utility of having health insurance or not is influenced by expected medical consumption or probability of sickness. Arrow (1963) notes

that medical need is associated with uncertainty and demand for medical services is "irregular and unpredictable" and "affords satisfaction only in the event of illness".

Thus as Propper (1989) observes, health insurance can only be used in states of 'ill health". Hence, the utility of health insurance when sick is expected to be greater than when well. Certain individual and household characteristics are associated with a higher or lower risk of medical need. Based on the theory of adverse selection, it is expected that those with high risk vulnerability are more likely to insure. Hence, we might expect that those with poor health status or a chronic condition, the elderly (due to decreasing health), the presence of children (due to higher expected medical consumption) and females (due to expected future consumption related to birth) will all have a positive effect on the demand for health insurance.

8.3 Econometric Model

8.3.1 Binary Logit

An ideal economic formulation for analyzing binary discrete choice behaviour is the random utility model (Greene, 2003). The rationale of the random utility model is that a consumer faces a choice between two alternatives; in this case to demand health insurance or not. Each alternative chosen has an associated utility index describing the attractiveness of the alternative to the consumer. Although the utilities are unobservable, consumers reveal their preferences by choosing the alternative with the highest utility index. A prelude for appropriate and timely health seeking for women and their children is to demand health insurance.

The decision to insure or not can be specified as a function of observed individual characteristics such as income, age and educational level *inter alia* and other factors influencing the demand for health insurance. The individual's utility for each choice is unobserved but she reveals her preferences by choosing the alternative with the higher level of utility. Algebraically, the individual or household decision process can be expressed as follows;

$$EU_{ij} = f(M_{ij}, X_i) + \varepsilon \quad (8.1)$$

Where EU_{ij} is the utility that *i*th household expects to derive from choosing j^{th} health insurance option; $j = 1$ if a household has health insurance; $j = 0$ if a household has no health insurance. M_{ij} is a vector of insurance specific attributes and X_i is a vector of a household's socioeconomic characteristics plus a stochastic error term (ε). The latter component captures errors in model specification including omission of relevant variables and errors in data measurement.

The basic assumption underlying (8.1) is that the i^{th} household opts for health insurance if $EU_{i1} > EU_{i0}$, prefers no health insurance if $EU_{i1} < EU_{i0}$, and is indifferent between the two alternatives if $EU_{i1} = EU_{i0}$. Hence, the probability that i^{th} individual or household prefers to have insurance is $P_{i1} = P(EU_{i1} > EU_{i2})$. On the other hand, the probability that i^{th} household prefers not to have health insurance is $P_{i0} = P(EU_{i1} < EU_{i0})$.

The commonly used model when the dependent variable is dichotomous is the binary logit and probit models. The probit and logit models are indistinguishable from each other excerpt for their tails in which the logit has fatter tails (Gujarati, 2003). The choice between logit and probit models is largely one of convenience and convention, since the substantive results generated are indistinguishable (Long, 1997). The probit model was not used because of the nature of the variables used in the study since it assumes cumulative normal distribution. The logit model is preferred because it is computationally simpler.

To determine the probability that the i^{th} woman opts for health insurance, the functional form of the logit model can be expressed as follows;

$$p_i = \frac{1}{1+e^{-(x_i'\beta+\varepsilon_i)}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (8.2)$$

Where p_i represents the probability of the *ith* person enrolling in the health insurance scheme or not, x_i is the vector of explanatory variables; β is the parameters to be estimated and ε_i is the stochastic error term.

The logistic equation can be rearranged into a linear form by converting the probability into log odds or logit;

$$\text{logit}(p_i) = \ln\left(\frac{p_i}{1-p_i}\right) = x_i'\beta + \varepsilon_i \quad \text{..... (8.3)}$$

Logistic regression enables researchers to predict a discrete outcome such as the ownership of health insurance from a group of variables that may be continuous, discrete, dichotomous or a combination of these. The predictor variable in logistic regression can take any form because it makes no assumption about the distribution of the independent variables (they do not have to be normally distributed, linearly related or of equal variance within each group).

The explanatory variables were selected based on the study hypothesis, relevant general empirical knowledge and the needs of the model. In Ghana, the head of the household influences to a greater extent the demand for health care. Thus household head, educational attainment, household income, age, marital status alongside supply side variables such as nurse-per-population and the distance to the nearest health facility have been included. A novel feature of this study is the focus on maternal health insurance and the introduction of the supply side of health care demand. We expect that higher household income, age, marital status, and health input (nurse-per-population) will increase the demand for health insurance while distance to the nearest health facility will retard the demand for health insurance.

In the binary logit model, insurance premium is excluded for two reasons. Firstly, in the individual market, prices are often based on the individuals' characteristics, thus making the insurance paid by an individual endogenous (Blumberg and Nichols, 2001). Secondly, a measure of price (insurance premium) is unavailable for those not participating in health insurance.

8.3.2 Fractional Logit

The phenomenon of uninsurance from the viewpoint of the household is important for several reasons. The health of one household member can influence the health and well-being of the family as a whole. For example, an uninsured parent may delay seeking care and suffer debilitating ill health that hinders her job market participation or caring for children. Even if there is only one uninsured member, if that person has a serious illness or accident, it could generate medical bills that threaten the economic strength of the whole family. Within the family, parents make decisions for their children about seeking care. Whether and how

they use the health system for themselves may affect whether their children receive needed and timely care. Therefore, it is important to investigate the factors that influence the proportion of household members insured.

For given prices of all other commodities, P^c our model for the household participation rate is functionally formulated as follows:

$$y^c = f(\text{NPR, DISTANCE, } \nu)$$

Where y^c is the proportion of household members insured (holding all other prices with the exception of insurance premium constant).
NPR is nurse-per-population; DISTANCE is the distance to the nearest health facility where the insurance is tenable and finally ν is a vector of control variables including income, household size, insurance premium and household health risk captured by a dummy for hospitalization of a household member in the past six (6) months preceding the survey. The control variables were chosen with recourse to general empirical theory. At the household level, we expect that income, health input, household size and the number of children aged under-five will increase the participation rate while insurance premium and distance will hamper it.

Apparently, OLS estimations are not appropriate when the dependent variable (in this case the proportion of household members insured) is a ratio bounded between 0 and 1. Employing OLS on a fractional dependent variable would cause analogous problems as it does in the case of linear probability model for strict binary choices (Wooldridge, 2002). One obvious weakness associated with the use of OLS in this case is that predicted values of OLS estimates would not necessarily lie in the [0, 1] interval. One advantage that the fractional logit approach confers is that it accounts for possible non-linear relationship in the model.

An alternative approach of modelling dependent variables which are bounded between 0 and 1 is a logistic transformation where the log-odds ratios is modelled as a linear function of a set of independent variables and apply OLS or WLS. However, such procedure does not incorporate the limits 0 and 1. In addition, it is not possible to recover the predictions for the

dependent variable without some simplifying assumptions. In the case of the household participation rate model, the ratios are bounded between 0 and 1.

As proposed by Papke and Wooldridge (1996), an alternative to the OLS is the Generalized Linear Model (GLM) that makes use of quasi-maximum likelihood estimation procedures. The GLM is premised on the notion that a regression model can be decomposed into a random component with expected value and variance of the dependent variable, a systematic component that is predicted by covariates, and a link function that relates the systematic component to the random component. In the case of the classical regression models, the random component is assumed to be a normal distribution while the link function is an identity in that the random and systematic components are identical (McCullagh and Nelder, 1989). The advantage of using the GLM is that the normality assumption on the distribution of the random component could come from any function of the exponential family, and the link function could be any monotonic differentiable function (McCullagh and Nelder, 1989).

In our model, we have the dependent variable y_i^c and the vector of explanatory variables x, where $0 \leq y_i^c \leq 1$. Then for all *i*:

$$E(y_i^c) = \chi_i \beta \tag{8.11}$$

Thus the random component, $E(y_i^c)$, is expected to have a value of μ so that $0 \leq \mu \leq 1$. Unlike the linear regression model, the random component could have a distribution different from normal. However, it might have a normal distribution given that the mean of a binomial distribution, which is in the exponential family, falls between 0 and 1. Notably, the link function cannot be assumed to be identity because the systematic component ($\chi_i \beta$) does not ensure the condition that the random component, $E(y_i^c)$, lies between 0 and 1. Thus the link function that relates $E(y_i^c)$ and ($\chi_i \beta$) could be expressed as:

$$E(y_i^c \mid \chi_i) = G(\chi_i \beta) \tag{8.21}$$

Where G(.) is a link function satisfying the condition that $0 \leq G(.) \leq 1$.

It has been shown that Pseudo-Maximum Likelihood Estimators (PMLE) or Quasi-Maximum Likelihood Estimators are consistent as long as the likelihood function is in the linear exponential family and given that the link function (8.21) holds (Gourieroux *et al*, 1984). Papke and Wooldridge (1996) suggested the random component to be Bernoulli, its advantage lies with the ease in maximizing the likelihood function; and as a member of the linear exponential family, its quasi-maximum likelihood estimator is consistent. McCullagh and Nelder (1989) recommend that the canonical link function for a binomial distribution is the logit function.

Hence, if we employ the special case that $y^c_i \sim$ Bernoulli with a logistic link function, we have:

$$G(\chi_i\beta) \equiv \Lambda(\chi_i\beta) = \frac{e^{x_i\beta}}{[1+e^{x_i\beta}]} \tag{8.22}$$

The Bernoulli likelihood function is given by

$$f(y_i^c \mid \chi_i;\beta) = [\Lambda(\chi_i\beta)]^{y_i^c}[1-\Lambda(\chi_i\beta)]^{1-y_i^c}, \text{ where } y_i^c \in [0,1] \tag{8.33}$$

Transforming (8.33) we arrive at

$$L(\beta) = y_i^c \log[\Lambda(\chi_i\beta)] + (1-y_i^c)\log[1-\Lambda(\chi_i\beta)], \tag{8.44}$$

The QMLE procedure yields a consistent estimator with a conditional assumption on the variance. The assumption is that:

$$\text{var}(y_i^c \mid x) = \sigma^2 G(\chi_i\beta)[1-G(\chi_i\beta)] \text{ for some } \sigma^2 > 0 \tag{8.55}$$

The drawback though is that such an assumption on the variance for this particular mix of a Bernoulli distribution of random component with a logistic link function is restrictive as argued by Papke and Wooldridge (1996).

By synthesizing the GLM results and that of the quasi-maximum likelihood estimations, Papke and Wooldridge (1996) suggested the likelihood function to be Bernoulli with asymptotically robust inference for the conditional mean parameters if the assumption on the conditional variance fails in estimating fractional dependent variables. The Generalized Linear Model (GLM) has recently been used to model crop choice (i.e. land under cash crop in proportion to total land size) in Ethiopia (Nuru Ali, 2007).

8.4 Results and Discussion

8.4.1 Descriptive Statistics

Approximately 55 percent of the women respondents were insured in the National Health Insurance Scheme. This is not surprising since many women have taken advantage of the NHIS to enhance their health status especially expectant mothers through regular antenatal and post-natal cares.

Table 8.1: Reasons for not participating in Health Insurance (Women)

Reasons	Frequency	Percent	Comm. Percent
The premium is too high	18	7.50	7.50
Don't have money to pay the premium	143	59.58	67.08
I don't fall sick	12	5	72.08
Undecided	62	25.83	97.92
Don't Know	3	1.25	99.17
Other	2	0.83	100
Total	*240*	*100*	*100*

Source: own computation

The most pressing reason retarding participation in health insurance is poverty. This stems from the fact that only 7.5 percent of the respondents indicated that the premium is too high while an overwhelming 59.58 percent indicated that the problem had to do with their inability to pay (*see* Table 8.1). A quarter of the uninsured respondents were undecided about participating in the scheme although they may join in the nearest future. Interestingly, 5 percent of the respondents were not prepared to join the scheme because they consider themselves insusceptible to sickness. This implies that some education must be carried out to enlighten the public about the essence of health insurance.

Table 8.2: Means of Selected Independent Variables in the Demand for Health Insurance Equation (Women)

Variable	Insurance	Without Insurance	Overall (Means Test of Significance)
Population-per-Nurse	1169.64	1279.267	1219.0***
Distance to the nearest health facility	3.9814	5.4717	4.6524***
Residence (1=Rural)	0.5973	0.7333	0.6585***
Log of Household Income	7.2373	7.0426	7.1496***
Log of Household Size	1.4772	1.4354	1.4584
Primary Education	0.1365	0.1875	0.1595
Junior High	0.34812	0.3875	0.3658
Secondary+	0.1980	0.1208	0.1632
Married (1=Yes)	0.7645	0.6625	0.7186***
Employed in Agriculture (1=Yes)	0.2048	0.2083	0.2064
Age (20-24)	0.2389	0.2625	0.2495
Age (25-29)	0.2901	0.3208	0.3039
Age (30-34)	0.2218	0.1458	0.1876
Age (35-39)	0.1331	0.1208	0.1276
Age 40+	0.0819	0.0792	0.0807
Watches Television	0.4778	0.3708	0.4296***
Reads Newspaper	0.1092	0.0167	0.0675***
Listens to Radio	0.7372	0.7167	0.7280
Catholic	0.3652	0.1208	0.2927***
Moslem	0.1399	0.1167	0.1295
Traditionalist/Atheist	0.0921	0.1333	0.1107

Source: own compilation from Maternal and Child Health Survey 2007/2008, ****Significant at 1%, ** Significant at 5%* .

In the overall sample, the median household income was US$1521 with a standard deviation (STD) of US$509. The sub-sample of households with insurance had a mean income of US$1713.7 (STD=945) while those without insurance had a mean income of US$1285.7 (STD=590.6). The average household size in the overall sample was five members with a standard deviation of two. The sub-group with health insurance had an average household size of 4.7 (STD=2.0) while the uninsured had 4.5 (STD=1.86).

In terms of age, the group with health insurance had an average age of 29 (STD=6.9) as compared to those without health insurance with a mean age of 28.2 (STD =6.9). It is important to reiterate that the women in the sample are those within the fertility bracket of 15-49 years. The data had also been collected to investigate under-five mortality among the sampled women.

In terms of marital status, the mean for the overall sample was 0.718 (STD=0.45) while the insured sub-sample had mean of 0.765(STD=0.42). The uninsured sub-sample had a mean of 0.66 (STD=0.47). The average years of schooling for the entire sample is 6.4 years (STD=4.9) while those with insurance have a mean years of schooling of 6.7 years (STD=5) as compared to 6.2 years (STD=4.6) for those without health insurance.

8.4.2 Regression Results

To ascertain the characteristics of women that were more likely to participate in the National Health Insurance Scheme (NHIS), the logit model was employed reporting both coefficients and marginal effects. The model has a Pseudo R^2 of 0.13 and the Wald test of joint significance implies that the model is significant at the 1% level[37]. Pindyck and Rubinfeld (1981) have shown that an upper bound R^2 for binary-choice models is about 0.33, thus a Pseudo R^2 of 0.13 indicates a good fit.

[37] .In addition, a Link test performed on the model indicated that the model is correctly specified. Thus the logit of the outcome variable is a linear combination of the independent variables. Hence, we reject the null hypothesis of model misspecification.

Table 8.3: Results for Participation in Health Insurance (Women)

Variable	Coefficient (Rob. Std. Err)	Marginal Effects
Population-per- nurse	-0.0012(0.0003)***	-0.0003
Distance to the nearest health facility	-0.0419(0.0183)	-0.0103
Residence (1=Rural)	-0.2074(0.2294)	-0.0506
Log of Household Income	0.5557(0.1363)***	0.1364
Log of Household Size	-0.2807(0.3158)	-0.0687
No education (Ref. Category)	-	-
Primary Education	-0.5314(0.3134)*	-0.1318
Junior High	0.0302 (0.2736)	0.0074
Secondary+	0.1714(0.323)	0.0417
Married (1=Yes)	0.4557(0.2244)**	0.1126
Mortality rate per mother	-0.0928(0.6232)	-0.0228
Employed in Agriculture (1=Yes)	0.4162(0.2784)	0.0910
Age (15-19) (Ref. Category)	-	-
Age (20-24)	0.5798(0.4882)	0.1379
Age (25-29)	0.3212(0.4855)	0.0779
Age (30-34)	1.0131(0.5070)**	0.2287
Age (35-39)	0.5918(0.5361)	0.1384
Age 40+	0.8476(0.2295)***	0.1488
Watches Television	0.5930(0.2382)***	0.1436
Reads Newspaper	1.4541(0.5287)***	0.2924
Listens to Radio	-0.1482(0.2522)	-0.0362
Other Christians (Ref. Category)	-	-
Catholic	0.9335(0.2605)***	0.2178
Moslem	0.5321(0.3177)*	0.1253
Traditionalist/Atheist	0.3011(0.3575)	0.0724
Constant	-2.8989(1.5326)**	-
Log pseudolikelihood = -318.70 Number of obs = 531 Wald chi2(23) = 85.15*** Prob > chi2 = 0.0000 Pseudo R^2 = 0.13 Area under ROC curve = 0.73		

*Significant at 1%, **: Significant at 5%, *: Significant at 10%.*

Following from the rule that the number of dummies be one less than the number of categories of the variable for which the dummy is being created, three dummies are introduced for religious denomination, four dummies for the five categories of age and three for education. The omitted group serves as a base or reference category by which comparisons are made **(**Gujarati, 2002).

Demographic factors

The demographic factors considered in this model are different categories of age and household size. In our model, women aged between 30-34 and over 40 years are more likely to participate in health insurance. These variables are statistically significant at the 1% and 5% levels respectively. Women aged over 40 years (menopausal range) have higher health risk as compared to their counterparts in the other age ranges. Economic theory postulates that as individuals advance in age, their inherited health stock depreciates at an increasing rate thus inducing increased health investment including that of health insurance (i.e. morbidity increases with age).

This corroborates Grossman's (1972) findings that because the health stock depreciation rate increases with age, it is likely that unhealthy (old) people will make larger gross investments in health than healthy and younger people. The household size variable had the expected negative effect but insignificant on the likelihood of participation in health insurance. Kirigia *et al*. (2005), Msuya *et al*. (2004) and Juetting (2003) reported robust negative effect of household size on health insurance.

Spatial

The spatial variable introduced into the model is the area of residence; rural or urban with the dummy coded for rural residents. Although the coefficient has the expected sign there is no discernible statistical relationship between the variable and the probability of insurance.

Economic factors

The two economic variables investigated are income (proxied by the log of total household consumption expenditures) and occupation status (in this case women engaged with agriculture). We logarithmically transformed the income variable in order to reduce its distribution skewness (Baernighausen, *et al*. 2007). The coefficient of the income variable

has the expected sign in the woman's participation model and statistically significant. Income is expected to induce higher demand for all goods that are not inferior goods and there is no evidence to suggest that health insurance is an inferior good. A one percentage point increase in income is likely to increase the probability of insurance ownership by 14 percentage points. The occupation of the woman had no discernible impact on the propensity to insure.

Social factors

The social factors are the educational levels and marital status. Firstly, we introduced a continuous variable for the number of years of education (educational attainment) and afterwards introduced various blocks of education with "no education" as the reference category. We found the educational attainment variable as highly significant but had unexpected negative association with health insurance ownership. This might suggest that additional years of education reduce the demand for national health insurance. The categories of education (dummies) provide more insight in that those with primary education are less likely to demand health insurance as compared with no education (reference category). However, for those with Junior high education and beyond, the coefficients have the expected positive sign in the participation equation but insignificant. Women with secondary and post-secondary education are more likely to be employed in formal sectors where there exist company sponsored health care schemes hence the insignificant association with the national health insurance ownership. The usual problems of long queues, congestion, woefully inadequate medical staff and pharmacies without drugs in public health facilities make company sponsored health schemes a better option.

Marital status had a significantly positive effect on the demand for health insurance. This finding is corroborated by Kirigia *et al* (2005), Rhine *et al* (1997), Liu and Chen (2002) and Harmon and Nolan (2001). In Ghana's NHIS, children under-18 years, whose parents or guardians pay their own contributions, are exempted from paying any contribution. Thus married couples may demand insurance in order to protect their children and also tend to be more averse to the risk of devastating health expenditures (Harmon and Nora, 2001).

Religious factors

Three religious dummies have been explored to investigate their empirical significance in terms of health insurance ownership. The reference category is "other Christians". Two of the three dummy variables were statistically significant namely Catholics and Muslims. There was however, weak statistical significance between women who were Moslems and insurance ownership. For instance, if "other Christians" were to be converted to Catholicism, their probability of demanding health insurance will increase by 22 percentage points. Juetting (2003) also found a statistical relationship between Catholicism and health insurance participation in Senegal. This is not surprising since the idea of District Mutual Health Insurance was initiated by the Catholic Church in Ghana. In fact, mutual health insurance scheme in Ghana (for instance, the East Gonja and the Nkoranza schemes) which has now been incorporated into the NHIS is a brain child of the Catholic Church.

Access to health information (Media)

Access to TV, radio and Newspapers are used as proxies for health information as these media provide avenues for health education. The respondents were asked their sources of health related information of which radio is the largest source. In the model, three dummies are introduced for women who watch Television, listen to radio and read Newspapers. The coefficients for Television and Newspapers were found to be positively and statistically significant at the 1% level. The marginal effect for TV variable implies that if non-TV "watchers" were to watch TV, their likelihood of being insured will increase by approximately 14 percentage points. This might imply that Television and print media are better media for health education as compared to radio.

Community factors

Supply side variables have been neglected in most studies on health insurance. Two supply side variables "nurse-per-population" and "distance to nearest health facility" (accessibility and proximity) have been introduced to ascertain their statistical significance. These target variables have the correct sign and are statistically significant at, at least the 5% level. However, the signage of the health input variable (nurse-per-population) must be interpreted with tact. This variable was measured as the population in a given district divided by the number of nurses. Thus an increase in the ratio denotes a deterioration of the health input situation, holding other factors constant. Therefore, the negative sign implies that a reduction

in this ratio will increase the demand for health insurance which is the hypothesized relationship. In addition, distance to the nearest health facility had the hypothesized sign indicating that fewer women will demand health insurance if health facilities are farther away from their residents. Thus accessibility of health care will encourage demand for health insurance.

Table 8.4: GLM Estimation of Household Participation Rate

Variable	**Coefficient (Rob. Std. Err)**	**Marginal Effects**
Population-per-nurse	-0.0009(0.0003)**	-0.0001
Distance to the nearest health facility	-0.0393(0.0194)**	-0.0042
Residence (1=Rural)	-0.0996(0.2258)	-0.0105
Premium Paid	0.0411(0.0146)***	0.0044
Log of household income	-0.2013(0.1866)	-0.0215
Log of household Size	-1.5075 (0.3629)***	-0.1607
Children <5yrs	0.7445(0.2044)***	0.07937
Age of household head	0.0426(0.0503)	0.0045
Age Squared	-0.0006(0.0004)	-0.0001
Years of schooling of the head	-0.0527(0.0173)***	-0.0056
Female headed household (1=Yes)	0.0294(0.2425)	0.0031
Hospitalization (1 =Yes)	0.1257(0.2112)	0.0132
Piped into residence (1=Yes)	0.0276(0.2587)	0.0029
Clean toilet facility (1=Yes)	0.3304(0.1868)*	0.0352
Clean cooking fuel (1=Yes)	-0.6967(0.2225)***	0.0029
Constant	4.8865 (1.5717)***	
Log Pseudolikelihood = -84.23 Number of observations = 284 AIC =0.7058 BIC = -1444.87		

Significant at 1%, **: Significant at 5%, *: Significant at 10%.

Table 8.4 presents the results for the household participation rate in health insurance. Household size was found to be inversely and statistically significant. This might be due to the intuition that, at the household level, holding income constant, an increase in size will reduce per capita income and hence less members will participate. In addition the presence of children below five-years in the household is a significant predictor of household health

insurance participation (see also Chatterjee, 2009). Unexpectedly, income is not a significant determinant of household collective insurance decision.

The quantity demanded of any economic good is primarily a function of its price, in this case the insurance premium for one year. Economic theory postulates an inverse relationship between "price" and the quantity demanded. Contrary to expectations, the insurance premium is positively and significantly related to household insurance decision, regarding the number of its members to participate. Such outcome is difficult to explain since it defies economic theory. This might be due to the fact that the premium is indexed to the cost of treatment and thus as the cost of treatment increases, the demand for health insurance is likely to increase, without recourse to "price". Another probable reason for this finding is that the premium is not a function of one's income *per se* and perceived health risks (*not yet inculcated in the NHIS scheme*) but based on perceived economic status, which is very difficult to measure in a developing country such as Ghana. This might suggest the presence of adverse selection in the NHIS, in that wealthier households may be willing to insure if the price of the premium is adjusted to account for the increasing cost of health care.

In addition, educational attainment of the head is statistically significant and inversely related to the number of household members insured. This might be due to the fact that highly educated household heads tend to utilize private or work based insurance schemes. The age of household head and its squared had the expected signs but were insignificant.

Three other socio-economic variables were introduced at the household level; access to piped water, clean toilet facility and clean cooking fuel to ascertain the effect of health risk factors on household participation in health insurance. It is envisaged that households with access to clean water, cooking fuel and toilet facilities are less susceptible to ill health and thus might demand less health insurance. We find no significant relationship between households with piped water and the proportion of household members insured. However, access to clean cooking fuel decreases household participation rate by 3 percentage points while access to clean toilet facility increases the participation rate by 4 percentage points. Thus the effect of health risk factors on household participation rate is mixed.

Our target variables; nurse-per-population and distance have the correct sign and are statistically significant at, at least the 5% level. While the magnitude of the marginal effect of nurse-per-population is somehow negligible, that of distance is relatively robust, indicating that distance reduces the proportion of household members insured by 5 percentage points.

We had previously hypothesized that income, distance and nurse-per-population have no discernible effect on health insurance demand. For the women participation equation, income ($t = 4.1$), distance ($t = -2.3$) and nurse per population ($t = -4.0$). The rule of thumb is that: reject the null hypothesis ($H_0:\beta_i=0$) provided the calculated t-value, t_k is greater than the critical t-value, t_c, insofar as the sign of t_k is the same as the sign of the coefficient implied in the alternative hypothesis ($H_A:\beta_i\neq0$). Otherwise, the null hypothesis (H_0) that the estimated regression coefficient of interest is not significantly different from zero holds. In our case, the coefficients of income, nurse-per-population and distance are statistically significant at the conventional 5% level and the computed t-values, t_k are greater than the critical t-value, t_c (1.960, based on a two sided test). Therefore, we reject the null hypothesis and conclude that the coefficients are significantly different from zero and that the variables are important in explaining the demand for health insurance. Therefore, we reject the null hypothesis that the supply side via health input has no effect on health insurance. However, for the household participation rate, distance ($t = 2.03$) and nurse-per-population ($t = -3.0$) are consistently different from zero but income ($t = -1.1$) proved insignificant[38].

[38] The T-test which is a basic test for testing hypothesis is derived by dividing the value of the coefficient of interest by its standard error.

8.5 Limitation

Since the data was collected mainly for studying mortality and health (treatment) seeking behaviour among under-five children, insurance specific attributes such as health rating, the presence or otherwise of chronic diseases and behavioural attributes such as alcohol consumption and smoking were left out. In the health insurance participation model, different categories of ages were used to approximate health ratings. The women's BMI were used as proxies though did not prove significant. In the household insurance participation rate, a dummy for a household member having being hospitalized for the past six months preceding the survey was used as a proxy for the household's health risk (shock).

However, omitting insurance specific attributes such as the quality of care, alcohol use and smoking can lead to a possible specification or omitted variables bias. Omitting such important regressors can change the estimated coefficient away from the true value of the population. Therefore, the interpretations and conclusions drawn should be done with these anomalies in mind.

8.6 Conclusion

This chapter has primarily investigated the determinants of health insurance among a cross section of Ghanaian women aged 15-49 and determinants of household participation rate (insurance intensity). Although there is a depth of studies on health insurance in Africa and Ghana in particular following the popularization of Mutual Health Insurance schemes in the 1990s, focusing on women in the fertility bracket has not been accorded attention. In addition, community and supply side factors have not been explored.

The paper reveals that the most significant determinants of a woman's propensity to insure are marital status, income, age, religion and access to Television and Newspapers (proxies for health information). Conversely, variables that negatively and significantly retard women's participation in insurance are household size, education, occupation, distance and public health input (nurse-per-population). On the household participation rate, variables that proved significant in increasing the participation rate are the premium and the presence of under-five children in the household. Conversely, household size, education of the household

head and distance to nearest health facility decrease the number of household members insured.

Following from the study findings, the paper recommends that promoting access to health information via television will improve maternal and child health since it triggers the demand for health insurance among women. Larger household size still poses an impediment to household welfare and insurance participation. It is therefore, imperative to sustain the current campaign on family planning and ideal family size. Larger family size leads to poverty and retards households' ability to demand health insurance. To save the scheme from collapsing, the management should devise means to actuarially determine the premium.

Barring the pricing aspects of health insurance, there is the need to explore the possibility of compulsory insurance through income transfer to the poor. After all, the National Health Insurance Act (560) stipulates compulsory insurance. Although the social arguments for and against compulsory enrolment are based on other considerations rather than positive economics, it can be used as a policy tool to ensure the health of women in the fertility bracket and their children alike.

CHAPTER NINE

CONCLUSIONS AND POLICY RECOMMEDATIONS

9.1 Introduction

The essential role of the state in health care is to provide public goods such as road infrastructure; to regulate health care and health insurance and to offer safety net for the poor and vulnerable in society including children aged under-five years and women in the reproductive bracket. Good health itself, together with preventive and curative interventions exert strong positive externalities, causing market failure in the provision of health care and hence, justifying state participation in health care. In a developing country such as Ghana, the market for private health care is underdeveloped and relatively expensive; hence the government owns over 50% of health facilities and also subsidizes the operation of private and mission health facilities. Governments' intervention in the health care market is also justified on the grounds that health is a merit good and that the ensuing social benefits exceed private benefits. The government of Ghana has in place a free health care policy for children aged under-five and adults over 70 years but its implementation is fraught with difficulties, the prominent of them being finance. In order to promote the demand for affordable and appropriate health care, the government introduced a National Health Insurance Scheme in 2005.

This study has shown that Ghana's under-five mortality rate is high and that there is the need to examine the factors influencing the menace to help inform policy. The study argues that access to appropriate health care can help reduce the high mortality rate. In this regard, self-treatment, faith healing and buying over-the counter drugs with its concomitant effects should be discouraged in favour of allopathic care. It has been observed that approximately 47% of mothers or care givers resort to inappropriate health care as the first remedy during childhood morbidity and only make use of appropriate health facilities when their children's health condition is already deteriorated. An important health policy which will serve as a catalyst in the demand for appropriate health care is access to health insurance. If women in the reproductive age could have access to health insurance, it will promote the utilization of appropriate health care and reduce fatal outcomes. Following this logic, this thesis looked principally at three empirical chapters regarding child and maternal health care and health

seeking behaviour. In chapter five, we investigated the key factors driving Ghana's under-five mortality in the context of a duration model with and without unobserved heterogeneity. In chapter six, we presented both descriptive and empirical findings as regards the choice of health care provider conditional on childhood morbidity. Chapter seven which is a follow-up on chapter six is concerned with unravelling which health provider confers the greatest satisfaction to health care users. In the eighth chapter, we investigated the factors influencing the health seeking behaviour of the mothers via ownership of health insurance.

9.2 Conclusions

In our child mortality model, pre-delivery and post delivery bio-medical health inputs such as utilization of antenatal care services, childhood vaccinations and use of insecticide treated bednets were found to be statistically significant and crucial in mitigating under-five mortality in a developing country such as Ghana. Our finding also shows that multiple pregnancies and deliveries pose a higher risk than single deliveries. Distance to the nearest health facility had the a priori positive association with mortality but the effect is not robust. This might indicate that the effect of distance on mortality is attenuated by the other covariates in the mortality model. More importantly, health inputs such as nurse-per-population and health infrastructure captured by asphalted roads have the tendency to reduce under-five mortality. These variables were consistently significant in explaining under-five mortality and health seeking behaviour.

However, in the mortality model, we found that biomedical health inputs: utilization of antenatal care services, ITNs and childhood vaccinations were more robust than our target variables namely road infrastructure and nurse-per-population. For instance, whereas road infrastructure reduces the average hazard of under-five mortality by approximately 1%, childhood vaccination and utilization of antenatal care services reduce same by approximately 60% and 26% respectively. Our results support the Mosley-Chen proximate determinants framework in which social and economic factors are considered to mediate the more important biomedical factors in explaining childhood mortality.

In order to make significant progress towards the MDG target of reducing under-five mortality by two-thirds by 2015, Ghana needs to accelerate its interventions earmarked for combating the menace. At the current level, if we assume a linear trend from 1995-2003

period and using the marginal gains as the basis for projection, it is highly improbable, that the MDG target of 44 child deaths per 1000 live births can be achieved by 2015 (Appendix-Table 1; see also ISSER, 2004).

From our empirical analysis, household income was found to be positively and significantly related to the demand for private medical care. In fact, the effect of income on private medical care is non-linear. At initial income levels, less private care will be demanded but as income increases, the demand for private medical care increases. It is also evident that treatment cost, waiting time, gender of child, age of child, type of disease and maternal insurance status among others influence the choice of a health providers. In addition, availability of hospital beds is a significant predictor for the demand for appropriate health care. Our finding shows that there might be probable sex discrimination in parental health seeking behaviour in that girl are less likely to receive appropriate care and more likely to die compared to boys. However, further research needs to be undertaken in order to affirm such conclusion. Our result also demonstrates that while faith healing/traditional medicine is prevalent in Ghana, it is not popular in the treatment of childhood ailments such as diarrhoea and malaria. Female headed households are less likely to resort to self treatment relative to male headed households, indicating that women might attach more importance to the health of their children. The empirical results is coterminous with our qualitative findings where users of inappropriate care cited distance and cost as some of the main reasons why they resort to self-treatment, buying-over the counter drugs and faith healing.

In terms of health care quality, it is apparent that consumers of private health care are more satisfied than consumers of alternative health providers. Hence, health care consumers disregard the high cost of private medical care in order to enjoy quality care. Other variables that were found to significantly influence health care satisfaction were access to media, proxied by television; gender of child, waiting time, distance, maternal education and marital status among others. Our results also indicate that rural residents are less likely to be satisfied with health care providers, signifying that rural dwellers are confronted with low quality health care. In particularly, women with secondary education or better are more likely to be dissatisfied with health care services. From our qualitative results, lack of drugs (32%), congestion at the health facility (27%) and “no doctor present” at the time of visit (20%) were the major reasons for dissatisfaction with allopathic health care providers.

We established a significant positive relationship between income and women's propensity to undertake health insurance. The relationship between income and health insurance ownership among women was also confirmed qualitatively where the uninsured mothers attributed their inability to enrol (approximately 60%) to lack of financial wherewithal. Strikingly, we observed that there is a differential impact of income on household decision to enrol a female household member (in this case a woman with under-five child) and collective household decision. While household income is important in enrolling mothers with children aged under-five, same cannot be said of the collective household insurance decision. Instead, socio-economic variables such as number of under-five children, household size and premium are significant determinants of household collective insurance decision. The empirical research concluded that there was no demonstrable evidence that either income or hospitalization of a household member significantly impacted the proportion of household members insured in a health insurance scheme. In particular, the result indicates that household size decreases the propensity to insure the household by 16 percentage points. This finding signifies the need for a strong population management policy to reduce the current rate of growth.

This study has contributed to the general empirical literature on childhood mortality and health seeking behaviour. In general, our result is consistent with literature. However, we also found conflicting results such as the positive association between income and under-five mortality on one hand and insurance premium and household participation rate on the other. The strength of the thesis is in the inclusion of variables such as hospital beds, number of health workers and road infrastructure *inter alia* in the mortality and health seeking models.

9.3 Policy recommendations

Based on the study findings and Ghana's quest to meet the MDG's related to health we make the following recommendations:

(i) One of the key findings from the study is that improvement in road infrastructure promotes demand for modern health care. Road infrastructure not only provides spillover effects for trade and other economic activities but also promote the demand for health care. Granted that only 15% of the entire road network in Ghana is asphalted, there is the need to expand and improve road infrastructure to serve as a catalyst in the demand for appropriate

health care. Since private sector participation in road infrastructure is non-existent at the moment, it is incumbent on the government to tighten revenue collection on the few toll-roads, while new roads should be demarcated for tolling to help generate revenue to repair existing road network and construct new ones. In addition, the revenues accruing from the road fund levy, which is an integral component of petroleum pricing formula, should be managed prudently. The current trend of relying on external donors for infrastructural development is not sustainable in the nearest future.

(ii) A careful examination of health policy in Ghana shows that, there is lack of synergy between road infrastructure and improvement in health care or yet still better health outcomes. It is about time that public health policies incorporated improvement in road infrastructure as a key health policy. Since the transport sector is primarily privately operated, transport owners will hardly ply bad roads in that it results in longer travel times and higher vehicular operation cost. The effect of which is to severe the barrier to health care for residents in the remotest part of the country. This is against the background that just about 5% of the population have their own means of transport, the majority of whom live in the urban areas. Once such synergy is recognised, the government through its agencies will give priority to maintenance, improvement of existing road infrastructure and the construction of new routes.

(iii) Physical distance to health facilities is an indicator of access to health services. At the moment, only 40% of Ghanaians (37% in our study) have access to health services, where access is defined for persons living in households with health facility less than 30 minutes away (GSS, 2003). Besides, rural dwellers are the most disadvantaged in terms of access, thus questioning the fairness in the distribution of health facilities across the country. Consequently, public health policy should be geared at increasing primary health facilities in the remotest parts of the country. In this direction, it is suggested that, a fraction of the Health Insurance Levy of 2.5%, which is a component of the 17.5% Value added Tax, could be lodged in a special account to improve rural health infrastructure.

(iv) Per our empirical results, as health workers (nurses, doctors etc) increase, the demand for self-treatment falls in favour of private and public health care. However, the current levels of health inputs via health personnel such as nurses and doctors are woefully inadequate in proportion to the population even when compared with other sub-Saharan

African countries. Our empirical results provide a prima facie case for the need to establish more medical and nursing training schools, to provide quality medical education to improve physician-patient ratio. In this light, the recent establishment of the School of Medical Sciences in Cape Coast and School of Medical and Health Sciences in Tamale is laudable. It is important, however to tread cautiously, so that numbers are not sacrificed for quality. It is incumbent on the school administration to source, appoint and retain competent faculty to bring the new schools to established medical norms and standards. At the moment, there is no private sector participation in medical education in Ghana. The government can encourage private sector participation by providing tax incentives to private universities that engage in medical education.

(v) Innovative ways of financing health care through health tourism could be explored. With consistent policy to develop health infrastructure and logistics over time, Ghana can become a haven for health tourism in the ECOWAS sub-region, which is otherwise characterized by poor health facilities and political instability. With well equipped health facilities coupled with stable political environment, Ghana can provide health care to its neighbours to generate foreign exchange which could be reinvested in the health care system and to subsidize domestic cost of health care for the needy and vulnerable such as women and children aged under-five years.

(vi) According to our econometric estimation, consumers rate private health care as more qualitative than public health care. Although public health care is highly subsidized, it is imperative that policy makers make frantic efforts to adequately equip public health facilities to provide quality health care. Often public health facilities are characterized by lack of essential logistics such as X-ray Machines, hospital beds and lack of essential drugs *inter alia*. Health care policy makers should adequately address this anomaly in order to increase the demand for public health at the expense of self treatment and faith healing.

(vii) Public health policies should focus on low cost but effective interventions such as the utilization of antenatal care services, childhood vaccinations and the utilization of insecticide treated bednet in the quest to achieve significant reductions in under-five mortality. To this end, pragmatic efforts should be exerted to increase nationwide immunization coverage in order to achieve significant reductions in under-five mortality. If Ghana were to make the MDG mark in reducing under-five mortality by two-thirds by 2015, then there is the need to

intensify the campaign on the importance of pre-delivery and post-delivery biomedical health inputs utilization. This is especially so since socio-economic factors only mediate to influence the utilization of these services.

(viii) To help implement to the fullest, the free medical care policy for under-five children, the aged and expecting mothers irrespective of insurance statuses, accruals from debt relief following Ghana's subscription to the Enhanced Highly Indebted Poor Countries initiative could be channelled into financing some of the burden of the scheme. While such a policy is laudable, its effective implementation and sustainability leaves much to be desired given that it is characterized by financial and institutional weaknesses. Proper mechanisms such as birth registration and certification could be encouraged to help identify the target population; under-five children, the aged and the 'needy' to save the policy from blatant abuse.

(ix) To ensure the sustainability of the recently introduced National Health Insurance scheme, appropriate instrument should be put into place to actuarially determine the premium so as to save the scheme from collapsing. This is against the backdrop that the current levels of premium are devoid of health status precipitating the problem of adverse selection and undue public subsidy of the scheme. The proposed one-time payment being considered for implementation by the government of the National Democratic Congress should be given an academic thought. Even, the most developed countries in the world could hardly practice a one-time premium payment. This is against the backdrop that Ghana's current NHIS does not incorporate health status or state of health into the premium charged. If the one-time premium is eventually implemented, it might lead to a further decline in the quality of health care given that the current system is undermined by inadequate health workers and other medical logistics.

(x) Given that malaria is widespread among children, the current campaign on the utilization of Mosquito Treated Bed-Nets (MTN) should be sustained and intensified. Although access to MTN for pregnant mothers and children is free at Child and Maternal Health Clinics, a quarter of the children sampled are not utilizing MTNs. To this end, socio-cultural norms that discourage the utilization of medical services should be combated through educational campaigns.

(xi) Since health is a merit good, it is onerous on the government to persuade the citizenry to demand appropriate health care. While parents have the right to choose the type of treatment option for their children, the children also have a fundamental right to appropriate health care. After all, the children's Act, 1998 (Act 560) calls for respect for the principle of "the best interest of the child" when decisions that affect children's lives are being taken. In many instances, parents or caregivers who resort to self treatment and other unorthodox treatment options, refer their children to appropriate health facilities only when their conditions have already deteriorated. It might be imperative if public health policy could address such anomaly by making appropriate health care an inalienable right of children via legislative instruments.

9.4 Summary of Study Limitations

In the childhood health seeking behaviour model, covariates such as severity of illness were not captured which might biased the empirical results. Also, the demand for health insurance model did not incorporate health status and other insurance attributes. It is also important to note that these variables even when they are included are highly subjective and usually captured by dummies based on the responses of the subjects. Measurement errors and information asymmetry are prevalent in studies of this nature given that parental or caregiver's recall of the five year cohort over which the under-five mortality model was estimated could be misleading. The data might suffer from probable recall bias because of the time frame and poor record keeping. Under-reporting of deaths by rural women cannot be ruled out, especially at the neonatal stage. Similarly, inclusion of deaths outside the period of investigation (2002-2007) cannot be overlooked due to recall bias. The results and findings must be interpreted in the context of these weaknesses. However, these limitations by no means invalidate the findings of the study.

9.5 Areas for Future Research

In the current study, the health seeking behaviour of parents conditional on childhood morbidity was studied without regard to specific diseases, barring the introduction of dummies for malaria and diarrhoea. In the nearest future, further research focusing on children but from the point of view of disease specific health seeking will be imperative and innovative. In addition, there is scant or non-existing literature on quality of health care and

health care satisfaction in the Ghanaian health delivery system. Hence, satisfaction with specific health care attributes such as pre-treatment waiting time, consulting time, cleanliness of the premises, availability of drugs and friendliness of the medical personnel *inter alia* need to be investigated further.

Moreover, nutrition plays an important role in child health, however, due to lack of data on nutritional status of the children; usually measured by three key anthropometric indicators: stunting (short for their age), wasting (underweight relative to height) and underweight (relative to age), it was not incorporated into the analysis. The empirical relationships between child nutritional status, public and community factors warrant further investigation using large scale data such as Demographic and Living Standard Surveys. Lastly, using Demographic Health Surveys to create Pseudo panel will help unearth the dynamics of under-five mortality in Ghana. With such large data set, the study could be disaggregated into covariates of neonatal, post neonatal, infant and under-five mortalities to facilitate comparison and help prescribe policies for the various stages of mortality. Regarding the National Health Insurance scheme, it is recommended that a thorough study be conducted on the relationship between insurance ownership and health care utilization (frequency) to help devise financial sustainability interventions.

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APPENDICES

Appendix-Table 1: Regional Trends in Infant and Under-five Mortality rates-Ghana (1988-2003)

Region	Infant Mortality Rates (IMR)				Under-five Mortality Rates (U5MR)			
	1988	1993	1998	2003	1988	1993	1998	2003
Western	76.9	76.3	68.0	66.0	151.2	131.8	109.7	109.0
Central	138.3	71.6	83.8	50.0	208.2	128.0	142.1	90.0
Greater .	57.7	58.4	41.4	45.0	103.8	100.2	62.0	75.0
Volta	73.5	77.8	53.8	75.0	132.7	116.4	98.0	113.0
Eastern	70.1	55.9	50.2	64.0	138.1	93.2	89.1	95.0
Ashanti	69.8	65.2	41.9	80.0	144.2	97.6	78.2	116.0
Brong A.	65.0	48.7	77.3	58.0	122.6	94.6	128.7	91.0
Northern	103.1	113.7	70.1	69.0	221.8	237.0	171.3	154.0
Upper East	103.1	105.0	81.5	33.0	221.8	180.1	155.3	79.0
Upper West	103.1	84.5	70.6	105.0	221.8	187.7	155.6	208.0
National	**81.3**	**74.7**	**61.2**	**64.0**	**153.8**	**132.8**	**110.4**	**111.0**
Rural	86.8	82.2	67.5	70.0	162.5	149.2	122.0	118.0
Urban	66.9	54.9	42.6	55	131.1	89.9	76.8	93

Source: DHS 1988, 1993, 1998, 2003

Appendix-Table 2: Comparison of Infant, Under-five and Maternal Mortality

Year	Ghana	Sub-Sahara Africa	Developing Countries	Industrial Countries
Trends in Infant Mortality (per 1,000 live births)				
1960	132	166	149	39
1970	111	137	111	20
1989	87	108	76	18
1990	76	106	74	13
1991	84	103	71	14
1994	79	97	64	14
1995	73	92	60	7
1997	68	105	64	6
2000	72	-	-	-
2003	64*	105	60	5
2006	76	94	54	6
Trends in Under- five Mortality (per 1,000 live births)				
1960	224	284	233	46
1970	186	225	170	26
1989	143	199	116	23
1990	140	175	112	18
1995	116	157	88	9
1997	107	169	94	7
2000	112	162	115	7
2003	111	171	88	6
2005	112	163	82	6
2006	120	157	79	6
Trends in Maternal Mortality in Ghana (per 100,000 live births)				
1980-1987	1,000	540	290	24
1988	700	690	420	26
1990	740	971	471	13
2000	540	916	444	13
2005	560	902	440	10

Source: African Development Indicators (World Bank), various issues
Social Indictors of Development (World Bank), various issues
Human Development Report (UNDP), various issues
World Development Indicators (2005), World Bank(2009)

Appendix-Table 3: Mortality Estimation by Cox Proportional Model

Variable	Hazard Ratio	Robust St. error	z
Population-per-nurse	0.9990**	0.0044	-2.12
Asphalted road (km)	0.9972	0.0020	-1.29
Distance to the nearest health facility	1.0194	0.1761	1.11
Sex of Child (Girl=1)	1.7722**	0.4636	2.19
Child is Twin (1=Yes)	2.8124***	0.9808	2.97
Low Birth weight (1=Yes)	1.3445	0.5433	0.73
Child Sleeps under ITB (1=Yes)	0.4141***	0.1070	-3.41
Total Childhood Vaccinations	0.6010***	0.0296	-10.34
First Order Birth (1=Yes)	0.6504	0.2197	-1.27
Birth Order > 4 (1=Yes)	3.0183**	1.3873	2.40
Antenatal care (No. of times visited)	0.8051***	0.0496	-3.51
Mother's age	0.9307	0.2110	-0.32
Mother's age squared	1.1590	0.5248	0.33
Parent's Mean Years of Education	0.9896	0.0171	-0.60
Household size	0.7423***	0.0816	-2.71
Log of Household Income	1.3210	0.4779	0.77
Piped into Residence (1=Yes)	1.1958	0.3582	0.60
No. of sample 771			
No. of death 92			
Log likelihood -449.95			
LR $Chi^2(17)$ 258.02***			

Appendix-Table 4: Results for Multinomial Logit Model (reference category is Public health care)

Variable	Private	Faith Healing	Pharmacy	Self Treatment
Asphalted road (km)	0.0138(0.0051)***	-0.0008(0.0043)	0.0015(0.0038)	-0.0052(0.0052)
Hospital bed-per-population	0.0006 (0.0002)***	-0.0003(0.0002)	-0.00005(0.0002)	-0.0004(0.0003)
Distance to the nearest Health facility (km)	0.0985(0.0473)**	0.0269 (0.0780)	0.0219(0.0430)	0.1485(0.0590)***
Distance to Public Transport (km)	-0.0366(0.0420)	-0.0260(0.0545)	0.0274(0.0259)	0.0073((0.1212)
Distance to Food market	-0.0033(0.0520)	-0.0182(0.0534)	-0.0366(0.0527)	-0.1763(0.0630)***
Distance to Source of Drinking Water	0.2291(0.1601)	0.5337(0.3188)*	0.7137(0.2750)***	1.7734(0.4600)***
Sex of Child (Boy=1)	0.9502(0.4440)**	0.1803(0.4975)	0.5441(0.4215)	0.6586(0.6203)
Residence (Rural=1)	-0.7541(0.5750)	-0.3675(0.6079)	0.1081(0.6620)	-0.5192(0.9214)
Mother's Educational attainment	0.0246(0.0669)	-0.0062(0.0514)	-0.0588(0.0477)	-0.0691(0.0807)
Log of Household income	-2.4211 (1.1413)**	-1.0023(1.2509)	-0.8127(1.2771)	-3.1307(2.4498)
Log of Household income squared	0.3307(0.1502)**	0.1758(0.1762)	0.1262(0.1669)	0.3631(0.3238)
Household Health care savings (1=Yes)	0.9055 (0.5493)*	-0.1974(0.6392)	-0.0696(0.5547)	-0.0341(0.8849)
Age of Child (1-2)	-1.0535(0.6432)*	-2.2802(1.3074)*	-0.1379(0.5059)	-0.0416(0.8340)
Age of Child (2-5)	0.7446(0.5060)	0.2472(0.5197)	0.3259(0.4953)	0.3212(0.7039)
Mother is insured (1=Yes)	0.3030 (0.6117)	-0.4819(0.7057)	-0.6221(0.4609)	-2.5097(0.7530)
Cost of treatment	0.0880(0.0720)	-0.0765(0.0641)	0.1281(0.1254)	-0.6712(0.2503)***
Cost of treatment squared	-0.0013 (0.0006)*	0.0002(0.0003)	-0.01137(0.0080)	-0.0040(0.0143)
Mother is married (1=Yes)	-1.3756(0.7229)**	0.3040(0.6423)	-0.2946(0.6271)	-3.9192(1.4277)***
Waiting Time	-0.0028(0.0024)	-0.0051(0.0029)*	-0.0246(0.0046)***	-0.0569(0.0136)***
Household Head (1=Female)	0.6074(0.7016)	0.2587(0.6880)	0.1664(0.5728)	-3.1756(1.3959)***
Dependence Ratio	0.2697(0.3385)	-0.1936(0.4414)	0.2180(0.2402)	0.1713(0.3125)
Diarrhoea (1=Yes)	-1.6727(0.7272)**	-1.6594(0.8633)**	0.1834(0.6635)	-2.8177(1.1758)***
Malaria (1=Yes)	-0.9465(0.5346)*	-1.7982(0.5593)***	-0.5601(0.5519)	-1.2236(0.6362)**
Constant	1.4684(2.4911)	2.5557(2.2893)	2.5537(2.6985)	15.0553(5.5988)***
Number of Observations =315 *Pseudo R-square = 0.41* *Log Pseudolikelihood =-265.37* *Wald chi-square (92) = 209.79**** *Prob > chi-square = 0.0000*				

Marginal effects for significant variables in parenthesis. *** = (sig. at 1%), **=(sig. at 5%) and *(sig. at 10%).

Appendix-Table 5: Hausman Test for IIA

Omitted	chi^2	df	$p>chi^2$	evidence
Private	2.71	92	1.00	For H_0
Public	3.79	92	1.00	For H_0
Faith	-2.41	92	-	Indecisive
Pharmacy	19.89	92	1.00	For H_0
Self Treatment	6.89	92	1.00	For H_0

Source: Authors' own computation

Appendix-Table 6: Kruskal-Wallis Equality-of-populations Rank Test

Provider	Observations	Rank Sum
Private	35	6438.0
Public	137	22858.5
Faith	23	3845
Pharmacy	62	10079
Self treatment	60	7182

Chi-squared = 14.91 (with 4 d. f), P-value = 0.0024***
Chi-squared with ties = 16.495 (with 4 d. f.), P-value = 0.0049***
***: Significant at the 1% level.

CENTER FOR DEVELOPMENT RESEARCH (ZEF)

DEPARTMENT OF ECONOMIC AND TECHNOLOGICAL CHANGE

QUESTIONNAIRE FOR MATERNAL AND CHILD HEALTH (HOUSEHOLD) SURVEY (OCTOBER 2007-JANUARY 2008)

Note for Interviewers:

1. Before the start of the interview inform the members of the household that information received from them is confidential. Information provided by any individual household or person will not be revealed either to any other households or to the District Administration etc. The data will be coded anonymously for the sole purpose of academic research (PhD).

2. By no means should the questionnaire be filled by the respondents. Please make sure that all the questionnaires are filled systematically.

3. A person is a member of a household if he or she has been sharing food, i.e. "eating out of the same pot" with other members of the household for a period of at least three months. Thus a child who is now married and living away from home is not a member of the household, even though he or she may be a member of the family. Conversely, children in boarding school who return to the household during holidays are members of the household.

4. Assign an identification number for each woman and household interviewed. The names of members of households are needed to ensure that consistency is maintained. It is crucial that the characteristics of and information pertaining to individuals is not mixed up.

5. The mother (15-49 years) and children (under-5 years) are the basic units of analysis. The questionnaire should be administered to women who have had live births or otherwise since 2002 or later. For most of the sections, it is expected that the mother (father) will be able to provide the necessary information on all members of the household. However, where it is clear that the mother is in doubt, ask tactfully as possible for information from another knowledgeable member of the household.

6. Carefully measure the height and weight of all mothers interviewed. However, where the respondent has current and reliable information on her height and weight and does not want to be measured or weighed further, simply record the information provided.

7. A BCG vaccination against tuberculosis is an injection in the right shoulder that usually causes (leaves) a scar. A polio vaccine is a drop in the mouth where a DPT is an injection given in the thigh (to prevent him/her from getting tetanus, whooping cough, diphtheria), sometimes at the same time as polio drops.

8. For some sections of the questionnaire privacy is required, i.e. the individual should respond to the questions separately and not in the presence of other persons. If this is not done the person may either not respond to the question or else give a false answer.

THANK YOU FOR COLLABORATING WITH US IN THIS IMPORTANT EXERCISE

SECTION 1: GENERAL INFORMATION

1. **Region……..**
2. **District……..**
3. **Location ……**
4. **Urban /Rural (Urban =1, Rural =2)**
5. **Household Number…….**
6. **House Number…….**
7. **Name of Interviewer……**
8. **Date of Interview…….**
9. **Time Interview Started……...**
10. **Time Interview Ended…….**

District/Town Code	
	01
	02
	03

SECTION 2: STRUCTURE OF HOUSEHOLD: OBTAIN INFORMATION ABOUT ALL LIVING MEMBERS OF THE HOUSEHOLD

ID	1. Name of Person belonging to household *(Write down the names of all persons who normally live and eat together in this household, starting with the head)*	2. Gender 1. Male 2. Female	3. Age in years (months if less than 5yrs) Yrs (Months)	4. Relationship to Household Head 1. Household Head 2. Wife/Husband 3. Son/daughter 4. Adopted child 5. Grand Child 6. Sibling 7. Father/mother 8. In-law 9. Niece/Nephew 10. Other (specify)	5. What is (NAME'S) religious denomination? 1 Catholic 2 Anglican 3 Methodist 4 Presbyterian 5 Moslem 6 Pentecostal 7 Traditional /Spiritualist 8 No religion 9 Other Christian….	6. What is…marital status? 1. Never married 2. Married (monogamy) 3. Married (Polygamous) 4. Divorced 5. Separated 6. Widowed 7. other…	7. What is (NAME'S) highest educational level completed?*)* 0= pre-school 1= primary 2=Middle/JSS 3=Voc/Com. 4=O level/SSS 5= A level 6=Training College/Nursing. 7=Tech/Prof. 8= Tertiary 9=Koranic 10= None 11= Don't know	8. What is the total number of years of education completed by each member of the household? If household member is still in school put 'C' after the current level.	9. What is (NAME'S) major occupation? 0= student/pupil 1= Farming 2=Trading 3=Clerical 4=Construction 5=Professional/Managerial 6= None 7= Don't know 8=other…	10. What is (NAME) father's age and highest educational level completed (***Applies to only under-five children whose fathers are not living at home/part of the household*** ***Age*** ***educ.***			11. Which ethnic group does NAME belong to? 1. Akan 2. Ga/Dangme 3. Ewe 4. Guan 5. Mole-Dagbani 6. Grussi 7. Gruma 8. Hausa 9. Other
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SECTION 3: MOTHER CHARACTERISTICS/BEHAVIOUR.

1. Height (cm)/ Weight (kg) *Please weigh/measure* *cm*	*kg*	2. Total number of children ever born alive or dead (*Number*)	3. Does your husband/partner have other wives besides yourself? 1= Yes 2= No	4. If Yes to (3) how many other wives does he have? 1= One 2=Two 3= Three 4= Four 5=other (specify)	5. Is your husband/partner living with you now or is he staying elsewhere? 1= Living with me 2= Staying elsewhere	6. How long have you lived here? (years/ months)	7. If you have moved, Just before you moved here, did you live in a city, town or in a village? 1= City 2= Town 3= Village	8. What kind of work have you done for most of your life? 1= Farming 2=Trading 3=Clerical 4=Construction 5=Professional/ Managerial 6= None 7= Don't know 8=other…	9. Are you (or your partner) currently doing something or using any method to delay or avoid getting pregnant? 1= Yes 2= No	10. If yes, Which method are you using? 1. Female Sterilization 2. Male sterilization 3. Pill 4. IUD 5. Injectables 6.Implants 7. Male condom 8. Female condom 9. Diaphragm 10. Foam/Jelly 11. Lactational Amen. Method 12. Periodic Abstinence 13. Withdrawal 14. Other…….	11. In the last four weeks have you heard or seen messages about child care, immunization and family planning YES NO Radio 1 2 Television 1 2 Neswspaper/Mag 1 2 Poster 1 2 Leaflets/Broch. 1 2 Health Worker 1 2 Meeting 1 2 Other……

SECTION 4: CHILD HEALTH /CHILD CARE

1. Information on children under five (*living)* years old

ID	1. Sex of child Boy=1 Girl =2	2. Day/ Month/yr of birth	3. Birth order 1. First 2. Second 3. Third 4. Fourth 5. 4+	4. Birth spacing (Months) Posterior	5. Is child a twin? 1= Single 2=Twin (multiple)	6. Who delivered the child? 1. Doctor 2. Nurse/Midwife 3. Auxiliary midwife 4. TBA (Trained) 5. TBA (Untrained) 6. Other….	7. Where (place) was the child delivered? 1= Hospital, 2= Clinic, 3= Maternity Home, 4= =TBA's Home, 5 = Your Home, 6= ….Other	8. Was the child delivered by caesarean section? 1= Yes 2= No	9. Does child sleep under mosquito net? 1= Yes 2= No

2. Information on children under-five continued

ID	1. Weight at birth (kg)	2. Breastfeeding history (No of months before child was weaned)	3. Vaccination history (No. shots: DPT, Polio, measles and BCG) *Copy from Vaccination book/card if available* *DPT* *POLIO* *MEAS.* *BCG*	4. Antenatal and postnatal history (No. of times you visited the doctor/Nurse etc) Ante (No.) post (No.)	5. Where did you seek antenatal care 1= Doctor, 2= Nurse/Midwife, 3=Auxiliary midwife, 4=TBA (Trained), 5= TBA (untrained) 6. Other….	6. How many months pregnant were you when you first received antenatal care for each child?	7. How many months (times) did you receive postnatal care after delivery?

3. Information on children under-five continued

ID	1. Who makes decisions about the child's health and welfare? 1= Mother, 2= Father, 3= Both mother and father, 4 = Father in-law, 5= mother in-law, 6 = parents of the mother	2. Has any of the children being sick for **the past 1 months**? 1=Yes 2= No	3. What kind of sickness did (NAME) suffer? 1= Fever/malaria 2= Diarrhoea 3= Cough 4 =Measles 5= Tuberculosis 6= Tetanus 7= AIDs 8= other…..	4. When…. Was ill/sick did…visit 1. private hospital /clinic 2. public hospital /clinic 3. Traditional Healer/Religious Healing Centre 4. Pharmacist/chemical shop 5. self-treatment 6. doing nothing 7. other…….	5. Did you have any problem(s) at the time of visit? 1. No problem (satisfied) 2. Facilities were not clean 3. Long waiting time 4. No trained professionals 5. Too expensive 6. No drugs available 7. Treatment unsuccessful 8. Poor staffing attitude 9. other….	6. How long (time spent) did you wait at the respective health facility? (Hours/Minutes) Min	Hours	7. What was (were) the reason (s) for the delay? 1=There were too many patients 2= There was no doctor present 3=Inadequate Nurses 4=Inadequate drugs 5=don't know 6= other…	8. How much did you pay for the respective service in (4)? ***include estimated value of any inkind payment***	9. How satisfied were you regarding the services provided at the hospital 1= Very satisfied 2= Satisfied 3=Somewhat satisfied 4= Somewhat dissatisfied 5. very dissatisfied 6= Don't Know	10. If 'not satisfied', why not satisfied? 1= There was no doctor present 2=too congested 3= There were no drugs 4= Nurses were rude 5=Don't know 6=other….	11. If (4.9) Why did (NAME) not use medical care 1. No need 2. Too expensive 3. Too far 4. Other….

SECTION 5: PREVENTIVE CARE/ HEALTH CARE (ENTIRE HOUSEHOLD)

ID	1. How much in total did you spend in the past **6 months not related to an illness** ***preventive health care; Purchase of mosquito nets/spray, pre-natal visits, check-ups, etc if any***	2. How much in total did you spend in the past 6 **months** for non-prescription medicines? *Fansidar, Amodiaquine/Camoquine , chlroroquine and other ant- malarial tablets; cough syrup, paracetamol, pain killers etc* ***include estimated value of any in-kind payments***	3. During the last **6 months,** were you or any member hospitalized or had an overnight stay(s) in a medical facility? 1= Yes 2= No	4. What was the total cost of your hospitalization (s) or overnight stay(s) in a medical facility? ***include estimated value of any in-kind payments***	5. During the last 6 months, did you stay overnight at a traditional healer's or faith healer's dwelling? 1= Yes 2= No	6. What was the total cost of your stay(s) at the traditional healer or faith healer's dwelling? ***include estimated value of any in-kind payments***	7. Did you or other members of your household have to borrow money or sell assets in order to pay for these costs? 1=Yes 2=No	8. Has (NAME) ever been vaccinated? ***For all children under 7 years*** 1= Yes 2= No 3=Don't know	9. Were any of these vaccinations given to (NAME) during the past 12 months? DPT, Polio, Measles and BCG? 1= Yes 2= No 3=Don't know	10. Did you have to pay any fee for this vaccination? 1= Yes 2=No	11. How much did you pay for the last vaccination?	12. Why not (NAME) vaccinated? 1= Too young 2= Did not know he had to 3= Health Centre too far 4= Shortage of supply 5= too expensive 6= Religious reasons 7= Other…
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SECTION 6

1. In the last 5 years have you ever given birth to a boy or girl who was born alive but later died? Yes [ ] No [ ], If Yes, please do provide the following information

ID	1.Date/month/yr of birth	2.Sex of child Boy=1 Girl =2	3.Date/ month/ yr of Death?	4.Birth order 1. First 2. Second 3. Third 4. Fourth 5. 4+	5. Birth spacing (Months) Posterior	6. Mother's age at birth of respective child	7. Was Child a twin? 1. Single 2. Twin	8. Who delivered the child? 1=Doctor, 2= Nurse/Midwife, 3= Auxiliary midwife, 4 =TBA (Trained), 5 = TBA (Untrained), 6 = Other……	9. Where (place) was the child delivered? 1= Hospital, 2= Clinic, 3= Maternity 4= Home, 5= TBA's Home, 6 = Your Home, 7= ….Other	10. Was the child delivered by Caesarean section? 1= Yes 2= No

2.

ID	1. Weight at birth (kg)	2. Breastfeeding history (No of months)	3. Vaccination history (No. shots: DPT, Polio, measles and BCG) *Copy from Vaccination book/card if available* *DPT*	*POLIO*	*MEAS*	*BCG*	4. Where did you seek antenatal/post natal care 1= Doctor, 2= Nurse/Midwife, 3=Auxiliary midwife, 4=TBA, 5= Other….	5. How many months pregnant were you when you first received antenatal care for each child?	6. Did this particular child sleep under mosquitoes nets 1= Yes 2= No

3.

ID	1. Who made decisions about the child's health and welfare? 1= Mother, 2= Father, 3= Both mother and father, 4 = Father in-law, 5= mother in-law, 6 = parents of the mother	2. When…. Was ill did…visit 1. private hospital /clinic 2. public hospital /clinic 3. Traditional Healer/Religious Healing Centre 4. Pharmacist/chemical shop 5. self-treatment 6. doing nothing 7. other	3. What kind of sickness did (NAME) suffer? 1= Fever/malaria 2= Diarrhoea 3= Cough 4 =Measles 5= Tuberculosis 6= Tetanus 7= AIDs 8= other	4. Did the child die through accident or illness? 1= injury/accident 2=illness	5. Which illness? 1= Fever/malaria 2= Diarrhoea 3= Cough 4 =Measles 5= Tuberculosis 6= Tetanus 7= AIDs 8= other…..

SECTION 7: WELFARE/SOCIO-ECONOMIC CHARACTERISTICS (HOUSEHOLD)

1. The roof of the main dwelling/building is predominantly made of what material? 1. Mud 2. Thatch 3. Wood 4. Metal Sheets 5. Cement/Concrete 6. Roofing tiles 7. Asbestos 8. Other……	2. Main material of the floor 1. Earth/mud/mud bricks 2. cement/concrete stone 3. Burnt bricks 4. wood 5. Ceramic/marble tiles 6. Carpet 7. Terrazzo 9. other..	3. What is the material of the walls of the house? 1. Mud/mud bricks 2. stone 3. burnt bricks 4. cement/sandcrete 5. wood/bamboo 6.Iron Sheets 7. Cardboard 8. Other….	4. How many separate rooms do members of your household occupy? *(Count living rooms, dining rooms but not bathrooms, toilets, garage and kitchens)*	5. What is the main source of drinking water for members of your household? 1. Piped into dwelling or compound 2. Public outdoor tap 3. Borehole 4. Protected well 5. Unprotected well, rain water 6. River, lake ,pond 7. Vendor or truck 8. Other…	6. How long does it take you to go to the nearest hospital/clinic? Km Min.	7. What kind of toilet facility does your household have? (a) Flush toilet (b) Covered Pit Latrine (c) Uncovered Pit Latrine (d) KVIP (e) Bucket /Pan (f) No facility/Bush /Field/Beach (g) Other…… ……. (Specify)	8. Do you (household) share these facilities with other households? 1= Yes 2= No	9. How many households do you share these facilities with? *(tick)* 1-2 [ ] 3-4 [ ] 5-9 [ ] 10+) [ ]	10. What type of fuel does your household mainly use for cooking? 1. Electricity 2. LPG/Natural Gas 3. Kerosene/Oil 4. Charcoal/firewood 5.Crop residue/sawdust 6. Animal waste 7. other (specify)	11. Does any member of your household own (any means of transport?) 1. A bicycle 2. A motor cycle or motor scooter 3. A car or track 4. A tractor 5. A horse/cart?	12. How long (average) does it take to reach other nearest facilities by kilometres and minutes? 1. Public Transportation 2. Telecommunication facility 3. Supply of drinking water 4. Distance to food market 5. Distance to Vaccination center (U5C)	13. Does household have electricity? 1 = Yes 2 = No
												1 Km Min 2 3 4 5	

SECTION 8: HEALTH RISK AND INSURANCE BEHAVIOUR OF MOTHER (HOUSEHOLD)

1. Does household (or neighbours) have and use fixed telephone/ mobile phone? 1= Yes 2=No	2. If Yes to 1, have you ever used the fixed telephone or mobile to call a health provider concerning the health of your child? 1= Yes 2= No	3. How many of your neighbour's children (under five years) have died since last year?	4. Are you currently a member of a mutual health organisation or heath insurance scheme? 1= Yes 2= No	5. If yes, which one? 1. Private Health Insurance 2. National Health Insurance (NHIS) 3. District Mutual Health Insurance 4. Other…	6. If yes to 4, how much premium did you pay last/this year? (Amount)	7. If yes, how many members of your household are covered by the insurance scheme? How much was paid for the members insured?	8. If Yes, how long does it take you to reach the health facility where the insurance is tenable? Km Min.		9. How long have you been a member of the scheme (years/months)?	10. Have you ever benefited from the scheme? 1= Yes 2= No	11. What benefits does your scheme cover? 1. Consultation 2. Drugs 3. Laboratory costs 4. X-ray 5. Admission 6. Surgery 7. Specialist Care 8. Transport 9. Antenatal care 10. Normal delivery care 11. complicated del, care 12. Family planning 13. Other….	12. If no why are you not a member of any of the health insurance schemes? 1. the premium is too high/expensive 2. don't have money to pay the premium 3. I don't actually fall sick 4. undecided 5. Don't know 6. Other…….	13. If no will you consider joining a scheme in the future? 1= Yes 2= No 3= Don't know	14. Do you manage to save every year towards health care? 1= Yes 2= No	15. If yes, how much per year is allocated to healthcare?

HOUSEHOLD EXPENDITURE(INCOME)

What has been the expenditure of your household **last month/year (in Cedis)**?

Item	Monthly	Yearly	Frequency*
1. Food (imputed) (Total wage income paid in form of food + consumption of home produced food)			
Grains			
Beans, Nuts, Oil			
Roots, Tubers, Plantains			
Fruits			
Vegetables			
Meat, Fish			
Dairy Products			
2. Food (Actual)			
3. Housing and related expenses (Actual and imputed)			
Rents			
Repair and maintenance			
4. Clothing (**yearly**)			
Men clothing			
Women clothing			
Children clothing			
5. Fuels and Electricity			
Electricity			
Gas			
Firewood			
Charcoal			
Kerosene			
6. Household appliances and utensils (**yearly**)			
Kitchen utensils			
Other			
7. Education (**yearly**)			
School fees			
Books, stationery			
Uniforms/shoes			
8. Health			
Traditional remedies			
Health service (Doctor, hospital)			
Medicine			
9. Transportation			
10. Remittances			
11. Donations			
Church			
Funerals			
Wedding/Marriage ceremonies			
Other gifts			

* Frequency code: 1=monthly, 2=yearly, 3=both.

Information on household assets

Does any member of the household currently own any of the following assets?	1. Yes 2. No	Qty owned	Current Resale value
1. Motor car			
2. Motorbike			
3. Bicycle			
4. Truck			
5. Tractor			
6. Furniture/Sofa			
7. Sewing machine			
8. Refrigerator/Freezer			
9. Radio			
10. Radio cassette			
11. Video deck			
12. Television			
13. Video camera/camera			
14. Mobile phone			
15. Electric/Gas stove			
16. Electric iron			
17. Electric Fan			
18. Air conditioner			
19. Boat			
20. Canoe			
21. Outboard motor			
22. House made of blocks			
23. Land (Hectares)			
24. Generator			
25. Cloth: Dumas, Lace etc			
26. Cattle			
27. Sheep/Goats			
28. Chickens			
29. Other…			