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KUMASI**

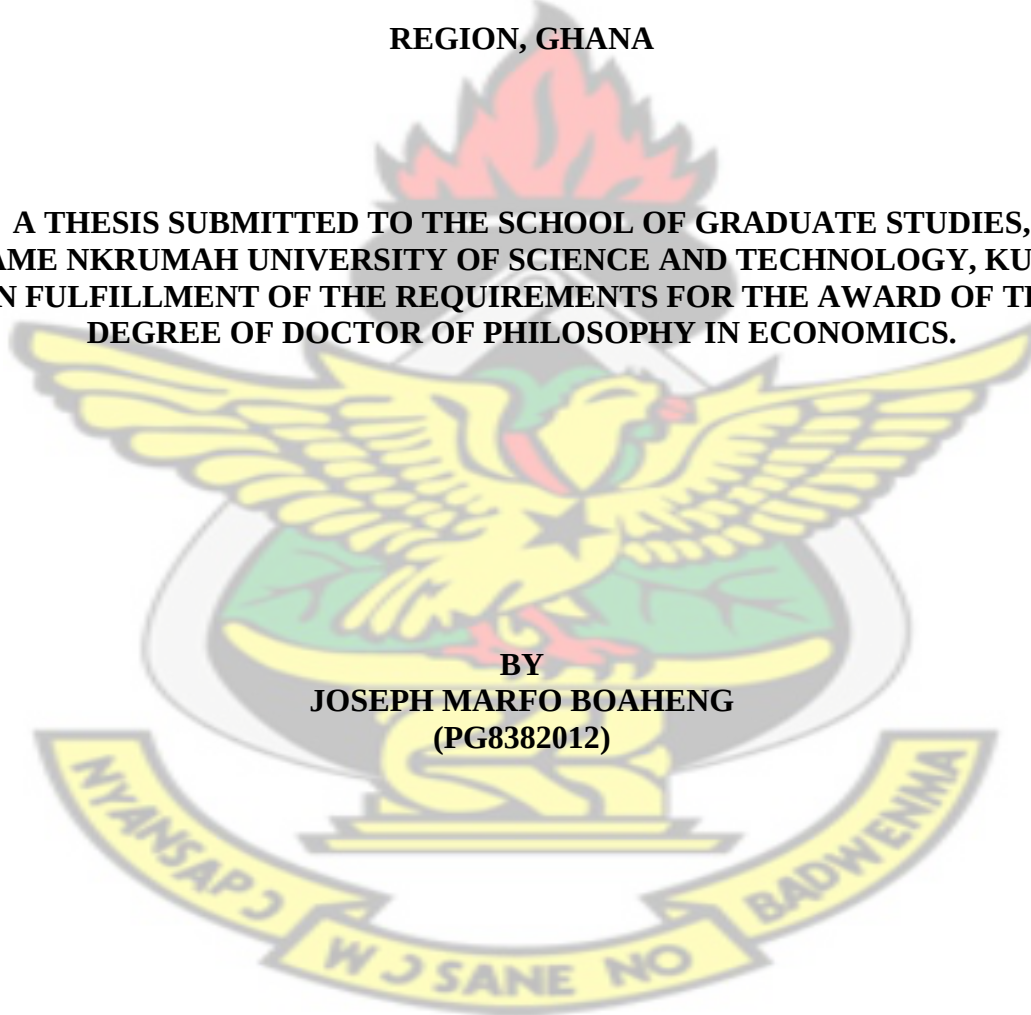
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

DEPARTMENT OF ECONOMICS

**STUDIES ON STRATEGIES TO INCREASE NATIONAL HEALTH INSURANCE
SCHEME'S ENROLLMENT AND RETENTION RATES; CASE OF ASHANTI
REGION, GHANA**

**A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES,
KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI
IN FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE
DEGREE OF DOCTOR OF PHILOSOPHY IN ECONOMICS.**

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April, 2017

DECLARATION

I declare that this submission herein is an original work I have personally undertaken under supervision except where due acknowledgement has been made in the text.

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DEDICATION

I wholeheartedly and graciously dedicate this invaluable work to my wife, Afia Serwaa Boahen, and Professor Daniel Ansong (Honorary Consultant, Department of Child Health, School of Medical Sciences-Kwame Nkrumah University of Science and Technology (SMS-KNUST). God should richly bless you and expand your frontiers. My foremost dedication also goes to my late Brother Lawyer Alexander Kwadwo Asamoah who unfortunately could not witness this great day in my life. Kwadwo you will forever be remembered.



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ABSTRACT

The discouraging rates of enrollment and retention on Ghana's National Health Insurance Scheme (NHIS) due to non-affordability of the cost of paying premium under the existing payment mode are a persistent source of worry to administrators of the scheme and the nation at large. This study explores a proposed Mobile Phone Payment System (MPPS) that can allow premium payment on pro-rata basis. The study used both qualitative study and quantitative cross-sectional survey to solicit the required information from an ICT specialist, NHIS experts and about 1152 respondents living in Kumasi Metropolis, Atwima Nwabiaya and Sekyere Central Districts of Ghana. The study's findings indicate that the feasible rate of cost of collecting premiums through the MPPS is between 0-22%. The empirical results have revealed that the insured individual is more than 2 times as likely to remain insured while the uninsured individual is less likely to remain uninsured when payment of NHIS premium is pro-rata. The study findings further reveal that there is a statistically significant relationship between a savings rate of 38% on cost of medical care for outpatient services when insured and enrollment or retention in NHIS ($p < 0.0001$). This finding implies that about 93.98% of individuals who have never enrolled were likely to enroll on the NHIS while 99.53% of those who have ever enrolled were also likely to remain on the NHIS based on the knowledge of the savings rate on medical fee for out-patient services' when insured. It is recommended therefore that the National Health Insurance Authority (NHIA) consider this payment system that has the potential of increasing the enrollment and retention of uninsured and insured respectively in NHIS especially those in the informal sector.

Key words: Enrollment, Retention, Health Insurance, Insured, Uninsured, Pro-Rata, Saving Rate

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LIST OF ACRONYMS

NHIS	National Health Insurance Scheme
NHIA	National Health Insurance Authority
MPPS	Mobile Phone Payment System
ADPS	Automatic Deduction Payment System
MMPS	Mobile Money Payment System
CPS	Conventional Payment System
WTP	Willingness To Pay
M.E	Marginal Effect
OR	Odd Ratio
CI	Confidence Interval
SE	Standard Error
LR	Likelihood Ratio
P-value	Probability Value
Mlogit	Multinomial Logistic
JHS	Junior High School
SHS	Senior High School
MSLC	Middle School Level Certificate

CHAPTER ONE

1.0 Study Background

Individuals desire good health for the sake of quality of life as well as remaining productive and earning income in the labour market (Dewar, 2010). However, the occurrence of ill-health is unexpected and uncertain. This implies that consumption of health-care by the individual at a point in time is inevitable. This risk is often accompanied by health-care cost which could be catastrophic due to uncertainty in the cost of care (Dewar, 2010). Nonetheless, not every individual is able to access health-care due to relatively high cost of care.

It is estimated that at least a billion people suffer each year because they cannot obtain the health services they need (WHO, 2014). From this figure, about 150 million of the people are subjected to financial catastrophe annually, and 100 million are pushed below the poverty line as a result of paying for the services they receive. More to it, about 3% of Sub-Saharan African countries' Gross Domestic Product (GDP) is also expended on health-care (Novignon, Olakojo, & Nonvignon, 2012). Hence, individuals are at risk of losing some of their income when illness occurs. This is because the individual has to cover the cost of health-care through out-of-pocket funding as has been the prominent health-care financing mechanism, especially in many low and middle income countries (Xu et al., 2007). However, empirical evidence has revealed that the out-of-pocket payment reduces the demand for medical care as well as deepen poverty level (World Health Organization., 2000; Xu et al., 2003).

In an effort of finding appropriate health-care financing mechanism that takes into consideration the economic status of the individual, it led to an alternative that provides financial protection

against health-care cost (Naim, Ajmal, Ahmed, & Saleem, 2013). Therefore, one such financial protection schemes is health insurance (Dewar, 2010).

The Health Insurance Association of America (HIAA). The HIAA defines Health insurance as a provision which caters for the payments of benefits in the event of sickness or injury, accidents, medical expense, disability and dismemberment. Amarteyfio & Yankah (2013) also define health insurance as a pre-payment scheme for health services accessed by residents and they further suggest that the healthcare costs of the clients are taken care of under the scheme from the premium contributions these clients have made earlier. As regards the benefits realizable from being enrolled on health insurance, paramount is the economic welfare cushion it provides its clients by transforming unpredictable healthcare costs into predictable insurance premium contributions; in the event of ill-health, clients are entitled to receive free health attention and treatment for pre-defined health conditions (Asgary, Willis, Taghvaei, & Rafeian, 2004).

Furthermore, Health Insurance extricates clients from the burden of direct Out-Of-Pocket payments (Ataguba & Goudge, 2012). This is due to the fact that health insurance coverage allows people to seek timely medical care and improves their lives and health (Bovbjerg & Hadley, 2007). Wagner et al., (2011) further assert that generally, people who are insured against future health contingencies are more probable to have access to care and as such, less likely to be saddled with health-care costs than the uninsured people. Thus health insurance is undeniably an imperative mechanism that succors the individuals, states and the nation at large (Boateng & Awunyor-Vitor, 2013) as it seeks to increase revenues and enhance equity and efficiency of the health system (Witter & Garshong, 2009).

Many African countries including Ghana have been implementing the National Health Insurance Scheme for the past decade. Prior to the implementation of the insurance scheme in 2003, health-care financing has mainly been the out-of-pocket payment based on the User Fee Policy popularly known as "Cash and Carry". Alongside the above system, others including general tax, donor funding and community based health insurance schemes have been tested. However, these systems have not been successful in providing affordable health-care for the poor as well as removing the inequities in health-care services in the country due to low coverage (Atim & Grey, 2001) cited in Akazili et al., (2014).

Ghana's vision to alleviate the burden of health-care cost of its citizens was realized in 2003 when the National Health Insurance Scheme (NHIS) was introduced. The core objective of this scheme is to provide equity in the health sector as well as ensure affordable health-care for the poor (Salisu & Prinz, 2009). The first 5 years of the scheme recorded the highest enrollment rate of 62% in 2009 (NHIA, 2013). Although current active membership of the scheme is low, the scheme, in the past decade of its introduction from records as of 2012, has enrolled 88.0% of the national population; a percentage which translates into Twenty-two million (22,000,000) people. These figures comprise first-time enrollments together with existing members who have renewed their membership. However, it is quite unfortunate that the informal sector of the economy of Ghana which represents a stunning 90% of the national population comprises 33.6% of active memberships on the scheme (NHIA, 2013). It is therefore the core objective of the National Health Insurance Scheme (NHIS) to expand both enrollment and retention rates especially at the informal sector (J. Akazili, 2010). This is highly needed since annual growth rate of enrollment on NHIS is only about 1% (Dapatem, 2013; Universal Access to Health-care Campaign Coalition, 2013).

1.1 Problem Statement

In order to provide equity in the health sector as well as ensure affordable health-care for the poor as has been the objective of the NHIS, high enrollment and retention rates are important. This increasing interest in ensuring high enrollment and retention rates of Ghana's national health insurance scheme has heightened the need for research into determinants of enrollment and retention. So far, investigations have been confined to the effect of socio-economic characteristics and operational challenge on the enrollment onto national health insurance schemes globally.

On the socio-economic characteristics of individuals, studies done revealed that income, education, poverty level, health risk, the level of awareness of insurance and the significant role of insurance consultants affect its enrollment (Alkenbrack, 2011; Vellakkal, 2013). Religion has also been noticed to influence one's decision to join health insurance scheme (Jenna Dixon, Luginaah, & Mkandawire, 2014). In Africa, a similar study in Kenya also shows that females and formal sector workers were more likely to participate in the national health insurance programme (Kimani, Ettarh, Kyobutungi, Mberu, & Muindi, 2012). Studies in Ghana have indicated that socioeconomic characteristics such as age, sex, marital status, cost of care, income, occupation, higher levels of education, religion and ill health are strong factors affecting individual's decision to join insurance scheme (Jenna Dixon et al., 2014; Gobah & Liang, 2011; Owusu-Sekyere & Chiaraah, 2014).

Regarding the operational challenge as a hindrance to enrollment onto Health Insurance Schemes (HIS), Gobah & Liang (2011) found long waiting hours and affordability of premium as barriers to joining the Ghanaian health insurance scheme. Amporfu (2013) and Osei-Boateng &

Ampratwum (2011) also showed that the lump sum payment (non-flexibility) of current insurance premium may be the reason for which the premium is not affordable and has led to low enrolment and retention rates of NHIS in Ghana especially in the informal sector of the economy. The informal sector members in the economy are characterised by irregularity in their income streams, hence their low participation in the scheme (Amporfu, 2013a; Osei-Boateng & Ampratwum, 2011). A study by Gobah & Liang (2011) recommends that the informal sector members be allowed to pay health insurance on pro-rata basis. Atinga, Abihiro, & Kuganab-Lem, (2015) also shared similar view as they noted in their study that non-affordability of premium was the predominant reason for low enrollment of health insurance in Ghana.

From the preceding discussions, it is noted that the pressing challenge affecting enrollment and retention rates in Ghana's health insurance scheme is non-affordability of the insurance premium especially to the informal sector members. The major concern of the non-affordability of the premium is lump sum payment of the premium due to the current payment mode. This implies that it is expensive to pay premium under the current payment mode especially by potential clients from the informal sector. This is determined in terms of inflexible payment modes, long waiting time at insurance offices and traveling time to NHIS offices. These problems arising from such payment method could explain why enrollment onto the scheme is low especially in the informal sector. However, dearth information exists in literature regarding empirical work on strategies to address the issue of non-affordability that is resulting in low enrollment and retention rate of NHIS in Ghana. The present study seeks to bridge this gap by proposing a Mobile Phone Payment System (MPPS) that allows NHIS premium to be paid on pro-rata basis. The present study thus defines Pro-rata payment as a system that allows for payment of health insurance premium on flexible or

part payment basis. Therefore, the motivation behind the conduct of the initial part of this study was to investigate the effect of pro-rata payment method with MPPS on the enrollment and retention rates of NHIS.

Lastly, limited or partial coverage is a factor that is understood to undermine effective enrollment and retention on the scheme. Studies which revealed the relationship between the propensity for an individual to enroll on the scheme and partial coverage of the scheme found that the persistent conception of the health insurance scheme among uninsured Ghanaians is that the scheme is a full insurance (which, in reality, is not) capable of providing total coverage (or even an adequate cushion) from the usually insurmountable bills they get when they acquire outpatient healthcare services. These contradicting perspectives consequently discourage the uninsured individual from enrolling since they fail to see how the scheme reduces healthcare costs (Kusi, Enemark, Hansen, & Asante, 2015; Panda, Chakraborty, Raza, & Bedi, 2016). This limited coverage includes uncovered drugs and tests at health facilities (Nguyen, Rajkotia, & Wang, 2011).

Although in the face of these facts, the uninsured does not appreciate the sum of savings made on health expenses when insured, but it is a fact that the uninsured accrue higher health bills than the insured. Sepehri (2014) carried out a similar study in Vietnam (a country with similar income status as Ghana) to ascertain the amount of money saved when insured people seek medical attention. The study revealed that averagely, the insured patient saves about 50-56% on health expenditure compared to fee-paying patients. However, the study failed to account for the impact that saving gained by the insured contributed to enrollment and retention on the scheme; this is the gap that the present study sought to fill – identifying the impact that knowledge of savings on

healthcare expenses on enrollment and retention on health insurance scheme. In view of this, the present study has investigated the significant role played by the knowledge of savings on medical cost to both the insured and uninsured on the scheme's enrollment.

1.2 Research Questions

This present study sought to answer questions drawn on three primary areas of enquiry. These were;

1. Will it be feasible to pay health insurance premium through the proposed MPPS in Ghana?
2. What is the effect of pro-rata health insurance premium payment with mobile phone on enrollment on Ghana's National Health Insurance Scheme?
3. What is the effect of knowledge of savings on cost of medical care by the insured on enrollment and retention onto Ghana's health insurance scheme?

1.3 Objective of the Study

The main objective of this study was to identify the strategies of increasing Ghana's National Health Insurance Scheme (NHIS) enrollment or retention rates. In order to achieve the main objective, three specific objectives were set as;

1. To determine the feasibility of paying health insurance premium through the proposed MPPS in Ghana.
2. To determine the effect of pro-rata health insurance premium payment with mobile phone on enrollment and retention on Ghana's National Health Insurance.
3. To determine the effect of savings on medical bill when insured on enrollment onto Ghana's National Health Insurance Scheme.

1.4 Study Hypothesis

- i. Paying Health insurance premium with mobile phone will not be feasible
- ii. There is no significant relationship between pro-rata insurance premium payment with mobile phone and the decision of individual to enroll or remain on the Ghanaian National Health Insurance Scheme
- iii. There is no significant relationship between the knowledge of savings on cost of medical care when insured and the enrollment and retention of individuals on NHIS

1.5 Relevance of the Study

The National Health Insurance Scheme (NHIS) in Ghana is a social one and hence its success and sustenance is largely dependent on maximum enrollment particularly of those in the informal sector through motivating premium payment plans for clients. The scheme is in dire need of evidence-based information to combat many of its institutional and operational problems; this present study seeks to help in this regard.

The findings of this present study seek to provide vital information that could be utilized by National Health Insurance Scheme to aid their decision-making on the formulation and implementation of sustainable and evidence-based alternative premium payment method, thus, ensuring policies that consider the characteristics of the informal sector as well as the poor in society. If policy makers become aware of the implications of the present challenges of the payment system, the feasibility status of the proposed payment system shall inform whether to adopt it or not and also better understand the savings gain as far as being insured on the NHIS is concerned. To the individual, the study information will moreover provide better understanding towards their decision to participate in the proposed payment system.

Furthermore, it is believed also that the potential telecommunication companies shall make use of the study information to examine both economic and accounting feasibility of this payment in its implementation.

As indicated already, the literature gap in health insurance enrollment will be filled as the study generates information on how the mobile phone could be used as a medium to promote extensive enrollment of national health insurance scheme in Ghana. This, the author believes is the first of its kind to provide such information. This is what the study seeks to contribute to existing knowledge.

It is worth emphasizing that increased enrollment on the scheme translates into higher chances of the scheme being sustained. As such, it is a matter of expediency for this study to suggest savings gains as an incentive to get the uninsured population insured. Ergo, the study findings are expected to sway the thinking of the uninsured population to get insured based on the knowledge that the NHIS is an avenue for them to reduce their healthcare expenditure. The main gap that this study fills is the quantification of savings gains that enrollment on the NHIS accrues to adult health seekers. On a larger scale, the society and health systems stand to gain through exposure to the comprehensive knowledge of savings on medical bill in health insurance by the health seeker in the post NHIS era. The economic benefits are clear to see too; individual gains and losses will be ascertained particularly in areas where the pro-poor interventions are concentrated thereby ensuring that resources of the health systems will be efficiently distributed to curb health challenges of the labor force.

1.6 Scope of the Study

The study highlighted challenges of the current system of paying health insurance scheme premium in Ghana. The current paying system does not allow for payment on pro-rata making the premium expensive i.e. not affordable for individuals especially those in the informal sector of the economy to pay in order to enroll onto the National Health Insurance Scheme. Again, the study perceives that the knowledge of savings on medical fee when insured could influence the decision of both the insured and uninsured to enroll or remain on the NHIS.

In light of these findings, the present study proposed the Mobile Phone Payment System (MPPS) to be adopted as that could best address the non-affordability challenge of the premium under the current payment system. To do this, the study first determined the feasibility of the MPPS by calculating the cost of collecting premiums through the proposed system that is acceptable to National Health Insurance Authority (NHIA).

Using qualitative design specifically key informant and focus group discussion, the optimum range of cost of collecting premium through the proposed MPPS was computed. The effect of pro-rata payment system and knowledge of savings on medical fee on the enrollment and retention levels were determined with logistic regression models using primary data collected at the community level.

1.7 Methodology

The study adopted simple logistic and multinomial logistic regression models to estimate the factors that influenced the patronage of the mobile phone payment system as well as determinants of participating in Automatic Deduction Payment System (ADPS) or Mobile Money Payment

System (MMPS) in Ghana respectively. Also the effect of savings on cost of medical care when insured on enrollment or retention was also determined with the logistic regression model. In line with the underlying methodology, both qualitative and quantitative methods of data collection using standardized questionnaire and key informant interview were employed. Using cluster sampling technique, the study considered adult users and non-users of mobile phone age 18 years and over, as well as those who consented to the study as eligible to participate in the survey. Sample size for the study was determined based on statistical assumptions including the design of the study, objective, precision of measurement, allowable confidence level and standard error and the population size under study. Data gathered from the field was subjected to both descriptive and inferential statistics. STATA 12.0 was used to conduct both the descriptive and inferential analyses.

1.8 Organization of the Study

Chapter one has presented the introduction of the study. It presents the background of the study, problem statement, research questions and objectives, relevance, scope of the study and brief methodology employed in the study. Chapter Two provides a review of the relevant literature on Health Insurance and mobile phone usage in health-care delivery. It begins with a discussion on Health Insurance, overview of health insurance in Ghana, empirical studies on determinants of enrollment onto Health Insurance Schemes, payment of health insurance on pro-rata and concept of mobile phone usage in health-care delivery and its associated empirical studies. Chapter Three discusses the methodology of the study. This includes the socio-economic profile of the study area, theoretical framework, model specification and data collection techniques. Chapter Four presents the descriptive analysis based on the survey data. Chapter Five followed with presentation and discussion of the empirical results of objective one. Chapter Six as well provided discussions on

the empirical results of objective two. Further the empirical results of objective three are presented in Chapter Seven. Lastly, Chapter Eight provides summary of findings, conclusions and policy recommendations. In addition, limitations of the study and suggestions for future research are provided.

1.9 Limitation of the Study

- Data on the proportion of cost of collecting premium was not available at the NHIS's office as at the time the study was conducted. Hence the consideration of 0, 50% and 100% as the possible cost of collecting premium currently for the computation of the feasible range of collecting premiums with mobile phone make the study results not expected to deviate much from exact cost of collecting premium through mobile phone. The study however recommends that the NHIS collects data on such issues to enhance decision making.
- The study was conducted in Ashanti region only. The findings of the study could have been more representative and diverse if it had been extended to other regions where the differences in culture and attitudes towards NHIS might not be exactly the same. Notwithstanding this limitation, the heterogeneous nature of the study areas makes the study findings reflective of the response to the proposed MPPS in the whole Ghana.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews literature on Insurance, Health Insurance, types of Health Insurance schemes and its importance. As well, literature on the determinants of enrollment onto health insurance schemes is reviewed. The chapter further gives detailed overview of mobile phone usage globally as well as the trend in Ghana. It finally presents literature on the use of the mobile phone in health-care delivery in Ghana and empirical review of papers on Willingness to pay, the use of mobile phone to pay health insurance premium and paying health insurance on pro-rata.

2.1 Insurance

The definition of insurance varies with several disciplines including law, economics, history, actuarial science, risk theory, and sociology. However, some components are common to all insurance plans. Putting those components together, the Commission on Insurance Terminology of the American Risk and Insurance Association (CITARIA) has defined insurance. According to CITARIA (cited in Rejda & McNamara, 2013), insurance is the pooling of fortuitous losses by transfer of such risks to insurers, who agree to indemnify insured for such losses, to provide other pecuniary benefits on their occurrence, or to render services connected with the risk. This means insurance encompasses four main attributes according to Rejda (2008). Per the report of Rejda (2008), insurance is characterized by pooling of risk. The pooling of risk is where losses incurred by few are spread over the entire group so that average loss is substituted for actual loss in an event of loss. Furthermore, paying for loss that is unforeseen and unexpected, a phenomenon called fortuitous loss is also unique about insurance. This implies that insurance transfers pure risk from the insured to the strongly financial positioned insurer who pay for loss. Rejda (2008) reports that

insurance is characterized by indemnification where the insured is restored to his normal financial position prior to the occurrence of loss. However, it must be noted that insurance does not prevent losses from occurring neither does it reduce the cost of losses to the economy as a whole (Vaughan & Vaughan, 2013). However, the basis of insurance definition should go beyond what was postulated by CITARIA (cited in Rejda & McNamara, 2013). Rather, consideration should be given to country specific definitions. For instance health insurance in Ghana is infinitesimal financed by premium contributions from clients alone but rather about 95% funding comes from other sources including 2.5% VAT levy, and 2.5% deduction of workers contribution to the Social Security and National Insurance Trust (SSNIT) fund (Owusu-Sekyere & Chiaraah, 2014).

In reference to the work of Rejda, (2008), the benefits of insurance to both the insured and insurer are discussed. Firstly, to the insured individual, he is indemnified when loss occurs as mentioned already. This suggests that the insured maintains his financial security when there is risk. More to it, the insured is less probable to worry about financial security in the event of loss. To the insurer, prior to the loss, the collected premiums are invested to increase the company's stock of capital. This has the tendency of promoting economic growth and full employment. The insurer as well involving in loss-prevention activity is more likely to reduce both direct and indirect or consequential loss. Two main types of insurance are proposed by the author. Rejda (2008) pointed out that insurance can be broadly classified into Private and Government. Life and health insurance fall under private while social and other governmental insurance are also government insurance. However, due to relatively high cost of private insurance, some governments undertake health insurance as in the case of Ghana. For the purpose of this current study, we focused on health insurance. Although private health insurance exist in Ghana, it operations are not vibrant as

compared to the National Health Insurance Scheme set up by the government which is a typical social health insurance.

2.2 Concept of Health Insurance

As way of broadly explaining the concept of health insurance, the study deemed it imperative to source various definitions regarding the subject. Firstly, health insurance is the financial protection against healthcare cost arising from disease or accidental bodily injury (Naim et al 2013b). Health Insurance is also a pre-payment scheme for health services that gives clients the opportunity to cover their health-care costs which are spread over a stipulated period of time in the form of some agreed regular contribution called premium (Amarteyfio & Yankah, 2013). However, in the case of Ghana, the determination of membership of the scheme is contingent upon the individual paying his or her premium. The Health Insurance Association of America (HIAA) has also defined health insurance as coverage that provides for the payments of benefits as a result of sickness or injury, for losses from accident, medical expense, disability, or accidental death and dismemberment. In health insurance, payments made are spread over the clients and over time in the form of some agreed regular contribution called premium (Amarteyfio & Yankah, 2013). Services are provided according to clients' health needs.

On the contrary, coverage under the Ghana's Health Insurance Scheme (NHIS) does not include disability, or accidental death and dismemberment as seen in the definition by HIAA. Rather coverage is limited to selected cases of health care including Outpatient services (Malaria, acute respiratory tract infection, diarrhoeal disease, skin disease and ulcers, hypertension, acute eye infection, rheumatism, anaemia, intestinal worms disorders, acute ear infection, typhoid fever, dental caries, diabetes mellitus, STIs, asthma and others (general and specialist, investigations,

including laboratory investigations, x-rays, ultrasound scans for general and specialist out-patient services, HIV/AIDS symptomatic treatment for opportunistic infections, Out-patient/day surgical operations, including hernia repairs, incision and drainage of abscesses, and excision of lumps and haemorrhoidectomy, Out-patient physiotherapy);

NHIS also covers certain inpatient services including general and specialist in-patient care, investigations including laboratory investigations, x-rays and ultrasound scans for in-patient care. Cervical and breast cancer treatment, diagnosis and complications from other cancers, e.g. anaemia or obstruction, surgical operations, including appendicectomy, in-patient physiotherapy, accommodation in general ward, feeding, medication, namely, prescription medicines on the National Health Insurance Scheme Medicines List, traditional medicines approved by the Food and Drugs Board and prescribed by accredited medical and traditional medicines practitioners and processing for blood and blood products are also covered by NHIS.

More so, some oral health services are catered for by Ghana's NHIS. These include pain relief, incision and drainage, tooth extraction and temporary relief, dental restoration, which includes simple amalgam, fillings and temporary dressing). Furthermore, eye care services such as refraction, visual fields, scan, Keratometry, cataract removal, eye lid surgery are also covered by NHIS.

Finally, maternity Care including antenatal , care, deliveries (normal and assisted), caesarean section, post-natal care and Emergencies (Medical emergencies and surgical emergencies, including brain surgery or heart surgery due to accidents, paediatric emergencies, Obstetric and

Gynaecological emergencies including caesarean sections, road traffic accidents, industrial and workplace accidents are catered for by Ghana's NHIS (NHIS, 2017),

2.2.1 Types of Health Insurance

From the work of McIntyre (2007), there are several types of health insurance. Notable among them are Social Health Insurance (SHI), Private or Voluntary health insurance and Community-based Health Insurance (CBI) (Robyn et al., 2012).

2.2.1.1 Social Health Insurance (SHI)

In determining the meaning of Social Health Insurance, it was found that this type of health insurance is usually enforced by law. The SHI provides insurance for the population of a country and covers the cost of healthcare (Naim et al., 2013b). The authors describe it at times as National Health Insurance (NHI). Carrin & James (2004) also describe Social Health Insurance (SHI) as one of the principal methods of health financing. This type of Insurance can be mandatory or voluntary. Mandatory Health Insurance (MHI) is an insurance system that the law requires certain population groups or the entire population to adhere to or which provides benefits only to those who make insurance contributions (McIntyre, 2007) similar to Ghana's case. The Act of Parliament that established the Ghana's National Health Insurance Scheme requires that enrollment and membership in the NHIS is mandatory for all residents of Ghana except those working with the Ghana Armed Forces, the Ghana Police Service or those who can prove they hold a health insurance policy. In contrast, Voluntary Health Insurance (VHI), carries no such legal requirement. For instance, health insurance in Ghana is voluntary (HEPNET, 2007).

2.2.1.2 Private Health Insurance (PHI)

In the context of the work of McIntyre (2007), Private Health Insurance (PHI) is noted for enrolling mostly higher-income earners in society. Company employees often join the health insurance scheme and contributions to the scheme are shared between employees and employers, although membership may be open to anyone who chooses to contribute. In the case of commercial health insurance schemes, contributions tend to be risk-rated, e.g. the elderly and people with chronic conditions would pay a larger contribution than people likely to require fewer and less costly services (McIntyre, 2007). However, some private voluntary insurance schemes charge community-rated contributions, often because of a legal requirement to do so. It moreover offers health plans covering a specified list of health conditions in exchange for a renewable premium (Asgary et al., 2004). The private mutual insurance schemes in Ghana only cover less than 1 percent of the insured population (Gajate-Garrido & Owusua, 2013).

2.2.1.3 Community-Based Health Insurance (CBI)

The Community-based Health Insurance (CBI) was noted to be voluntary, not-for-profit health insurance schemes, that is organized at the level of the community with the application of the principle of risk sharing (Carrin, Waelkens, & Criel, 2005; Robyn et al., 2012). The operation of CBI schemes are community centered where people live in a common geographical area. The members who share common socio-economic characteristics or of ethnic population group pool resources in order to provide support for covering health expenditures (Carrin et al., 2005). There is also ample evidence to show that community-based health insurance offers some financial protection by reducing out-of-pocket spending as well as improving cost-recovery (Ekman, 2004). Prior to implementation of the National Health Insurance Scheme in Ghana, such CBIs exist.

Notable among these were Nkoranza Community Health Insurance Scheme and the West Gonja Health Insurance Scheme established in 1992 and 1995 respectively (Yevutsey & Aikins, 2010).

2.3 Importance of Health Insurance

The decision to join Health Insurance is a function of the desire utility (benefits) to be derived from it. Hence, the study examined the importance of such health insurance schemes. In doing so, the work of Asgary et al., (2004) revealed that health insurance reduces the high cost of health-care on economic wellbeing of households as health insurance turns unpredictable health expenditures into predictable insurance payments. Moreover health insurance plays important role in rural medical costs since it reduces direct out-of-pocket payments (Ataguba & Goudge, 2012). This is because health insurance coverage helps people get timely medical care and improves their lives and health (Bovbjerg & Hadley, 2007). Wagner et al., (2011) further added that generally individuals covered by health insurance are more likely to have access to care and less likely to be burdened by health-care costs. Undoubtedly, insurance is an important mechanism that succours the individuals, states and the nation at large (Boateng & Awunyor-Vitor, 2013a) as it seeks to increase revenues and to improve the equity and efficiency of the health system (Witter & Garshong, 2009).

2.4 Health Insurance Provider Payment Methods

There exist many different methods for paying providers and each method has an effect on the value of health-care services, cost containment and administration (Amo, Ansah-Adu, & Simpson, 2013). Provider payments may be classified as either Fee-for-service, Diagnosis related grouping and Capitation (Barnum, Kutzin, & Saxenian 1995).

2.4.1 Fee-For-Service (FFS)

Fee-for-service is a payment mechanism whereby health-care providers are paid for each service or act provided to a patient (Carrin & James, 2004). Fee-for-service systems are assumed to lead to increased health-care resource use (Lee, Cowie, & Slobodian, 1999). This can be attributed to the fact that Fee for service impact on health-care spending and quality by generating a substantially higher level of costs for health-care without yielding higher-quality care (Stevens, 2012). The effects of fee-for-service payments on rates of cost growth, however, are less clear. Stevens (2012) further asserts that Fee-for-service payments at least accommodate large geographic variations in spending for health care. A study in 2006 found that spending per enrollee in major markets varied from less than \$7,000 in Minneapolis to about \$12,000 in New York City with even higher costs observed in Miami i.e. over \$16,000 per enrollee. Under FFS payment, the health-care provider is reimbursed for each item of service provided and occurs after care has been provided (Gosden et al., 2000). Therefore, depending on the level of the fee, there is the incentive to deliver more care in order to inflate income. This can lead to supplier induced demand (SID) where the patient receives more care due to asymmetric information.

2.4.2 Diagnosis Related Groupings (DRG)

In the Diagnosis Related Grouping (DRG) payment method, the average cost of treatment for a related diagnosis of group of diseases is determined. Providers are paid this average cost according to the diagnosis they give their client. The process is administratively complicated and makes a heavy demand on the time of both provider and scheme staff and the NHIA.

The DRG payment method has the disadvantage of encouraging “creeping” resulting in cost escalation. In “creeping” the provider may deliberately give a diagnosis that attracts a higher fee

e.g. instead of diagnosing simple malaria they diagnose complicated malaria. However cost inflation under a DRG payment system are less than in an itemized fee for service system.

2.4.3 Capitation

A capitation can be defined as the amount of health service funds to be assigned to a person for the service in question, for the time period in question, subject to any national budget constraints (Rice & Smith, 1999). In other words, provider is paid an amount per patient registered with them or in their care (Gosden et al., 2000). In effect, a capitation system puts a “price” on the head of every citizen. For instance, a provider could be given a capitation premium of a specific amount for each month for every member of a particular health plan. In return for this capitation, the hospital accepts to give hospital services to all members of that health plan, despite the actual price for the services (Amo et al., 2013).

Capitations are usually varied according to an individual’s personal and social characteristics, using a process known as risk adjustment. Capitation is a well-established provider payment method in several countries both high as well as middle income countries including Ghana (Amarteyfio & Yankah, 2013). For instance, the British National Health Service has used capitation for decades. Thailand, on the other hand, successfully covers virtually all its citizens with health insurance, uses capitation as the base of its provider payment system and reserves methods such as DRG for the higher referral level. Chile and Estonia are other examples of middle income countries using capitation as one of their provider payment methods; and that has been successful in attaining universal or near universal coverage with health insurance according to Amarteyfio & Yankah (2013).

2.5 Determinants of Health Insurance Enrollment and Retention

This increasing interest in ensuring the sustainability of insurance scheme per the application of the law of large numbers has heightened the need for research into determinants of enrollment into insurance schemes. The current trend of investigations has been confined to assessing the factors affecting enrollment onto national health insurance schemes globally. The discussion of determinants of health insurance in this present study is grouped under both socio-demographic and socio-economic characteristics.

Under socio-economic characteristics, quite a number of studies has investigated the relationship between demand or consumption of health insurance and socio-demographic characteristics. To begin with, it has been observed that the demand for private health insurance is influenced by factors of income, political allegiance, previous experience and the role of the state in providing health-care (Propper, 2000). A study done in India on determinants of enrolment in voluntary health Insurance revealed that low level of awareness of people about insurance and the significant role of insurance consultants play a major role in addition to income, education and health risk in determining enrolment in health insurance. The study also noted that the insurance consultants have important roles in enrollment because they serve as major source of information on health insurance (Vellakkal, 2013).

Furthermore, the poverty level of the individual also influences enrollment onto health insurance (Alkenbrack, 2011). What is more, scholars like Liu & Chen (2002); Trujillo (2003) are of the view that married couples are more likely to purchase insurance coverage. A similar study on the effect of marital status on demand for health insurance found a significant positive relationship

between marital status and demand for health insurance (Kirigia, Lin, & Greane, 2005; Liu & Chen, 2002). They concluded that, compared to unmarried individuals, married couples demand health insurance more due to the need to provide protection against the risk of unaffordable health expenditures of their children. Another group of scholars also noticed that individuals who are gainfully employed also take insurance coverage more than the unemployed (Butler, 1997; Savage & Wright, 1999).

More so, similar studies have also been carried out by some researchers and scholars to determine the relationship between socio-demographic characteristics and demand for health insurance. For instance, income and age were found as significant predictors influencing insurance decision of the elderly in demand for private insurance health-care (Temple, 2002). A similar study by Makoka et al (2007) revealed that income and education of the consumers are significant determinants of choosing private health-care in free public health-care institutions. Typically on education, a higher level of education is positively related with the demand for any type of insurance product wherein health insurance is inclusive. This is because people's ability to understand the benefits of risk management and even long term savings as a pre-cautionary measure increases with their level of education and therefore increases their risk aversion. Thus, education is seen as an important determinant of the consumption of health insurance (Bloom, 2004; Blumberg & Nichols, 2002; Juetting, 2003; Trujillo, n.d.).

In the quest of further finding the factors that affect the demand for health insurance, submissions by Pauly & Herring (2001) also found that the price of insurance or premium has a significant influence on the demand for health insurance. With regard to the relationship between income and

demand for health insurance, Browne & Kim (1993) found a positive relationship between life insurance consumption and the level of income. As expected, health insurance consumption should rise with income as per the theory of demand for normal good. This is due to the fact that an individual's consumption and human capital typically increase along with income, therefore, in order to safeguard the income potential of the insured, insurance is secured. More to it, education, age, marital status, sex, family size, occupation and income have been observed to have direct and significant positive influence on health insurance consumption (Ibok, 2012) Religion has also been noticed to influence one's decision to join health insurance scheme (Jenna Dixon et al., 2014). In Africa, a similar study in Kenya also shows that females, formal sector workers are more likely to participate in the national health insurance programme (Kimani et al., 2012).

Ghana is not left out in such studies. Studies in Ghana indicate that socioeconomic characteristics such as sex, marital status, cost of care, income, higher levels of education and poor ill health are strong factors affecting decision to join insurance scheme (Owusu-Sekyere & Chiaraah, 2014). Age and occupation have also been identified as the major determinants of membership of the scheme (Gobah & Liang, 2011). The authors also found operational challenge (long waiting hours) and affordability of premium as barriers to joining the Ghanaian health insurance scheme. The study further found that lump sum payment (non-flexibility) of current insurance premium which may not be affordable to the informal sector is also contributing to the low enrollment rate on NHIS in Ghana (Amporfu, 2013; Osei-Boateng & Ampratwum, 2011). This is due to the fact that the informal sector members are characterized by irregularity in their income streams hence the lower participation of the informal sector in the scheme. Atinga et al., (2015) also shared similar

view as they noted in their study that non-affordability of premium was the predominant reason of low enrollment on health insurance in Ghana.

Other reasons cited for non-renewal of insurance included poor service quality, lack of money and taste of other sources of care. The gender, marital status, religion and perception of health status of respondents significantly influenced their decision to enroll and remain in NHIS (Boateng & Awunyor-Vitor, 2013). Boateng & Awunyor-Vitor (2013) also found out that gender, marital status and the perceived health status of respondents were found to influence individuals' decisions to renew NHIS insurance. In their work, female respondents were significantly 2.5 times more likely to renew their insurance as compared to the male respondents ($OR=2.5; p<0.01$). Respondents who were married were also 3.1 times more likely to renew their health insurance and this relationship was statistically significant ($OR=3.1; p<0.05$). Respondents who viewed their health as poor showed also increased likelihood of renewing NHIS insurance as compared to those who viewed their health status as good. Ironically, poor low enrollment is also attributed to poverty. The underlying structural cause was policy makers' and implementers' lack of commitment to pursue NHIS' equity goal (Kotoh & Van der Geest, 2016).

Another study has also found that respondents' perceptions about NHIS significantly influenced their decision to renew their insurance. Respondents who disagreed to the assertion that joining the scheme stands to benefit them were less likely to renew their insurance as depicted in model 2 ($OR=0.3; p<0.05$). Respondents' decisions to renew health insurance were also based on their convenience about the processes. Respondents who disagreed that the collection of NHIS cards was convenient were also less likely to renew their health insurance ($OR=0.3; p<0.05$). Premium of insurance and cost of registering for the insurance also played key role in ones decision to renew

insurance. Controlling for demographic characteristics and perceptions about NHIS, respondents who did not view the insurance premium as high were 2.5 times more likely to renew their insurance (OR=2.5; $p<0.01$)(Boateng & Awunyor-Vitor, 2013b).

Determinants of health insurance enrollment and retention is also believed to be influenced by level of education background. In this regard, a study has depicted that individuals with longer years of schooling were 21% more likely to insure against sickness than people with lower years of schooling if other explanatory variables remain unchanged. This confirms the expectation that individuals with higher education tend to better appreciate the operation of health insurance schemes and register (Owusu-Sekyere & Chiaraah, 2014). Their result also shows that individuals' earning higher incomes were on the average 7% more likely to take up health insurance than respondents' with low income.

Review of a study on Household perceptions and their implications for enrollment in the National Health Insurance Scheme in Ghana revealed that perceptions related to providers, schemes and community attributes play an important role in household decisions to voluntarily enroll and remain in insurance schemes (Jehu-Appiah et al., 2011). The details of their work point out that price (including premium and registration fees), convenience and benefits of NHIS are all scheme's factors that are significantly correlates with enrollment and retention. The authors predicted from their results that the probability of enrollment decreases if the price of premium is perceived to be high.

The study by Jehu-Appiah et al., (2011) further showed that inconveniences as a result of the scheme's administrative arrangements could be a potential barrier to NHIS enrollment and retention in Ghana. The authors finally argued that both insured and uninsured hold positive perceptions on the benefits of the NHIS. The study found out that the uninsured and previously insured are somewhat less positive on scheme benefits, and this may be associated with their decision not to enroll and renew membership. The same study finds that provider attitudes were perceived negatively that could hamper enrollment and retention on NHIS in Ghana. More to it, perceptions on community attributes were also identified by Jehu-Appiah et al., (2011) as barriers to Ghana's National Health Insurance Scheme enrollment and retention. Community attributes such as health beliefs, attitudes and peer pressure were found to influence individual's decision to enroll on the NHIS. For instance peer pressure was noted to be negatively associated with enrollment.

Findings from the work of Ayitey et al., (2013) also indicate that education and economic status (being non-poor and being employed) are significant and positive predictors of the decision to enroll in the NHIS. Further, age, area of residence (urban) and geographical area of residence per Ghana's ten administrative regions were found by the authors to be significantly correlated with the decision to enroll in the NHIS. In addition, Ayitey et al., (2013) study found that individuals who seek health care from orthodox healthcare providers are also more likely to enroll relative to those who seek care from traditional practitioners. Dixon (2014) also carried out a research in Ghana's Upper West Region on the determinants of health insurance enrolment. Results of a quantitative analysis reveal that although wealth, education and desire for health insurance are primary determinants in enrollment, these factors impact men and women differently. As well,

women with erratic incomes, who reported being food insecure and those with young children were more likely to drop out from the insurance schemes whereas men were more likely to drop out of the NHIS for being unsatisfied with services provided.

Again some quantitative and qualitative studies have demonstrated that low levels of income and lack of financial resources are major factors affecting enrollment. More to it, poor healthcare quality including stock-outs of drugs and medical supplies, poor healthcare worker attitudes, and long waiting times were found to be associated with low Community-Based Health Insurance (CBHI) coverage (Adebayo et al., 2015).

It has been identified from a meta-analysis that enrollments in Community Based Health Insurance (CBHI) were positively associated with household income, education and age of the household head, household size, female-headed household, married and chronic illness episodes in the household (David Mark Dror et al., 2016). The authors further suggested that other enabling factors for enrollment include knowledge and understanding of insurance, quality of healthcare as well as trust in scheme management. However, factors found to be militating against enrollment according to David Mark Dror et al., (2016) include inappropriate benefits package, cultural beliefs, affordability, distance to healthcare facility, lack of adequate legal and policy frameworks to support CBHI, and stringent rules of some CBHI schemes. Education, household size and trust in the scheme management were positively associated with member renewal decisions.

In all the literature reviewed on determinants of Health Insurance Enrollment and Retention, what has not received much attention is the registration process or payment mode. Currently people

have to line up for hours to enroll or renew membership which often lead to high time cost. In this regard, a new method of payment or registration that does not require long waiting time and lump-sum payment is urgently needed. Therefore, technological payment option in a form of Mobile Phone Payment System (MPPS) is proposed to estimate the effect of this new proposal on NHIS enrollment and retention.

2.6 Overview of National Health Insurance Scheme in Ghana

Act 650 of 2003 established National Health Insurance Scheme (NHIS) in Ghana (NHIA Annual Report, 2011). The purpose of the scheme is to provide primary healthcare services to persons resident in the country through mutual and private health insurance schemes (Boateng & Awunyor-Vitor, 2013). The scheme operates under three different types in the country which are the District-Wide Mutual, Private Mutual and Private Commercial Schemes. These different schemes are regulated by the National Health Insurance Council (NHIC) (Scheme NHI, 2010). With the District-Wide (Public) Mutual Health Insurance scheme, workers of the public sector directly pay a share of their salaries into the health insurance system.

At present, quite a number of the districts operates district based health insurance schemes, which are voluntary and to a greater extent integrated to health-care facilities (Boateng & Awunyor-Vitor, 2013). On the other hand, the Private Mutual Health Insurance scheme thrives on contribution from subsistent farmers, people working in the informal sector and unemployed people who were not formerly employed in the public sector. Lastly, with the Private Commercial Health Insurance Scheme (PCHIS), contributions are from those employed by larger companies and multi-national companies. The PCHIS companies are few and are patronized by employers and few individuals according to Boateng & Awunyor-Vitor (2013).

Funding of the National Health Insurance Scheme as established by Act 650, comes from a Fund created by the Act, with income from two main sources, also created by the act. These are the National Health Insurance Levy (NHIL), a 2.5 percentage top up of the Value Added Tax (VAT), and a 2.5 percentage transfer from the existing Social Security and National Insurance Trust (Boateng & Awunyor-Vitor, 2013). Additionally, other consolidated funds and premiums are used to finance the scheme. For instance “Donations, grants, gifts and other voluntary contributions” are also added to fund the scheme (HEPNET, 2007; Salisu & Prinz, 2009). As already established by Blanchet et al., (2012) the 2.5 per cent tax on goods and services is by far the largest source, comprising about 70 per cent of revenues. Social security taxes account for an additional 23 percent, premiums for about 5 per cent and other funds for the remaining 2 percent.

There are three types of insurance schemes that exist under the National Health Insurance. According to (HEPNET, 2007), within these schemes, the health insurance programme offers the full Out Patient Department (OPD) and admission treatment (surgery and medical) cost including feeding, full payment for medicine if within the approved list; payments for referrals (gatekeeper system) are taken care of provided it is within “inclusive list”. However, the scheme excludes appliance, prostheses, rehabilitation, dentures, organs aids, cosmetics surgery and assisted reproduction; HIV retroviral drugs, hormone and organ replacement therapy; heart and brain surgery other than accidents; diagnosis and treatment abroad as well as dialysis for chronic renal failure and cancers. Despite these numerous benefits the scheme provides, it is confronted with challenges threatening its sustainability.

As of 2013, the scheme had registered about 17.5 million people representing about 72.92% of the population of Ghana (NHIA Annual Report, 2011). However current active membership of the scheme stands at a paltry population of 8,227,823 according to the NHIA recent report representing 38% of the population. This figure represents members who have renewed their membership as well as new members enrolled on to the scheme. In the same report, adult population forms about 29.2%, under 18 years taking 48.9% while the rest are covered by other categories. Members pay premium charges in the ranges of GHS7.5 to GHS25.00 (\$5.00 -\$17.00) based on employment type and age of the prospective member.

According to Amarteyfio & Yankah (2013), provider payment methods currently used in Ghana are Itemized Fee for service (FFS) for insured clients (both services and medicines), Diagnosis Related Groupings (DRG) for insured clients (Services only) and recently introduced Capitation method.

In an itemized fee for service provider payment method, different total cost of different health-care services delivered by a provider for a client (patient) is forwarded to purchaser for payments. The advantage of the itemized fee for service payment method is that there is no financial risk borne by the provider. The disadvantage of itemized fee for service is that there is the possibility of inducement due to asymmetric information.

As indicated earlier, in the Diagnosis Related Grouping (DRG) payment method, providers are paid an average cost according to the type of diagnosis made on a client. Currently, Ghana uses the DRG system to pay for services to insured clients while continuing to pay for medicines by an

itemized fee for each medicine supplied after successful vetting of claim forms. This system has two main disadvantages which include the complicated nature of its administration which makes a heavy demand on the time of both provider and scheme staff and the NHIA. The DRG payment method also encourages “creeping” resulting in cost escalation since the provider may deliberately give a diagnosis that attracts a higher fee e.g. instead of diagnosing simple malaria they diagnose complicated malaria. Under the Ghana DRG system medicines at all levels continue to be paid for by an itemized fee for medicine payment method and the potential of major cost escalation remains strong according to (Amarteyfio & Yankah, 2013).

Capitation, as noted by Amarteyfio & Yankah (2013) is another form of payment method under health insurance. Under Capitation, providers are paid in advance a pre-determined fixed rate to offer a defined set of services for each individual enrolled with the provider for a fixed period of time. The amount paid to the provider is irrespective of whether that person would seek care or not during the designated period. The fixed amount is typically expressed on a Per Member Per Month (PMPM) basis. Under this payment system, the member or subscriber selects a preferred primary provider (PPP) to provide all the services under the capitation basket in exchange for the capitation premium. The capitation basket refers to the services and medicines that are to be paid for by the per capita rate. The amount is calculated based on the total number of active members who have selected a given provider.

2.7 Overview of Mobile Phone Usage

There has been a rapid increase in mobile phone penetration globally particularly in the Asia Pacific region, with 90% of the global and 80% of rural population having access to a mobile

network in 2010 (de Jongh, Gurol-Urganci, Vodopivec-Jamsek, Car, & Atun, 2012). In that same year, the number of subscriptions reached 5.3 billion following earlier study in 2006 that reported an estimated subscription of 2 billion (ITU, 2010). This represents 76.2% global penetration rate. In Africa, the demand for mobile phones is huge and rapidly increasing recording 50million subscribers a decade ago (Scott, Batchelor, Ridley, & Jorgensen, 2004). This represents 7% of the continent's population. With the annual growth rate of 35% according to Scott et al. (2004), it is expected that the current figure will overwhelmingly increase after 10 years.

In Ghana, mobile phone penetration stands at 30,360,771 subscribers according to National Communication Authority as of December 2014. In 2015, the total number of mobile phone subscribers increased to 35,008,387 while it increase marginal to 38,305,078 in 2016. The overwhelming consumption of this good could be attributed to its versatile application in all fields that ensure the wellbeing of individuals. This includes infrastructure services, economic, education, health, agriculture and social issues. The application of mobile phones in our daily activities can have both negative and positive impact on society. Positively, a survey in American's use of internet reports that about 65% of mobile phone users say that mobile phones have made it “a lot” easier to stay in touch with the people they care about (Smith, 2012). Another study in Mali also found out that residents are able to call relatives living in the capital city of Bamako or relatives in France (Aker & Mbiti, 2010).

Searching through studies done in Ghana, it was revealed that farmers in Tamale, Ghana are able to send a text message to enquire about prices of foodstuffs in the capital, Accra, which is over 1,000 kilometres away. Furthermore, mobile phones have made it easier to plan, schedule and be

productive in our daily routine while engaging in other things (Smith, 2012). A survey in Kigali, Rwanda, suggests that the use of mobile phones is allowing micro-entrepreneurs to develop new business contacts (Donner, 2006). Similar studies done in South Africa, Tanzania, and Egypt also revealed that the use of mobile phones has increased the profitability of about 60% of micro-entrepreneurs (Samuel, Shah, & Hadingham, 2005). In Niger, day labourers are able to call acquaintances in Benin to find out about job opportunities without making the US\$40 trip (Aker & Mbiti, 2010). On the contrary, mobile phones have made it difficult to give people undivided attention as well as to focus on a single task without being distracted (Smith, 2012.).

This overwhelming use of mobile phone in Ghana implies that it may be feasible for National Health Insurance premium to be paid through mobile phones that has the potential of making NHIS premium less expensive to pay hence maximizing both the enrollment and retention rates of Ghana's National Health Insurance scheme as already mentioned.

2.7.1 The Use of Mobile Phone in Health-care Delivery

In health settings, the use of mobile phones until recently has played remarkable roles in health-care delivery. For instance, text messaging interventions have been adopted to improve compliance to medication and attendance at clinical appointments (Car, Gurol-Urganci, de Jongh, Vodopivec-Jamsek, & Atun, 2012; Gurol-Urganci, de Jongh, Vodopivec-Jamsek, Atun, & Car, 2013; Horvath, Azman, Kennedy, & Rutherford, 2012; Mbuagbaw et al., 2015). Another study also found the use of mobile phone messaging interventions to support and improve preventive health-care, health status and health behaviour outcomes (Vodopivec-Jamsek, de Jongh, Gurol-Urganci, Atun, & Car, 2012). A similar study also reports that mobile phone messaging interventions are likely to provide

benefit in supporting the self-management of long-term illnesses (de Jongh et al., 2012). This happens through Short Message Service (SMS) and Multimedia Message Service (MMS) for improving patients' self-efficacy skills through medication reminders and therapy adjustments or supportive messages.

Furthermore, mobile phones have also been employed in managing communicable diseases and in health promotion programmes (Obermayer, Riley, & Jean-Mary, 2004). More to it, among population groups including teenagers and young adult males who do not often use health services, the use of mobile phones have been identified to provide the opportunity to remotely access care providers for advice (Atun & Gurol-Urganci, 2006). Another study has also been done in Malawi among HIV patients. In Malawi's case, HIV and AIDS patients can receive text messages daily to remind them about their medication schedule (Aker & Mbiti, 2010).

Regarding all these studies, what is missing in literature is the use of mobile phone to purchase health care in an era in sub-Saharan Africa especially Ghana where there is over-reliance of health insurance in financing health care expenditure. In health insurance, the sustainability of it depends on rate of enrollment or retention. The larger the enrollment, the better. However, the National Health Insurance Authority (NHIA) in Ghana is struggling to maximize its enrollment or retention rate. The idea of maximizing the enrollment and retention rates is to improve upon the current 1% annual enrollment rate (Universal Access to Health Care Campaign Coalition, 2013) to a Universal Health Coverage threshold requirement. Mobile phone payment system is being proposed to improve upon the current enrollment as well as retention rate due to its extensive usage in Ghana.

2.7.2 The Use of Mobile Phone to Pay Health Insurance Premium

Paying health insurance premium with mobile phone has not received much consideration from policy makers or managers of health insurance schemes globally. Although it has been thought to provide a flexible and convenient platform for remittance of periodic insurance premium contributions especially from informal sector populations (Maara, 2014), less attention is paid to usability of the device.

Kenya has made a bold step by launching a mobile phone platform called "M-Pesa" (Mobile Money Payment System) for paying health insurance premium on monthly basis (Maara, 2014). According to Maara (2014), since the introduction of the M-Pesa payment system, membership of Kenya's National Health Insurance Fund (NHIF) has increased 10 times from 10,000 to close to 100,000 in 2014. This is what the present study seek to study and replicate by determining the effect of paying health insurance premium with mobile phone on enrollment and retention rates in Ghana's health insurance scheme. The report further adds that the system has helped to reduce the administrative cost of NHIF as fewer cashiers are required to handle M-Pesa payments. More to it, M-Pesa has made it possible for individuals to make insurance premium payments on behalf of others with little or no income.

The conditions for using mobile phone to pay insurance premium with M-Pesa application according to (Maara, 2014) are that,

- 1. Individual selects Pay Bill option on mobile phone*
- 2. Enters NHIF Business Number – Type 200222*
- 3. Enters a/c no – Type in contributor's National Identity Number*

4. *Enters amount – Type in the amount you wish to contribute*
5. *Enters Pin – Type M-PESA PIN*
6. *Confirms details are correct and hits OK and*
7. *User receives two confirmation SMS's from M-PESA and NHIF immediately.*

In Kenya's case, the implementation of the system was not without challenges (Maara, 2014). Initially, there was a challenge with the integration of systems. There were difficulties and delays in integrating the M-Pesa payment platform with the NHIF payment and information technology system. Secondly, in its first iteration, M-Pesa payment system was not able to detect member account information that might have been entered correctly or not. When error occurs (miskeyed number), it becomes strenuous for the managers of the fund to trace these errors and correctly assign payment to the right individual. The effect was that members' contributions were not being reflected in membership accounts in real time resulting in inability to access health-care services at a point of seeking health care.

Maara (2014) confirms that these challenges have now been corrected and are recognized by the NHIF as an important consideration to take into account when introducing new payment platforms.

2.8 Pro-rata Payment of Health Insurance Premium

From the premise of the modalities of payment of health insurance premium at a go without considering the characteristics of poor households, this section investigates whether proposals have been made to pay health insurance premium on pro-rata basis i.e. installment terms.

There is an evidence to suggest that the premium amount to be paid remains unaffordable for very poor households (Allegri et al., 2006). These authors further argue that requiring that the premium be paid all at once for the entire household constitutes an important barrier to enrollment. In spite of this difficulty, proposals have been made to grant households the possibility of spreading payment over a longer period of time in several installments (Allegri et al., 2006). This current study moreover shall provide additional information to Allegri et al., (2006) work by estimating the effect of the magnitude of spreading payment in several installments on health insurance enrollment and retention rates.

Furthermore, a newspaper publication in India has also added a voice to the call of paying health insurance premium in installment. The report suggests that the absence of the pro-rata payment option is considered as the main reason for India's poor medical insurance enrollment (Venkatesh, 2016). With regards to India's case, government data reveal that only 18 percent of the urban population is covered by any medical insurance while the figure is even lower at 8 percent in rural areas. However, the report from India case is based on newspaper publication which lacks rigorous scientific scrutiny. Therefore, the current study seek to provide information on how the pro-rata payment option will impact on health insurance enrollment and retention through a mobile-phone-payment system.

Another related work is Amporfu (2013) who believes that the insurance premium may not be affordable to the informal sector due to non-flexibility in its payment. This is because the informal sector in Ghana is characterised by irregular income due to underemployment, low wages and bad working conditions (Amporfu, 2013a; Osei-Boateng & Ampratwum, 2011). Due to the high rate

of informal sector members in the economy, a study has also recommended that the members be allowed to pay NHIS premium on pro-rata (Gobah & Liang, 2011).

This present study is believed to be the first of its kind to provide vital information on how subscribers respond to the use of mobile phone to pay insurance premiums based on premium payment flexibility. Moreover, to obtain credible findings, the results shall be subjected to rigorous statistical testing. This includes model evaluation techniques, predictive accuracy and discrimination analysis as well as statistical tests of individual predictors of the model. In terms of policy, the findings of the study shall provide the relevant information that could aid the National Health Insurance Scheme in their decision-making on the formulation and implementation of sustainable evidence-based payment method for the scheme.

2.9 Effect of Savings in Medical Cost on National Health Insurance Scheme Enrollment and Retention

The relationship between the propensity for an individual to enroll on the scheme and partial coverage of the scheme found that the persistent conception of the health insurance scheme among uninsured Ghanaians is that the scheme is a full insurance (which, in reality, is not) capable of providing total coverage (or even an adequate cushion) from the usually insurmountable bills they get when they acquire outpatient healthcare services. These contradicting perspectives consequently discourage the uninsured individual from enrolling since they fail to see how the scheme reduces healthcare costs (Kusi, Enemark, Hansen, & Asante, 2015; Panda, Chakraborty, Raza, & Bedi, 2016). This limited coverage includes uncovered drugs and tests at health facilities (Nguyen et al., 2011).

Although in the face of these facts, the uninsured often does not appreciate the sum of savings made on health expenses when insured although the uninsured accrue higher health bills than the insured. Sepehri (2014) conducted a similar study in Vietnam (a country with similar income status as Ghana) to ascertain the amount of money saved when insured people seek medical attention. The study revealed that averagely, health insurance reduces 50-56% of out-of-pocket health expenditure of insured patients compared to fee-paying patients.

However, Sepehri (2014) study failed to account for the impact that the knowledge of the reduced health cost or savings for the insured on their healthcare expenditure contributed to enrollment unto the scheme; this is the gap that the present study sought to fill i.e. identifying the effect of the magnitude of the knowledge of savings on healthcare expenses on enrollment and retention on the health insurance scheme. In view of this, the present study has investigated the significant role played by the knowledge of savings on medical cost to both the insured and uninsured on the scheme's enrollment and retentions. Another study on "the effect of health insurance protection against out-of-pocket and catastrophic expenditures and also support poverty reduction in Ghana" also indicated that enrollment into health insurance reduces household OOPE by 86% (Aryeetey et al., 2016).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This section explains the methodology that was applied in the study. The concept of the proposed Mobile Phone Payment System (MPPS), study area, the study design, theoretical model used and data collection techniques are discussed. The data collection techniques outline the sample and sampling method, data collection tool and relevant statistical tools that were used in the analysis of the data set.

3.1 The Concept of Proposed Mobile Phone Payment System (MPPS)

3.1.1 Expectation from Telecommunication Company

The proposed system is supposed to be feasible, citing the instance of the talk-tax system, market promotions, advertisement and mobile money systems carried out through mobile phone in Ghana. The proposed payment system can equally be done if optimum cooperation is derived from all the Telecommunication Companies (Telecos) in the country. The Telecos should be willing to provide platforms for this service at a minimum commission fee.

3.1.2 Understanding of the Design of the System

From the focus group discussion including an IT expert, the proposed system for mobile phone payment of NHIS premium shall use the Unstructured Supplementary Service Data (USSD) platform. The USSD platform is the only application preloaded on every mobile phone in Ghana since it requires no software installation on the handset. The USSD is a protocol used by GSM cellular telephones to communicate with the service provider's computers (TelecomSpace, 2010). USSD can be used for WAP browsing, prepaid callback service, mobile-money services, location-

based content services, menu-based information services, and as part of configuring the phone on the network.

With the present study, USSD communication shall be integrated into all the Telecommunication Companies platforms in Ghana except those on Code Division Multiple Access (CDMA). Customized database/account could easily be created on the platform for each subscriber using USSD Services.

3.1.3 Proposed Payment Preferences in MPPS

The proposed system shall allow for 2 major payment routes either subscribing to Automatic Deduction Payment System (ADPS) where certain amount of credit is deducted from one's stock of credit or Mobile Money Payment System (MMPS) i.e. paying through the mobile money system. The USSD application receives the service request from the user and responds by sending the user "a menu of options".

With our proposed study, we expect the "menu of options" to display either the Automatic Deduction Payment System (ADPS) or Mobile Money Payment System (MMPS). In the proposed ADPS, the mobile phone user willingly subscribes so that certain amount of credit is deducted automatically from the person's stock of credit when a voice call is made within a predefined talk time. This implies that payment of insurance premium is on pro-rata basis. Further advantage of this system is that long waiting time at NHIS offices to make registration or renewing NHIS membership is minimized. Transportation cost to NHIS offices is also minimized. Lastly, taking information on demographic characteristics of the individual that usually prolongs the waiting time

at the NHIS office is eliminated. Once enrolled onto the NHIS through this route, one time visit is made to the NHIS office for biometric data capturing and issuance of card at an expected minimal waiting time.

In the Mobile Money Payment System (MMPS) on the other hand, the mobile phone user pays health insurance premium through the mobile money system. The user has the choice to make lump sum or pro-rata payment. There is a minimal waiting time due to the availability of numerous mobile money merchant/vendors in every corner of Ghana. Therefore the issue of transportation cost is minimized.

Generally, under the USSD, the mobile phone user paying health insurance through mobile phone initiates the USSD session by dialing the USSD string defined by the Service provider; e.g. *119# and sequence of events as found below are followed.

- The user responds by selecting the desired options.
- Supposed the user selects ADPS option, the USSD application sends back details (options) to the user requesting him/her to select amount to be deducted from his/her stock of credit per minute of talk time. e.g. GHS0.01 @ cost x_1 , GHS0.02 @ cost x_2 , GHS0.03 @ cost x_3 , ..., GHS n @ x_n
- The user selects the appropriate response and the USSD application responds by sending a confirmatory message of subscription and ends the session.
- The user can as well deactivate the subscription by dialing another USSD string defined by the Service provider; e.g. *180#.

- On the other hand, if the subscriber selects VPS option, the USSD application responds by *asking how much the subscriber is paying*
- The mobile user responds with the amount to pay at x cost.
- The USSD application responds by sending a confirmatory message of payment and ends the session

Figures 3.1 and 3.2 show an example of sequence of data transfers between a mobile user's handset and the USSD application to implement the "ADPS and MMPS" service described above.

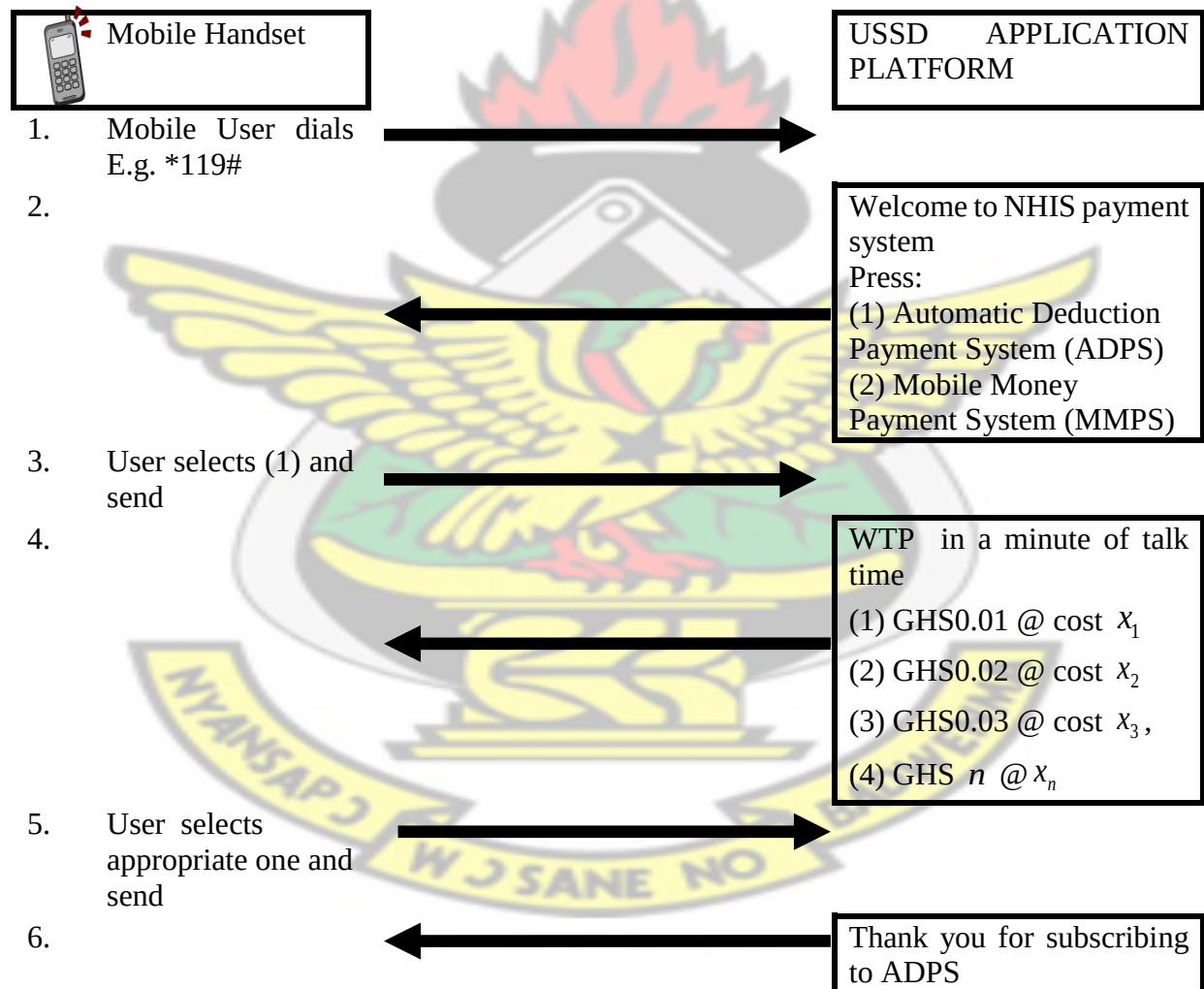


Figure 3.1: Automatic Deduction Payment System (ADPS)

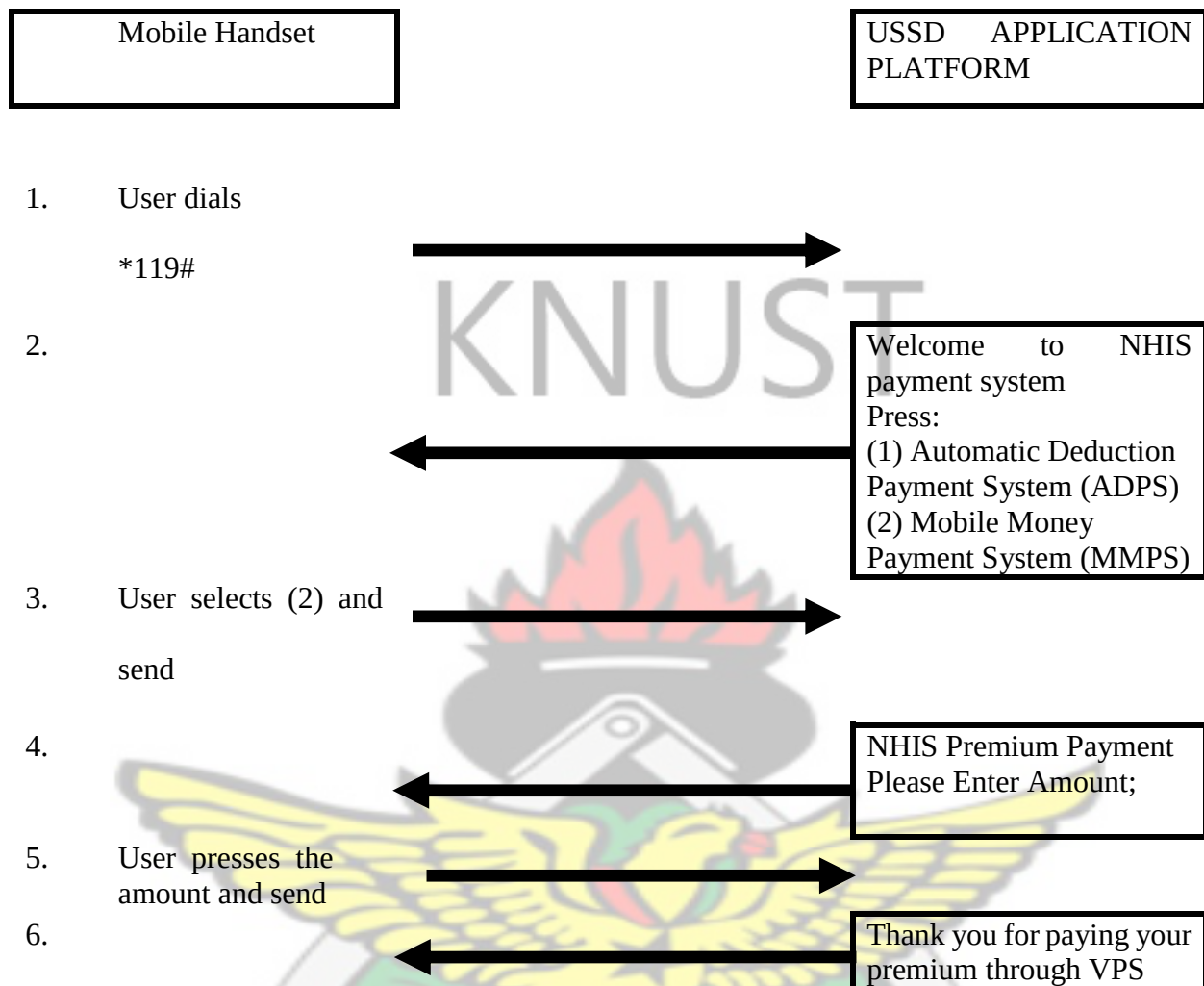


Figure 3.2: Mobile Money Payment System (MMPS)

3.1.4 Conditions of the Proposed MPPS

To participate in the proposed MPPS, the individual should possess a mobile phone registered in his or her name and other demographic characteristics with a valid national identification card. Secondly, the subscriber may have registered onto the mobile payment system. Moreover, it should be noted that payment under ADPS is contingent upon talking time. This translates into the type of voucher used, call duration and the frequency of calls or data usage in a day. To achieve early payment of premium and subsequently gain full membership, the aforementioned factors are very critical. Increase in the magnitude of such factors translates into more talking minutes, hence more

contribution to make. Regarding the MMPS too, the participation in the system is not mandatory as well as not dependent on a required talking time. However, the perceived hitch is possible inconvenience cost of travelling to mobile money vendors to make payment into mobile payment system account.

The mobile phone payment was considered due to its extensive use in the economy which is about 38,305,078 users as of December 2016 (National Communication Authority Report, 2016), therefore, it may be feasible for national health insurance premium to be paid through mobile phones; this has the potential of making NHIS premium less expensive i.e. affordable, to pay hence maximizing both the enrollment and retention rates of Ghana's National Health Insurance scheme.

3.2 The Study Area

This study was conducted in 1 urban, 1 peri-urban and 1 rural district in Ashanti Region (the second largest region in terms of population in Ghana as well as fourth largest in size in the country). The choice of these categories of districts was to ensure adequate representation of subscribers with different characteristics in the study setting. Moreover, the region was strategically chosen based on past experience of being used for other pilot projects including capitation implementation by NHIS. The region's population as of the 2010 census stood at 4,780,280, representing 19.4 percent of the country's total population (Ghana Statistical Service, 2012). The Ghana Statistical Service report revealed that females dominate in the region representing about 51.55% of the entire region's population. The report further asserts that the economically active population in the region is engaged mainly in farming, comprising 44.5%. This is followed by wholesale and retail trade (18.4%), manufacturing (12.2%) and community, social and personal services etc., (9.9%). About

37 % of the region's population was actively enrolled onto the NHIS as of 2011 (National Health Insurance Authority, 2011).

3.2.1 Urban District-Kumasi Metropolitan¹

Kumasi Metropolis is among the thirty (30) districts in Ashanti Region. It is located between Latitude 6.35°N and 6.40°S and Longitude 1.30°W and 1.35°E and elevated 250 to 300 meters above sea level. The Metropolis shares boundaries with Kwabre East and Afigya Kwabre Districts to the north, Atwima Kwanwoma and Atwima Nwabiagya Districts to the west, Asokore Mampong and Ejisu-Juaben Municipality to the east and Bosomtwe District to the south. It is approximately 270km north of the national capital, Accra. It has a surface area of approximately 214.3 square kilometers which is about 0.9 percent of the region's land area. However, it accommodates about 36.2 percent of the region's population. The Kumasi Metropolis, with a population of 1,730,249 represents 36.2% of the total population of Ashanti Region, according to the 2010 Population and Housing Census. Its population depicts a broad base population pyramid which tapers off with a small number of elderly persons. The average age dependency ratio for the Metropolis is 58 years that is, 59.9 years for males and 56.3 years for females. The total fertility rate for the Metropolis is 2.6 with a General Fertility Rate of 76.5 births per 1000 women between 15-49 years. The crude birth rate is 22.8 per 1000 population and the crude death rate is 4.7 per 1000.

¹ 2010 Population and Housing Census, District Analytical Reports

About 66.5% of the population aged 15 years and older is economically active. Of the economically active population, 91.4% is employed. For the economically inactive, 56.4% are students, 19.5% perform house duties and 2.9% are disabled or too sick to work. Of the employed population, 38.9% are in the service and sales work (with 55.1% being females and 22% being males), 22.8% are in the craft and related trades (with males comprising 32.9% compared to only 13.1% females), 10.3% are into elementary occupation and only 2.6% are skilled agricultural forestry and fishery workers. About 49.2% of the workforce is self-employed without employees with male and female proportions at 37.9% and 60.1% respectively. About 8.5% of households in the metropolis are engaged in agriculture mainly into crop farming and livestock. About 2.4% of the total population in the Metropolis has a disability with a male composition of 2.3% compared to 2.5% females. The types of disability in the Metropolis cover sight, hearing, speech, physical, intellect and emotion. Persons with sight disability recorded the highest (42.8%) followed by physical disability (22.5%).

Kumasi Metropolis has 136 health facilities providing healthcare services to its residents. The biggest such facility is the Komfo Anokye Teaching Hospital (KATH) which is a modern teaching hospital widely used by residents and others from Ghana and overseas. The majority of the 136 health facilities (115) are privately owned.

Of the population 12 years and older, 72.4 percent own mobile phones. Among those who own mobile phones, 76.3 percent are males and 69 percent are females. The map of Kumasi metropolis is shown below.

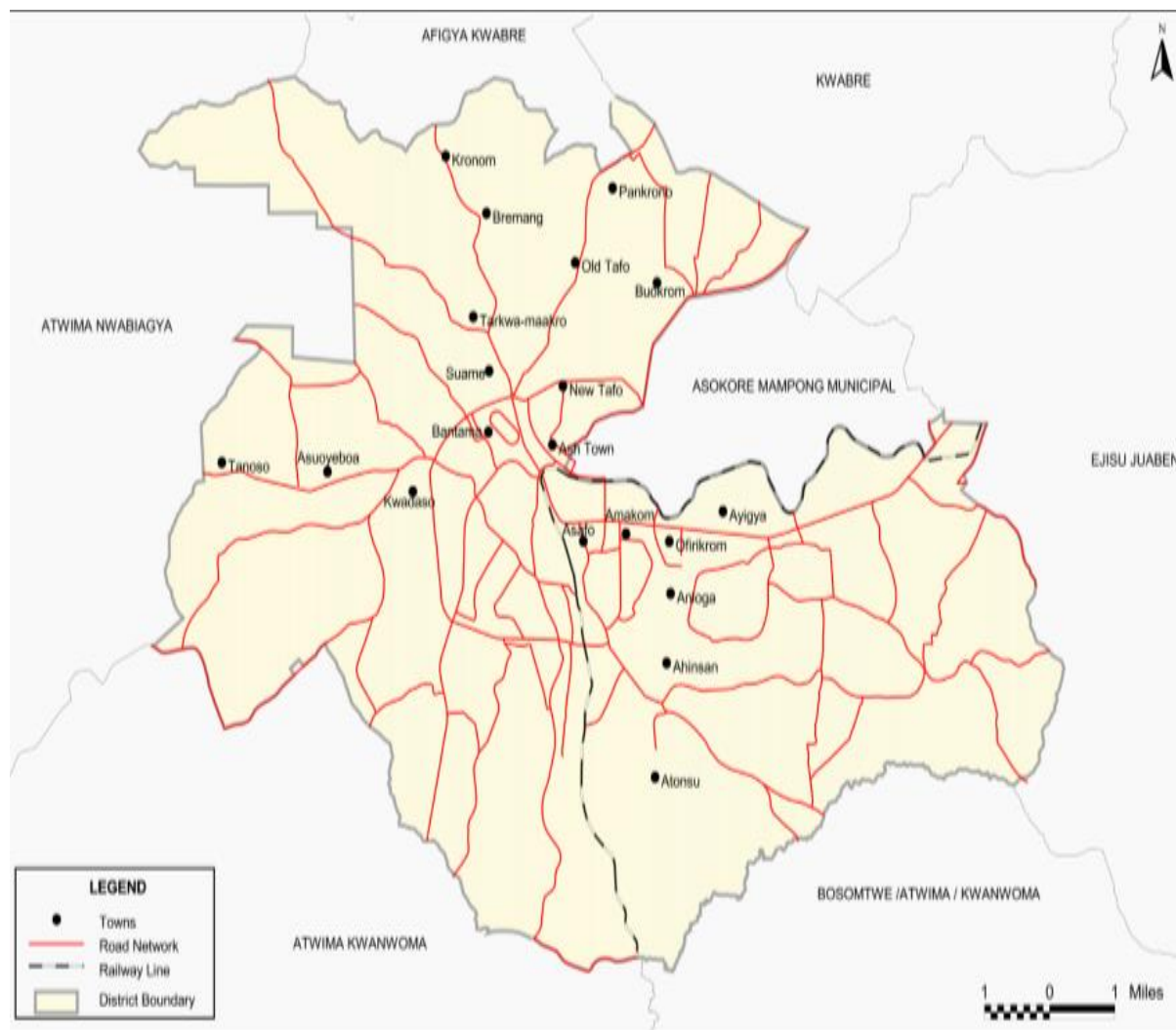


Figure 3.3: Map of Kumasi Metropolis

Source: Ghana Statistical Service, GIS

3.2.2 Peri-urban District -Atwima Nwabiagya District²

The Atwima Nwabiagya District lies approximately on latitude 6° 32'N and 6° 75'N and between longitude 1° 45' and 2° 00' West. It is situated in the western part of the region and shares common boundaries with Ahafo Ano South and Atwima Mponua Districts to the West, Offinso Municipal to the North, Amansie–West and Atwima Kwanwoma Districts to the South, and Kumasi Metropolis and Afigya Kwabre Districts to the East. It covers an estimated area of 294.84 sq. km. The district capital is Nkawie. The Atwima Nwabiagya district has a population of 149,025 with 68.5% of the population living in rural localities. Females constitute more than half (51.7%) of the population of the district resulting in a sex ratio of 93.3. With respect to the sexes, male heads constitute a higher proportion (30.6%) than females (18.1%).

The economy of Atwima Nwabiagya District can be classified under four broad categories namely agriculture, industry, trading and services. The service industry employs 31.7 percent of the labour force, followed by trade/commerce which employs 25.9 percent, agriculture, (22.8%) and lastly industry employing (19.6%). Although the district is 68 percent rural and 32 percent urban, generally it would be expected that agriculture dominates the economy, however it should be noted that most of the settlements are closer to the urbanized communities and so are mostly engaged in services and trade activities.

² 2010 Population and Housing Census, District Analytical Reports

The district has only one (1) Hospital, four (4) Health Centres, six (6) Private Maternity Homes and four (4) private clinics, which are located in Abuakwa, Akropong, Nkawie, Toase, Dabaa, Afari, Adankwame and Barekese. The hospital is located at Nkawie/Toase. Rural communities such as Kobeng, Wurapong, Bankyease, Abira and Amakye-Bare have been provided with Community Health Planning Services (CHPS) compounds. On mobile phone usage in the district, of the population 12 years and older, 58.6% have mobile phones. Males constitute 51.5% as compared to 48.5% of females. Below is the map of Atwima Nwabiagya District.



Figure 3.4: Map of Atwima Nwabiagya District

Source: Ghana Statistical Service, GIS

3.2.3 Rural District - Sekyere Central³

Sekyere Central District is located on the northern part of the region, and shares boundaries with Mampong Municipal, Atebubu District, Sekyere East, Sekyere South, and Ejura Sekyeredumasi. The land size of the District is 1,631.1 sq. km and it is located within longitudes 0.05 degrees and 1.30 degrees west and latitudes 6.55 degrees and 7.30 degrees north. It has about 150 settlements with about 70 percent being rural. The rural areas are mostly found in the Afram Plains portion of the District where communities with less than fifty (50) people are largely located. The Sekyere Central district with a population of 71,232 represents 1.5% of the region's total population. Males constitute 49.5% and females represent 50.5%. Majority of the population reside in the rural areas (68.3%). The district has a sex ratio of 97.8.

Farming is the predominant economic activity and employs about 75 percent of the economically active labour force. The District has a vast arable land; however, farming is at subsistence level. The geographical location of the District and its closeness to other districts enhances trade activities. Market days in the various districts experience inflow and outflow of both agricultural and manufactured goods. The result is that the Assembly's revenue is enhanced and traders' income improved because of the large market. The vast land in the north-eastern part of the District is a potential source of agricultural land for modernized agricultural development. The rainfall pattern of the District support two cropping seasons

³ 2010 Population and Housing Census, District Analytical Reports

Of the population 12 years and above, 28.1 percent have mobile phones. Men who own mobile phones constitute 31.0 percent as compared to 25.4 percent of females. See below the district map.



Figure 3.5: Map of Sekyere Central District

Source: Ghana Statistical Service, GIS

3.3 The Study Design

The problem of both the National Health Insurance Authority (NHIA) and the individual was the decision to participate in the proposed MPPS. What is more, could the individual especially the

uninsured be influenced to enroll on NHIS based on the knowledge of savings on cost of medical care by the insured as he demands medical care?

To do this effectively, the study adopted both quantitative cross-sectional community-level survey, exploratory case-control design and appropriate qualitative techniques to obtain the relevant information to address the objective of the study. Both primary and secondary data were used for the study. The secondary data including process of registration, challenges of the current payment method, components of processing fee, premium amount and cost of collection of premium were obtained through the qualitative data collection technique. These information were used to compute a feasible cost of collecting NHIS premium through the proposed MPPS that would be acceptable to NHIA. Information on the premium and processing fee were obtained from the National Health Insurance Scheme (NHIS) through the qualitative design.

The primary data on the other hand was obtained from cross-sectional community-level survey, and was used to estimate the determinants of participating in the proposed MPPS. Information on factors influencing the decision of the individual to pay NHIS premium by mobile phone, the choice of preferences i.e. ADPS and MMPS were obtained from the quantitative design. More to it, the quantitative design was also used to find out the effect of the pro-rata NHIS premium payment and savings on cost of medical care by the insured on the enrollment on NHIS. For the purpose of the design of the present study, the survey was inclusively conducted on both non-users and users of mobile phone as well as key stakeholders in the National Health Insurance Scheme. Consideration was given to the age limit necessary for the study and it was pegged from 18 and above since that is the age from which an individual becomes liable to pay health insurance

premiums; ergo, those outside this category were not considered. Data collection was done in October, 2016.

3.3.1 Sample and Sampling Techniques

Using a proportion, $p = 75\%$, of individuals willing to pay health insurance premium with mobile from a pretest, a two-tail bound of $d = 0.025$ from the estimate with a precision $Z = 1.96$, and the population of the selected districts $N = 2,255,321$, a total sample size of 1,152 was required for the study using the formula $n = Z^2 * \frac{p(1-p)}{d^2 + (Z^2 * p(1-p)/N)}$ (Lwanga, Tye, & Ayeni, 1999), where; n = minimum sample size, Z = precision given as 1.96 for 95% confidence interval, p = rough approximation of proportion of the population usually from previous studies or pre-test, d = allowable sampling error tolerated or accuracy of measurement and N = Population of the 3 selected districts. The quota for each chosen district was determined on the basis of their respective population sizes. In this regard, the sample sizes 974, 120 and 57 were allocated to the Kumasi metropolis, Atwima Nwabiagya and Sekyere central respectively (see Table 3.1).

Table 3: 1: Distribution of Sample of Size by Selected Districts

Sample Size		1152		
Sampled District	Stratum	Population	Sample Size	Adjusted sample size
KMA	Urban	2035064	1039	974
Atwima Nwabiagya	Peri-urban	149025	76	120
Sekyere Central	Rural	71232	36	57
TOTAL		2255321		1152

Source: Author's Own Calculation from 2010 Population & Housing Census, 2016

The study then employed cluster sampling technique to select these respondents from 20 clusters within the 3 districts chosen. To do this, the region was first segregated into three strata namely Urban, Peri-urban and Rural districts. Following this, simple random technique was used to select one district from each stratum.

For the purpose of the design of the study, allocation of number of clusters to each district was based on their population sizes. Considering the population sizes of the 3 selected districts as the basis of allocation of the clusters, the study found that allocation of the clusters was biased towards the peri-urban and rural districts due to relatively lower population sizes. Due to this, the initial allocations were adjusted so as to obtain substantial number of individuals to be interviewed. To do this, the ratio of the sum of the population of peri-urban & rural districts to the KMA population was computed as 1:9. Based on this result, about 90% of the calculated sample size was allocated to KMA while the 10% was allocated proportionately to Atwima Nwabiagya District and Sekyere Central based on their population sizes. From the adjustment made to initial allocation, 15 clusters were allocated to the Kumasi Metropolis, 3 for the peri-urban district (Atwima Nwabiagya) while 2 clusters for the rural district (Sekyere Central) -see Table 3.2. The Probability Proportional to Size (PPS) methodology was then used to identify the specific clusters in each district (see Table 3.3, 3.4 & 3.5).

Table 3: 2:Allocation of Clusters

No. of Clusters		20			
Sampled District	Stratum	Population	Original Cluster	Adjusted Cluster	Actual Cluster
KMA	Urban	2035064	18	-3	15
Atwima Nwabiagya	Peri-urban	149025	1	2	3
Sekyere Central	Rural	71232	1	1	2
		2255321			

Source: Author's Own Calculation from 2010 Population & Housing Census, 2016

In each cluster, the systematic sampling was adopted to select the respondents that were involved in the interview. The clusters in this study represented the communities in the selected districts. Using the report of Ghana's 2010 Population and Housing Census, information on 20 main communities based on their population sizes in each district were provided. Hence, the consideration of the 20 clusters was influenced by this. The process of sampling technique is summarized as below;

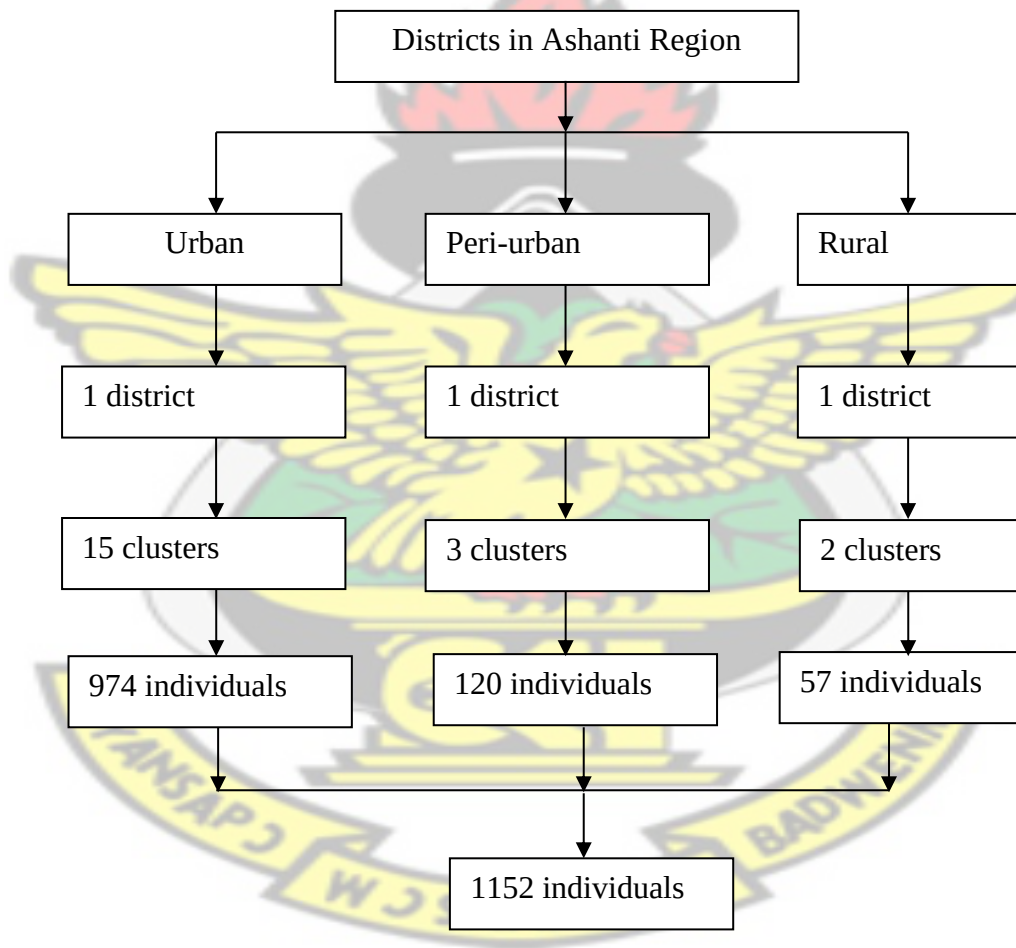


Figure 3.6: Flow Diagram of Sampling Procedure

3.3.2 Formation of Clusters

The formation of clusters in KMA, Atwima Nwabiagya District and Sekyere Central District is represented tables 3.3, 3.4 & 3.5 respectively.

Table 3: 3: Formation of Clusters in KMA

Sampling Interval	48543.75	Estimated Sample size	974	
Random Number	165			
Community	Population	Cum. Population	Cluster	Sample size
Old Tafo	122,131	122131	1,2,3	186
Bremang	91005	213136	4,5	139
Atonsu	65225	278361	6	100
Pankrono	57745	336106	7,8	88
Amakom	56874	392980	9,10	87
Ayigya	55476	448456	11	85
Buokrom	49510	497966	12	76
Suame	49095	547061	13	75
New Tafo	46001	593062	14	70
Kronom	44934	637996	15	69
Oforikrom	40454	678450		
Ash Town	38801	717251		
Kwadaso	37638	754889		
Bantama	35294	790183		
Tarkwa Maakro	32920	823103		
Tanoso	31381	854484		
Anloga	31651	886135		
Asouyeboa	30190	916325		
Asafo	28100	944425		
Ahinsan	26450	970875		
	970,875			974

Source: Author's Own Calculation from 2010 Population & Housing Census

The first column lists the name of each community in the chosen districts. The second column contains the total population of each community or town. The third column contains the cumulative population - this is obtained by adding the population of each community to the combined

population of all of the communities preceding it on the list. The fourth column provides information on which community was selected as a cluster. The last column then allocates sample size of each cluster.

Table 3. 1: Formation of Clusters in Atwima Nwabiagya District

Sampling interval		Estimated Sample size		
33767		120		
Random Number				
1144				
Community	Population	Cum. Population	Cluster	Sample size
Abuakwa	21268	21268	1	83
Atwima				
koforidua	7900	29168		
Asuofia	5617	34785		
Nkawie Nkuma	5552	40337	2	22
Barekese	5286	45623		
Asenemaso	4892	50515		
Akropong	4696	55211		
Toase	4480	59691		
Nerebehi	4390	64081		
Maakro	4245	68326		
Agogo	4081	72407	3	16
Sepaase	4073	76480		
Asaman	3894	80374		
Bokankye	3844	84218		
Manhyia	3487	87705		
Fufuo	3292	90997		
Esaase	2718	93715		
Mim	2684	96399		
Mfensi	2581	98980		
Hiawu Besease	2322	101302		
101302		120		

Source: Author's Own Calculation from 2010 Population & Housing Census, 2016

In identifying the clusters, first of all, sampling interval (k) was calculated by dividing the population of each of the 3 chosen districts by their respective number of clusters. Based on the

sizes of the population of the districts, 15, 3 and 2 clusters were chosen from Kumasi metropolis, Atwima Nwabiagya and Sekyere Central districts respectively. Subsequently, a random starting point (x) between 1 and the sampling interval calculated for each district was chosen using the random number function in Microsoft excel 2007.

Table 3. 2: Formation of Clusters in Sekyere Central

Sampling interval	11729	Estimated Sample size	57
Random Number	252		
Community	Population	Cum. Population	Cluster Sample size
Nsuta	4000	4000	1 38
Kwamang	3531	7531	
Beposo	2990	10521	
Atonsu	2003	12524	2 19
Jeduako	1620	14144	
Birem	1431	15575	
Kyeiase	981	16556	
Amoamang	934	17490	
Bonkrong	680	18170	
Kyebi	565	18735	
Aframso	652	19387	
Ankamadoa	587	19974	
Asuafo	418	20392	
Kyekyebon	501	20893	
Anasu	391	21284	
Bimma	402	21686	
Sasebonso	429	22115	
Congo No. 1	450	22565	
Oku Junction	435	23000	
Maluu	458	23458	
	23458		57

Source: Author's Own Calculation from 2010 Population & Housing Census

The first cluster is where the x th community is found, based on the cumulative population column. Continue to assign clusters by adding the sample interval k cumulatively to obtain the remaining clusters.

Furthermore, in determining the effect of savings on medical bill by the insured on the decision of uninsured individual to enroll onto the national health insurance scheme effectively, the study first computed the savings rate through an exploratory case-control design (pre-test). This particular study design was adopted to determine the differences in medical cost for outpatient services among the insured and uninsured population of adult health-seekers after the introduction of NHIS in Ghana. The study included both valid National Health Insurance (NHIS) card bearing members serving as the cases and uninsured population as controls. In this case, the study could be sure that the decrease in medical cost could be attributed to exposure to the NHIS i.e. the intervention.

In choosing the sample size for the exploratory study using case-control, the study relied on most recent report from NHIA (2013) which reported of 1,715,388 NHIS members in Ashanti region. This implies that 35% of the population in Ashanti region was enrolled. Per this enrollment rate, the total sample size for a case-control that is capable of detecting 0.6 standardized difference (design effect) of medical bill between the insured and uninsured groups with 90% power using an alpha level of 0.05 was approximately 120 (see figure 3.7: Nomogram for calculating sample size). In other words, 60 participants were required in each group of the study. The design effect was calculated as the difference between the proportion of active members of NHIS (35%) and uninsured proportion divided by the square root of the mean of the two proportions (Whitley & Ball, 2002).

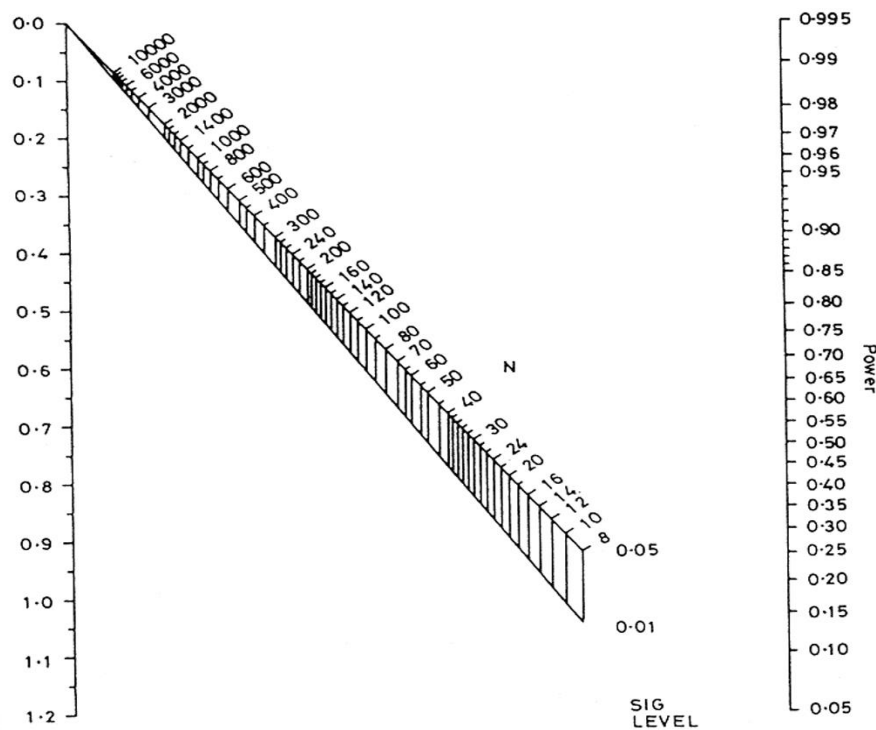


Figure 3.7: Nomogram for calculating sample size or power. Reproduced from Whitley & Ball, (2002)

At the exit points of the visited health facility, data collectors explained the purpose of the study to the potential participants after the person has consented to the study. The systematic sampling was adopted to collect the relevant responses from the participants with an aid of structured e-questionnaire. The electronic system is structured in such a way that once data was collected from a respondent, it was transported to the study's analyst in real time through online server. The data were subsequently downloaded in an excel format onto a password-protected laptop. Data cleaning was done to remove all the inconsistencies from the data set. The data set was thereof transferred to STATA 12.0 for the analysis.

3.3.3 Data and Data Collection Technique

As a result of the two different designs employed i.e. qualitative and quantitative, this study respectively used interview guides and standardized electronic questionnaire to elicit data to address the objectives of this study.

Under the qualitative design, the study used key informant interviews and focus group discussion aided by Interview Guides to collect data from the Telecommunication experts and NHIS officials. Data collected were used to compute the feasible cost of collection of premiums through the MPPS. The key informant interviews employed telephone and one-on-one interviews with two persons from both Atwima Nwabiagya District Mutual Health Insurance Scheme and National Health Insurance Authority. With regards to the Focus group interview, two sessions of meeting were held. The first meeting was made up of 4 participants including a health insurance client, the student researcher, health practitioner and Information and Communication Technology (ICT) expert. The meeting's proceedings based on the thematic areas discussed (see appendix II) were recorded by the student researcher. The second meeting was made up of 3 participants. The participants included the student researcher, an economist and an ICT expert. Also the proceedings from the meeting based on main themes as seen in appendix II were recorded and later transcribed and analyzed subsequently. These 2 separate meetings were held due to the seldom availability of the participants at a point in time.

The quantitative data collection used the electronic questionnaire. The questionnaire was structured in such a way to contain both open and closed ended questions. The researcher-administered methodology was used to collect the data. Prior to the conduct of the interviews, the

respondent in a particular cluster selected with the aid of systematic sampling was given a brief description of the purpose of the study in a language understood by him or her. The respondents' willingness to participate in the study was affirmed by him or her verbally consenting to the study. To ensure uniformity, objectivity and possible reduction of bias in the data collection, 10 enumerators were hired and trained to administer the quantitative electronic questionnaires using HP 7" android tablet or smart mobile phone with android platform.

The electronic questionnaire design used a system called ONA Systems, Inc. (ONA). The ONA is a cloud based electronic data collection system operated on URL address; www.ona.io. The system provides a service that is used to collect data as well as manage and conduct simple data analysis.

In using this system, the study, first created an account at www.ona.io/formhub. A database using excel spreadsheet with specific commands was developed. The excel database was subsequently uploaded onto the created account at www.ona.io. A matching data collection **app** called KoboCollect was downloaded onto an android device (phone or tablet). This **app** was used to download the excel database uploaded onto the online server at www.ona.io onto the android device of the data collector. This process is done by first opening the data collection **app** on the android device or the home page of the **app** and then to "*general settings*", after that, the URL address (www.ona.io), username and password were entered.

Going back to "*Home Menu*" of the data collection **app** and selecting "*Get Blank Form*", the uploaded database or questionnaire displays on the android device. The displayed database or electronic questionnaire is subsequently installed onto the android device held by the data collector. The form was selected by clicking "*Get Selected*". After successful downloading of the

database (form) onto the android device the *OK* button was clicked to acknowledge the successful installation.

During interview, the data collector selected the *"Fill Blank Form"* button on the "Main Menu" of the data **app**. The interview commenced and after each session, the data were saved as draft or sent if there was internet connectivity. The procedure was repeated for all the required sample size of the study. In situations where data were saved as draft, all the saved records were later sent to the account created on www.ona.io/formhub as soon as the android device was connected to the internet.

Finally, the account created at the www.ona.io/formhub was logged into and data saved online in an excel format was downloaded. Data cleaning was subsequently done and the data were ready for analysis.

3.4 Data Analysis

3.4.1 Data Processing

The quantitative data uploaded onto the online database were downloaded onto an excel format on a password-protected laptop. Data cleaning was done to remove all the inconsistencies from the data set. The data set was subsequently transferred to STATA 12.0 for the analysis.

3.4.2 Qualitative Analysis

Content analysis was conducted for qualitative data collected from the stakeholders in the Telecom Industry as well as personnel from NHIS. The focus of the analysis was to gather information from the focus group and key informant interview to compute a feasible cost of collecting NHIS

premiums through the proposed MPPS. The content of the meetings was categorized into themes (See appendix II). The information gathered were used to compute the feasible cost of collecting NHIS premiums through the Mobile Phone Payment System.

3.4.3 Descriptive Analysis

Socio-demographic and baseline characteristics of the respondents were summarized using standard descriptive statistics. The variables analyzed were age, gender, marital status, religion, educational level, occupation and income. These descriptive analyses were displayed with the frequency distribution tables.

3.4.4 Inferential Analysis

Two levels of inferential analysis were conducted in this study. Firstly, logistic regression analysis was conducted to determine the factors affecting the decision of the individual to pay health insurance premium through the proposed MPPS. Secondly, the estimates of the effect of the preference of the individual in paying insurance with mobile through the ADPS or MMPS as compared to the conventional system was also determined with Multinomial logistic regression model. The study was purposely conducted to determine the likelihood of individuals to participate in the proposed MPPS as against not participating, hence the choice of both simple and multinomial logistic regression models.

For all the inferential analyses, *alpha* was set at 0.05 to determine the significance level. Inferential comparisons using chi-square test of association between the socio-demographic characteristics and the decision to enroll or retain membership was conducted to determine the relationship.

3.5 Theoretical Framework of the Study

The present study hypothesized that increasing demand for health insurance in Ghana that could lead to high enrollment and retention rates is influenced by Pro-rata payment system with mobile phone as well as knowledge of saving on cost of medical care when insured.

To do this effectively, the study adopted the theory of demand for health insurance proposed by Eisenhauer (2006). The present study noted that a number of similar theories exist, however the central theme of such theories was not consistent with the objectives of the study. For instance, Nyman (2001) theory did not suit the current study since the theme of his theory is that the utility derived from health insurance is a function of additional health-care consumed as a result of becoming insured i.e. any moral hazard which is welfare. Other theory by Dror & Firth (2014) also focused primarily on demand for health insurance contingent on collective decision of groups to enroll onto Health Insurance Scheme rather than through individual decision making and with whom they have little experience in health insurance schemes.

The theory of Eisenhauer (2006) postulates that the main determining factor for purchasing health insurance is the individual's desire to obtain a financial protection cover in times of sickness which is consistent with the goal of the National Health Insurance Scheme in Ghana for which the present study sought motivation from.

To begin with, the individual's utility derives from demanding health insurance as function of Medical care M at price $P = 1$ and income available for purchase of other goods and services Y .

Thus utility function of the individual is given as,

$$U(M, Y) \quad (3.1)$$

For the uninsured individual, he maximizes the utility function subject to his budget constraint

$$Y^0 = MP + Y. \quad (3.2)$$

The Y^0 is the initial income of the individual while MP is the cost of medical care. If the demand for medical care M is given as

$$M(P, Y^0)$$

The first order condition is then given as;

$$\frac{U_M^S}{U_Y^0} = -1$$

The above is an indication that a marginal decrease in the price of medical care increases the demand for medical care.

Similarly, the insured maximizes his utility $U^I(M, Y)$ when sick, subject to the budget constraint $Y^0 - R = cMP + Y$ where R is the insurance premium and, c is copayment rate. In the case of insured individual, the demand for medical care M is a function of c , R and Y are presented as;

$$M(c, R, Y) \quad (3.3)$$

More formally, the maximization problem of the insured is given as,

$$L = U^I(M(c, R, Y), Y) + \lambda(Y^0 - R - cMP - Y) \quad (3.4)$$

The first order condition is thus given as $\frac{U_M^i}{U_Y} = -c$. In the original theory, R was not fixed so

further adjustment was made to the FOC. In the case of the present study, R is fixed hence FOC remain as it is.

The present study assumes R as a function of mode of payment. The current payment method requires a lump sum payment. The lump sum payment is assumed to be normalized as 1. However, if the payment period t is on pro-rata, R is paid over $\frac{1}{t}$ times.

Furthermore, the insured enjoys savings on cost of medical care in a form of income transfers from the NHIS to the insured when sick. This income transfer is represented by $M(1-c) = S$. This further implies that the insured is better off than uninsured by $M(1-c)$ when comparing the budget constraints in the two states. i.e.

$$\text{Insured; } Y^0 - R + M(1-c) = cMP + Y$$

$$\text{Uninsured; } Y^0 = MP + Y$$

The $R(1, \frac{1}{t})$ and S are put into equation (3.4) to derive the direct objective function below.

$$L = U^i(M(c, R(1, \frac{1}{t})Y), Y) + \lambda(Y^0 - R(1, \frac{1}{t}) + S - cM(c, R(1, \frac{1}{t})Y)P - Y) \quad (3.5)$$

A comparative statics of the function above with respect to t and S yields:

$$L_t = (\lambda c - U_M) \left(\frac{\partial M}{\partial R} \frac{1}{t^2} \right) + \lambda_R \frac{1}{t^2}$$

$$\text{From FOC, } L_M = U_M - \lambda c = 0,$$

$$L_t = \lambda_R \frac{1}{t^2} > 0 \quad (3.6)$$

$$L_s = \lambda_s > 0 \quad (3.7)$$

For the individual to maximize utility from the pro-rata and savings rate, the marginal utility of pro-rata premium payment denoted by λ_R and marginal utility of the saving rate also denoted by λ_s should be positive across the variables under consideration. Therefore, the equations (3.6) and (3.7) imply that a change in the NHIS premium payment system from the current payment status quo to pro-rata system as well as saving rate increases demand for national health insurance.

3.6 Model Specification

To empirically validate the functions obtained in equations (3.6) and (3.7), a logistic regression model was fitted on the data collected on pro-rata and savings rate. This section presents the models that explained the individual's decision based on pro-rata and savings on medical fee on demand for NHIS with mobile phone.

3.6.1 Simple and Multinomial Logistic Regression for Paying through Mobile Phone

The relevant models that explained the factors that influenced the individual's WTP health insurance premium through the mobile phone payment system (MPPS) as well as the specific payment preferences in an MPPS are the simple and multinomial logistic models respectively. The models explain the probability that demographic and socio-economic factors influence the patronage and participation in the proposed payment preferences. The models are implicitly specified as follows:

3.6.1.1 Simple Logistic Model

The cumulative logistic distribution function which is analogous to probability of the event happening is given as;

$$P_i = \frac{e^z}{1 + e^z} \quad (1)$$

where $Z_i = \beta_1 + \beta_2 X_i$, X_i represents a set of explanatory variables to be estimated and β_i denotes the coefficient of explanatory variables to be estimated.

However the probability of event not happen is also given as

$$1 - P_i = \frac{1}{1 + e^{z_i}} \quad (2)$$

Therefore, from equation (1) and (2), the probability of event occurring over not occurring is thus given as;

$$\frac{P_i}{1 - P_i} = \frac{e^z}{1 + e^z} * \frac{1 + e^z}{1} = e^z \quad (3)$$

$\frac{P_i}{1 - P_i}$ is odd ratio which simply means the ratio of the probability that an event will occur to the probability that it will not occur.

In order to linearize the equation (3) for ease of estimation, the natural log is taken;

$$L_i = \ln\left(\frac{P_i}{1 - P_i}\right) = Z = \beta_1 + \beta_2 X_i \quad (4)$$

Now L , the log of the odd ratio is liner in both X and in the parameters i.e. β_i . Therefore, the data from the current study is fitted to equation (4) to obtain the function below;

$$WTP = \ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 MIDAGE + \beta_2 OLDAGE + \beta_3 KMA + \beta_4 FEMALE + \beta_5 SINGLE + \beta_6 MARRIED \\ + \beta_7 INCOM + \beta_8 PREM + \beta_9 PRIMEDU + \beta_{10} TERT + \beta_{11} PRIEMP + \beta_{12} DEPEND + \beta_{13} LUSUM + \beta_{14} MIN1_30 + \varepsilon$$

$$\frac{P}{1-P} = \text{Odds ratio}$$

P = Probability of the event occurring. In the context of the study, the P represented the probability of participating in the proposed MPPS.

$1-P$ = Probability of the event not occurring. In the context of the study, the $1-P$ represented the probability of not participation in the proposed MPPS.

β = coefficients of the explanatory variables to be estimated

ε = denotes error term which captures unobserved effects that influence the model

The logistic model specified is then estimated with a Maximum Likelihood Estimation procedure.

3.6.1.2 Multinomial Logit Model

Going further, the study also assumed that the probability that the j th individual pays national health insurance premium through either of the 3 payment preferences y_j be denoted by $\Pr(y_j = 3)$

The 3 payment preferences as already indicated are Automatic Deduction Payment System (ADPS), Mobile Money Payment System (MMPS) and the Conventional Payment System (CPS).

If X_j represents a set of explanatory variables to be estimated, the probability that an individual participates in any of the payment options as compared to the conventional system is specified as:

$$\Pr(y_j = 3) = \frac{\exp(\beta_i X_i)}{1 + \sum_1^3 \exp(\beta_i X_i)} = \beta_0 + \beta_1 MIDAGE + \beta_2 OLDAGE + \beta_3 MALE + \beta_4 INCOM + \beta_5 PREM + \beta_6 PRIMEDU + \beta_7 PRIEMP + \beta_8 DEPEN + \beta_9 LUSUM + \beta_{10} MIN1_30 + \varepsilon,$$

where β_i is a vector of unknown parameters to be estimated. The multinomial model specified is then estimated with a Maximum Likelihood Estimation procedure.

3.6.1.3 Testing of Hypotheses

In order to test the hypotheses of the study, the simple logistic model was also used to determine the relationship between the pro-rata payment and enrollment or retention on National Health Insurance Scheme (NHIS) in Ghana. The model is specified as below;

$$NHISTATUS = \ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 PRORATA + \beta_2 MIDAGE + \beta_3 OLDAGE + \beta_4 SEX + \beta_5 DIVCE + \beta_6 MARRIED + \beta_7 SEPTD + \beta_8 SINGLE + \beta_9 WIDOW + \beta_{10} PRIMEDU + \beta_{11} JHS + \beta_{12} SHS + \beta_{13} TERT + \beta_{14} GOVEMP + \beta_{15} PRIEMP + \beta_{16} SELEMP + \beta_{17} AMTRGE + \varepsilon$$

$\frac{P}{1-P}$ = Odds ratio which represents the probability of pro-rata payment system influencing

enrollment or retention on NHIS over not influencing enrollment or retention on NHIS.

P = Represents the probability of pro-rata payment system having effect on the enrollment or retention rate of NHIS.

$1-P$ = Represents the probability of pro-rata payment system not having any effect on the enrollment or retention rate of NHIS

β = coefficients of the explanatory variables to be estimated

ε = denotes error term which captures unobserved effects that influence the model

Furthermore, the effect of knowledge of savings on medical fee in the insurance scheme on the enrollment or retention rate of NHIS by both insured and uninsured individuals was also determined with the Logistic Regression Model. Implicitly, the logistic regression model is represented as;

$$NHISTATUS = \ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 AGE + \beta_2 AGE2 + \beta_3 SEX + \beta_4 DEPEND + \beta_5 MARITALSTATUS + \beta_6 EDUC + \beta_7 EMPL + \varepsilon$$

where;

$\frac{P}{1-P}$ = Odds ratio which represents the probability of the individual characteristics having effect on enrollment or retention over not having any effect

P = Represents the probability of both insured and uninsured individuals to enroll or remain in NHIS based on the knowledge of savings in medical fee when insured

$1-P$ = Represents the probability of both insured and uninsured individuals not to enroll or remain in NHIS based on the knowledge of savings in medical fee when insured

β = coefficients of the explanatory variables to be estimated

ε = denotes error term which captures unobserved effects that influence the model

The logistic model specified is estimated with a Maximum Likelihood Estimation procedure.

3.6.1.4 Presentation of Logistic Regression Results

In order to assess the performance of the logistic regression model used in this study for the purposes of providing better predictions of the study outcomes, Overall Evaluation and Predictive Accuracy and Receiver Operating Characteristics (ROC) curves' tests were conducted on the model as advocated by Peng & So (2002).

The overall model evaluation discussed the Likelihood Ratio Test. The test determined the relationship between all of the independent variables taken together, and the retention of insured individual variable. The null hypothesis states that the model without independent variables provides a better fit to the data than the model with independent variable. Furthermore, **Hosmer - Lemeshow test** was conducted to examine whether the observed proportions of events are similar to the predicted probabilities of occurrence in subgroups of the model population (Hosmer & Lemeshow, 2000).

With regard to a predictive accuracy and discrimination test, the classification table by Peng & So (2002) evaluated the predictive accuracy of the logistic regression model. Using a cut-off value of 0.5, all predicted values above 0.5 can be classified as having an increase predictive accuracy. However, unlike the classification table of just selecting a single threshold point, the full range of thresholds values ranging from 0 to 1 are examined with a Receiver Operating Characteristics (ROC) curve. The ROC better discriminates the chances of occurring of the success of an event.

3.6.2 Operationalization of Variables

The operationalization of variables used in the regression model is presented in Table 3.6. Variables fit for a model are not selected haphazardly however it should be based on sound scientific approach. From this premise, the basis for selecting our variables for the model was discussed. Firstly, although to the best of the author's knowledge, no such study has been conducted elsewhere, some related studies were reviewed. For instance, studies on the use of demographic variables to control for key policy variables were reviewed from literature. Hence the inclusion of socio-demographic and economic factors in the models.

Table 3. 3: Operationalization of Variables Used in Simple and Mlogit Regression Models

Variable Name	Variable Definition
WTP	1 if individual is WTP by Mobile Phone, 0 otherwise
ADPS	1 if individual will participates in ADPS, 0 otherwise
VPS	1 if individual will participates in APS, 0 otherwise
CPS	1 if individual will participates in Conventional, 0 otherwise
KMA	1 if individual resides in Kumasi metropolis, 0 otherwise
AGE	Age of respondents
MIDAGE	1 if respondent is between the ages of 36-55, 0 otherwise
OLDAGE	1 if respondent is between the ages of 56-95, 0 otherwise
SEX	Sex of respondents
FEMALE	1 if respondent is a female, 0 otherwise
MARISTATUS	Marital status of respondents
SINGLE	1 if respondent is single, 0 otherwise
MARRIED	1 if respondent is married, 0 otherwise
SEPADT	1 if respondent is separated, 0 otherwise
WIDOW	1 if respondent is a widow, 0 otherwise
EDUC	Educational Status of respondents
PRIMEDU	1 if respondent has Primary Education, 0 otherwise
JHS	1 if respondent has JHS Education, 0 otherwise
TERT	1 if respondent has Tertiary Education, 0 otherwise
EMPL	Employment Status of respondents
GOVEMP	1 if respondent is government employee, 0 otherwise
PRIEMP	1 if respondent is private employee, 0 otherwise
DEPEN	Number of dependants of respondent
LUSUM	1 if premium is not expensive, 0 otherwise
TALKTIME	Average talk time at a time on phone
MIN1_30	1 if the respondent travels less than 30 minutes to NHIS office, 0 otherwise
AMTRGE	Amount spent recharging phone in a week

On the other hand, the variables including affordable premium ie lumpsum payment and minimizing distance to NHIS office for registration or renewal are the hypothetical benefits of the proposed Mobile Phone Payment System (MPPS). As has been identified already, the inclusion of the variables affordable premium and distance to NHIS office in the model is not out of place since these are the proposed strategies the study seeks to adopt to address the existing enrollment challenge of NHIS. The MPPS is a function of amount spent in recharging phone and talk time so it is therefore important to determine its effect on the participation of the proposed payment system.

CHAPTER FOUR

DESCRIPTIVE RESULTS

4.0 Socio-demographic and Economic Characteristics of Respondent

This section presents the descriptive analysis of the survey data. The descriptive analysis included presentation and analysis of both socio-demographic and socio-economic information of individuals.

4.1 Socio-demographic Characteristics of Respondents

The socio-demographic characteristics of the respondents as per the understanding of Ghana Statistical Service (2008) analyzed were age, sex, marital status and dependants. The findings of the descriptive results are presented in Table 4.1.

Table 4. 1: Distribution of Socio-demographic Characteristics of Respondents

		WTP by mobile phone		
Variable	Category	Frequency	Percentage	P-value
Age in categories	Young Adult (18-35)	543	50.79	<0.001
	Middle Adult (36-55)	492	42.86	
	Older Adult (56+)	68	6.35	
Sex	Female	591	51.93	<0.001
	Male	510	48.07	
Marital Status	Cohabiting	91	8.46	0.012
	Divorced	31	2.93	
	Married	507	44.72	
	Separated	66	5.78	
	Single	365	34.42	
	Widowed	41	3.69	
Age	Mean (SD)	36.37(11.51)		<0.001
	Median (IQR)	35 (27-45)		
Dependants	Mean (SD)	1.97 (1.91)		<0.001
	Median (IQR)	2 (1-3)		

Source: Survey Data, 2016

The socio-demographic characteristics and the willingness to pay premium with mobile phone was evaluated with a chi-square test of association. As indicated in Table 4.1, for the continuous variables including age and dependants, both mean and median values were presented. The median values are presented to make up for the large variability in the data due to high standard deviations of the mean values. At a Standard Deviation of 4.20 (SD=4.20), the mean age of the study area was determined to be approximately 36years and median age approximately at 36years (IQR=27-45). The *age* variable was further categorized into three as found in a study elsewhere (Petty, 2002) and it indicated that young adults are the majority (50.79%) in the sample; a result to imply that the young adults are major users of mobile phones in the surveyed area as has been identified in an existing study (Kuznekoff & Titsworth, 2013). The results from Table 4.1 indicate that there was significant statistical difference between the *age* and *Paying Premium with Mobile Phone variable* ($p<0.001$). This finding suggests that as the individual is aging, he/she is likely to pay NHIS premium via the mobile phone.

Regarding sex, the study further found a significant statistical relationship between *sex* and *paying premium with Mobile Phone variable* ($P<0.001$). Upon using a sampled population that has majority of females (approximately 51.93%) and also following similar findings from the 2010 Ghana Population and Census report, there is the implication that females are more probable to pay NHIS premium via mobile phone than men. The relationship between the *marital status* and *paying premium with Mobile Phone variable* was determined to be statistically significant ($p=0.012$) indicating that the respondent's marital status can affect the decision to pay health insurance premium with mobile phone. The results indicate that about 44.72% of the respondents had married followed by singles (34.42%). The divorcees were the least (2.93%) identified group

in the sample. Furthermore, there was a significant difference between the *dependant* variable and the *paying premium with Mobile Phone variable*. The median dependant was found to be 2 (IQR=1-3), a finding relatively lower than the 2010 Ghana Population and Census estimate; this result suggests that the risk of health-care expenditure is likely to rise for individuals with dependants and as such he is likely to secure financial protective cover for this marginal increase in dependants, hence willing to pay health insurance premium via mobile phone.

4.2 Socioeconomic Characteristics of Respondents

The variables including educational level, employment, economic sector, income, Premium with Mobile Phone, MPPS payment options and NHIS premium were analyzed. The results on the socioeconomic characteristics of respondents are presented in Table 4.2 and 4.3.

Table 4. 2: Distribution of Socio-economic Characteristics of Respondents

		WTP by Mobile Phone		
Variable	Category	Frequency	Percentage	P-value
Education	Basic	95	8.63	0.143
	JHS	247	22.61	
	None	31	3.18	
	SHS/MSLC	465	41.96	
	Tertiary	263	23.62	
Employment	Government	167	14.45	<0.001
	Privately	384	34.45	
	Self employed	416	38.15	
	Unemployed	130	12.94	
Sector	Informal	930	85.55	0.010
	Formal	167	14.45	
Premium Affordable	Yes	421	41.00	<0.001
	No	681	59.00	
Gross Income	Mean (SD)	440.20 (382.18)		0.204
	Median (IQR)	330 (200-500)		

Source: Survey Data, 2016

Although there was no significant difference between the *education* and *paying premium with mobile phone* variable, greater proportion of the respondents were found to have completed either SHS/MSLC or tertiary education; approximately 41.96% and 23.62% respectively. This indicates that educational level of the respondents appear to be high in the surveyed area. A finding that lends support to the assertion that education of the resident population in Kumasi and the region in general appears to be high (Vodounhessi, 2006).

Approximately 85.5% of the study sample was found to represent the informal sector of the economy of Ghana - a trend corroborated in the findings of other studies (Ghana Statistical Service, 2010; Universal Access to Health-care Campaign Coalition, 2013). This finding is unlikely to be bias on the study as confirmed by the significant relationship between the economic sector the individual belongs to and the *Paying Premium with Mobile Phone variable* ($p=0.010$). The result goes to suggest that the economic sector of the individual can influence the decision of an individual to pay health insurance premium via mobile phone.

Findings on employment status of the respondents in the surveyed area appear to be mixed; while a few of about 14.45% are government employees, the higher number of them are in the informal sector either self-employed or private employees. Only about 12.94% of respondents are unemployed. Moreover, there was significant difference between the *premium affordable variable* and *paying premium with mobile phone* ($p<0.001$). Since greater percentage of the respondents representing 59% indicated that the current premium is not affordable as a result of the lump sum payment is an indication that individuals are likely to participate in a system like the proposed MPPS that has the potential of making paying health insurance premium affordable. This finding agrees with earlier work by Atinga et al., (2015); Amporfufu, (2013); Osei-Boateng & Ampratwum,

(2011) who found that the lump sum payment of the current Ghanaian health insurance premium may not be affordable to the informal sector. The median value of *gross income* implies that at least or at most the individual earns GHS330.00 (IQR=200-400) per month.

4.3 Willingness to Pay (WTP) NHIS Premium by Mobile Phone

As seen in Table 4.3, the study found out that greater proportion of the sample of respondents representing about 92.22% expressed the WTP for health insurance premium through the Mobile Phone Payment System (MPPS).

Table 4. 3: Distribution of WTP NHIS Premium by Mobile Phone

Variable	Category	Frequency	Percentage
WTP by Mobile Phone	No	93	7.78
	Yes	1,103	92.22
MPPS Preferences	ADPS	883	74.45
	CPS	84	7.08
	MMPS	219	18.47
Economic Sector, n (%)			
Education	Formal	Informal	P-value
None	0 (0.00)	39 (100.0)	<0.001
Primary	2 (1.94)	101(98.06)	
JHS	2(0.74)	268 (99.26)	
SHS	8(1.61)	489 (98.39)	
Tertiary	159(56.58)	122(43.42)	

Source: Survey Data, 2016

This overwhelming response could be attributed to the potential of the system making the cost of paying NHIS premium affordable. The study further asked respondents about their preferred payment options under the proposed MPPS or prefer to remain with the Conventional Payment System (CPS). The proposed payment options as indicated already are the Automatic Deduction Payment System (ADPS) and Mobile Money Payment System (MMPS). The results presented in

Table 4.3 show that greater proportion of the respondents representing about 74.45% prefer the ADPS to both MMPS and the CPS. The attainment of such result could be attributed to the fact the ADPS is more likely to render the cost of paying NHIS premium more affordable.

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CHAPTER FIVE

EMPIRICAL FINDINGS I

5.0 Introduction

Under this section, a feasible cost of paying health insurance premium with mobile phones was determined. In investigating the feasibility of paying health insurance premium through the proposed MPPS in Ghana, the following questions were asked specifically;

- *What was the optimum cost of collection of health insurance premium through MPPS?*
- *What determinants influenced the decision of individuals to patronize the mobile phone system for paying health insurance premiums?*
- *What were the determinants of participating in either of Automatic Deduction Payment System (ADPS) or Mobile Money Payment System (MMPS) of paying health insurance premium with mobile phone in Ghana?*

From the preceding research questions, the study opted to specifically presents results on the following;

- *Optimum cost of collection of health insurance premium through mobile phone in Ghana that will be acceptable to NHIA.*
- *Estimates of determinants of the decision of individuals to participate in the Mobile Phone Payment System (MPPS).*
- *Estimates the determinants of participating in either of Automatic Deduction Payment System (ADPS) or Mobile Money Payment System (MMPS) of paying health insurance premium through mobile phone in Ghana.*

5.1 Optimum Cost of Collecting Premiums with Mobile Phone Payment System (MPPS)

The qualitative results revealed that, based on the nature of the proposed MPPS especially with regards to ADPS, payment is contingent upon the type of voucher used, duration of call at a time, amount spent recharging phone, and frequency of using mobile phone and number of voice calls in a day. This is because under ADPS, a fraction of stock of credit is deducted as premium when a voice call is made. Therefore, to facilitate early completion of payment of premium under the ADPS, the aforementioned factors are very critical. The study data therefore collected information on this and the results are presented in Table 5.1. Reporting the median values from the table due to relatively high standard deviations of the mean values, the common type of credit voucher purchased by individuals was the GHS2.00 voucher. The individual then talks for about 3 minutes per call for about 3 times in a day. The individual further spends about GHS8.00 for recharging the phone for about 3 times in a week. The table further shows that the median annual premium paid currently was found to be GHS24.00 (IQR=23-26). This amount agrees with earlier study that the annual premium amount paid by an individual in the informal sector as set by national regulation is between GH¢7.20-GH¢48.0 (Gobah & Liang, 2011). It is with this amount that the individuals, especially, those in the informal sector find it unaffordable (Atinga et al., 2015). When the respondents were asked how many hours is spent at NHIS office to register with the scheme or renew membership, the study detected a median value of 5 hours. These relatively long hours could be a disincentive for individuals to enroll onto the NHIS. An existing study has confirmed this by identifying that long waiting hours at NHIS offices in Ghana is a major threat to the scheme's enrollment (Gobah & Liang, 2011).

Table 5. 1: Summary Statistics of Continuous Variables in the Data Set

Variable	Mean	SD	Min	Max	Median	IQR
NHIS premium	23.95	3.74	2	51	24	23-26
Hour spent at NHIS office	5.06	4.14	1	30	4	3-5
Minutes of walk to NHIS office	29.82	18.03	1	120	30	15-44
Minutes of walk to Mobile Vendor	8.96	8.13	1	35	5	3-15
Frequency of recharging in week	3.27	2.11	1	30	3	2-4
Amount recharge	8.26	5.51	1	60	8	5-10
Common credit	3.57	2.90	1	20	2	2-5
Call in a day	4.14	2.74	0	15	3	2-5
Talk time	4.82	4.42	1	20	3	2-5

Source: Survey Data, 2016

5.1.1 Determining Optimum Talking Time to Pay Full Insurance Premium with Mobile Phone

For ease in computing the optimum cost of collection under the MPPS, the study assumes that cost of collecting premium under ADPS is equal to that of the MMPS. The Telecommunication companies (Telecos) charge, on the average, GHS0.10 for a minute (m) of talk time within the same network (NCA Report, 2014). For the Telecos not to be worse off in what is currently charged per minute of talk time and what the user shall be deducted as premium, a top up fee π_m is charged per every minute of talk time. If π =GHS23.00 as with current premium price (see table 1), the question is how many talking minutes in a year will generate the amount?

It must be noted that deduction greater than 50% of one's stock of capital or income on flexible payment basis is not encouraged⁴. This suggests that with our present study, deduction per minute cannot be greater than GHS0.05. Therefore, suppose, a user contributes GH¢0.01 in $m = 1$ of a voice call implies that 2300 minutes of talk time in a year is needed to contribute GHS23.00 as NHIS premium. The 2300 minutes is equivalent to 38 hours per year or about 6 minutes of daily talk time on the average. On the other hand, if subscriber contributes GHS0.05 in $m = 1$ of a voice call, implies that 460 minutes of talk time per year is needed to contribute GHS23.00 as NHIS premium. The 460 minutes is equivalent to 8 hours per year or 1.2 minutes of daily talk time on the average.

5.1.2 Determining the Feasible Cost of Collecting Insurance Premium through MPPS

The focus of the present study sought to determine a feasible cost of collecting the premium by the mobile phone companies that could influence the decision of National Health Insurance Scheme (NHIS) to partake in the proposed Mobile Phone Payment System (MPPS). This is because economic thought for adoption of a new Information Technology (IT) system asserts that the cost of operating a proposed IT system should not exceed the cost of operating an existing system as the former leads to increase efficiency and better resource utilization (Rahardjo, 2006). With regards to the present study, it means that the proposed MPPS is feasible to NHIA if it is not

⁴Interaction with staff of Controller and Accountant General's Department

more costly to collect NHIS premium by mobile phone than the current cost of collecting the premium.

Presently, the average total cost of processing NHIS membership is GHS5.00 and this includes cost of collection of the premium π . If the proportion of cost of collecting premium is δ where $0 \leq \delta \leq 1$, it implies that proportion of the cost of collection in the processing fee is given as $\delta 5$.

If the proposed cost of collecting premium π through MPPS is γ , as indicated already, collection by mobile phone is feasible if it is not more costly than the current cost is. Therefore, it is expected that the total cost of collecting health insurance premium $\gamma\pi$ through mobile phone should be at most equal to the current cost of collecting the premium $\delta 5$. i.e. $\gamma\pi \leq \delta 5$

$$\gamma \leq \frac{\delta 5}{\pi} \quad (5.1)$$

π is total premium collected by NHIA currently at cost $\delta 5$

$$\begin{aligned} \pi &= p + (1 - \delta)5 + \delta 5 \\ \Rightarrow \pi &= p + 5 \end{aligned} \quad (5.2)$$

But currently the average premium π according to National Health Insurance Scheme is GHS23.00 so less cost of collection, p the current actual premium charge is GHS18.00, Further π is substituted into equation (5.1) to obtain;

$$\gamma \leq \frac{\delta 5}{23} \quad (5.3)$$

The study found the cost range within which the collection by mobile phone is feasible. That range depends on the current cost: δ

Suppose $\delta = 0$ i.e. if it costs the NHIS nothing to collect the premium then the NHIS should not pay anything to the mobile companies for premium collection: i.e., the feasible

$$\gamma = \frac{\partial 5}{\pi} = \frac{(0)5}{23} = 0 \quad (5.4)$$

Suppose $\delta = 0.5$ i.e. if 50% of the processing fee is used to pay for collection cost, then

$$\gamma = \frac{\partial 5}{\pi} = \frac{(0.5)5}{23} = 0.11 \quad (5.5)$$

Suppose $\delta = 1$ i.e. if all the processing fee is used to pay for collection cost, then

$$\gamma = \frac{\partial 5}{\pi} = \frac{(1)5}{23} = 0.22 \quad (5.6)$$

So the NHIS cannot accept any γ above 0.22; i.e., $0 < \gamma < 0.21$ so γ^* should be within this range. Moreover, since $0.11 < 0.22$ so as δ increases i.e. $\frac{\partial \gamma}{\partial \delta} > 0$ from equation (5.3).

Now let us translate this into cedis, recalling the total cost of collecting health insurance premium

$\gamma\pi$

If $\delta = 0$ implies that $\gamma\pi = 0$ i.e. (5.7)

Equation (5.7) indicates that the mobile companies must charge 0

On the other hand, if $\delta = 0.5$ means $\gamma\pi = 2.53$ (5.8)

The mobile companies must charge not more than GHS2.53

Finally, If $\delta = 1$, implies that $\gamma\pi = 5.06$ (5.9)

Equation (5.9) means that the mobile companies can charge not more than GHS5.06.

Therefore, from the above analysis, the feasible range of fee that is acceptable to NHIA will be between GHS0 and GHS5.06.

5.2 Simple Logit Estimates of Individuals Participation in Mobile Phone Payment System

The study presents the results of simple logistic regression model estimates based on Peng & So's (2002) recommendation.

5.2.1 Overall Model Evaluation

Overall fit of our model showed a strong relationship between all of the independent variables taken together and willingness to pay health insurance with mobile phone variable. This was based on significant difference shown by the likelihood ratio test of ($LR=-148.36558, p<0.001$) between the fitted models with and without the independent variables (see Table 5.3). From this result, the null hypothesis which states that the model without independent variables provides a better fit to the data than the model with independent variable was rejected. This implies that at least one of the independent variables contributed to the prediction of individual's willingness to pay health insurance premium with mobile phone (Hyeoun-Ae, 2013).

In examining whether the observed proportions of events are similar to the predicted probabilities of occurrence in subgroups of the model population, the Hosmer-Lemeshow test prescribed by Hosmer & Lemeshow (2000) was conducted. From Table 5.2, p-value for the Hosmer and Lemeshow goodness-of-fit test was insignificant ($p= 0.8102$). This suggests that the null hypothesis which states that the model fits the data well was not rejected. This moreover implies that our model passed the test.

5.2.2 Predictive Accuracy and Discrimination

5.2.2.1 Classification Table

The classification table by Peng & So (2002) employed in this analysis evaluated the predictive accuracy of the logistic regression model. Using a cutoff value of 0.5, all predicted values above 0.5 were classified as predicting the likelihood of paying health insurance premium with mobile phone from a set of covariates and all below 0.5 as otherwise. From the table 5.2 with dichotomous observed outcomes, and dichotomous predicted outcomes, the overall percentage correct value of 94.38% showed an increased predictive accuracy of individual's willingness to pay health insurance premium through mobile phone given some covariates.

Table 5. 2: A Classification Table of Paying Insurance Premium with Mobile Phone

Observed	Predicted		% Correct
	Yes	No	
Yes	861	44	905
No	8	12	20
Overall % Correct	869	56	94.38%

Sensitivity = 99.08%, Specificity = 21.43%, Positive predictive value =95.14%, Negative predictive value= 60.00%

Source: Surveyed Data, 2016

The sensitivity and specificity values of 99.08% and 21.43% indicate a better fit of the model (Hyeoun-Ae, 2013). The sensitivity results indicated the probability that the model was able to correctly identify those willing to pay health insurance with mobile phone was 99.08%. Out of this, the predictive positive value of 95.14%, denotes the actual number of people who are willing to pay with mobile phone. On the Other hand, the specificity results show the probability that the model was able to correctly identify those not willing to pay health insurance with mobile phone was 21.43%. Out of this, the negative predictive value of 60.00% represents the actual number of people who are not willing to pay with mobile phone.

5.2.2.2 Discrimination with Receiver Operating Characteristics (ROC) Curves

Unlike the classification table of just selecting a single threshold point, the full range of thresholds values ranging from 0 to 1 were examined with Receiver Operating Characteristics (ROC) curve. The result is shown in Figure 5.1.

From the figure 5.1, the larger area under the curve (AUC=93%) and above 45° line for the variables representing *old age, sex, affordability of lump sum premium payment, minimization of cost of transport and NHIS status* depicted better predictability of the model. This finding agrees with the assertion of Bewick, Cheek, & Ball (2004) that larger AUC and points above and further away from 45° line indicate better predictability of the model.

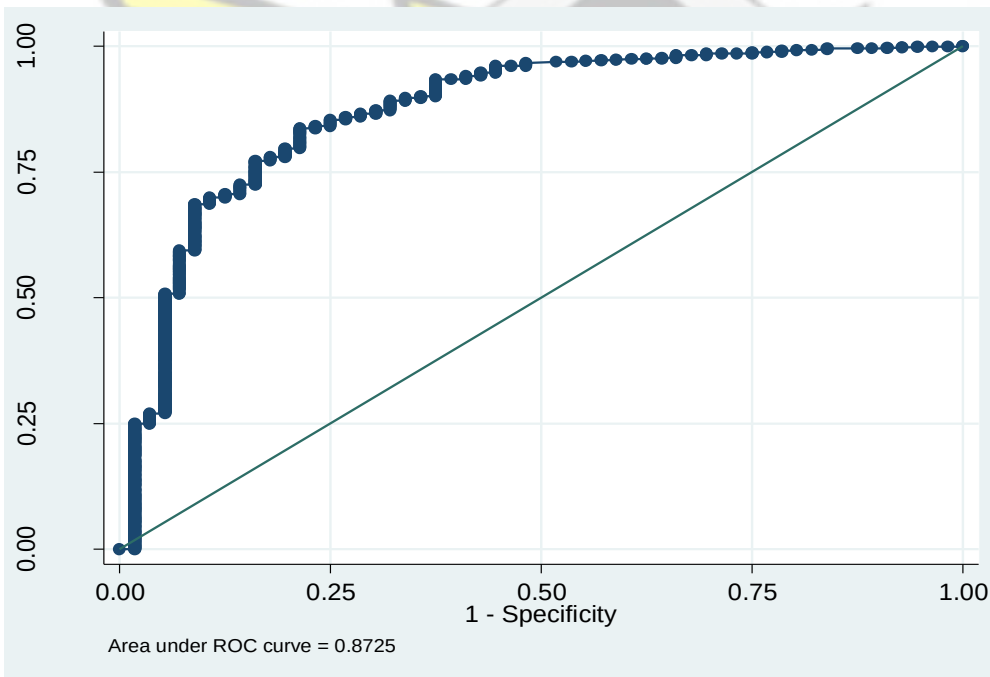


Figure 5.1: ROC of WTP Insurance Premium with Mobile Phone

5.2.3 Determinants of Decision to Pay for NHIS Premium by MPPS

The study used logistic regression to determine the factors that will motivate individuals to decide to pay NHIS premium with MPPS. The results are shown in Table 5.3. According to Table 5.3, the variable representing *KMA*, *premium*, *primary education*, *affordability of lump sum premium payment* and *distance to NHIS office (Min1_30)* were significant predictors for individual WTP insurance premium with mobile phone. The odds ratio of the *KMA variable* indicates that residents of Kumasi metropolis are more than 4 times as likely to pay health insurance premium by mobile phone than those in other study districts, holding all other variables constant (OR=4.691, $p < 0.001$, C.I.=2.094-10.512). This result was expected since greater number of respondents who are mostly informal sector members reside in the urban KMA. As reported in studies by Atinga et al., (2015); Amporfu (2013); Osei-Boateng & Ampratwum (2011), that the cost of current Ghana's insurance premium may not be affordable to the informal sector members. Furthermore, this finding implies that since paying health insurance premium by mobile phone is expected to make the cost of paying it affordable, it is likely that residents in KMA shall enroll or renew their health insurance through the proposed MPPS. Hence, an increase in enrollment or retention rates. Ayitey et al., (2013) also indicated that area of residence (urban) and geographical area of residence are significantly correlated with the decision to enroll in the NHIS.

The significant effect of the *female* variable indicates that females are 96% more likely to pay NHIS premium by mobile phone than men, all other variables remaining constant. This result could be attributed to the fact that women are more risk averse than males (Bernasek & Shwiff, 2001; Booth & Nolen, 2012). In this regard, females have the tendency to seek financial protective cover to forestall any uncertain high cost of medical bill in times of sickness. Boateng & Awunyor-

Vitor (2013) also found out that females are more likely to renew their insurance as compared to the male counterparts. Therefore, this implies that utility derived from health insurance increases more in females than in men.

The relationship between the *current NHIS premium* and the willingness to pay NHIS via the MPPS was found to be significant (OR=1.071, P=0.031 CI=1.006-1.139). The result implies that for those individuals who pay higher premium, the odds in favour of WTP health insurance premium by mobile phone increases by about 7% than those paying lower premium, holding all other variables constant. On the other hand, respondents who pay higher premium are, on the average, more likely to take up health insurance than respondents who pay lower premium. Similarly, submissions by Pauly & Herring (2001) also found that the price of insurance or premium has a significant influence on the demand for health insurance. The reason behind this result is that, premium payment is a function of your ability to pay (Amporfu, 2013). In this regard, the ability to pay also depends on your income level. By inference, it could be assert that high income earners shall pay higher premium than low income earners. Therefore individuals who pay higher premium are likely to enroll or remain in NHIS.

The odds 0.253 of the *primary education* variable depicts that the respondents with primary education level are less likely to pay NHIS premium through the MPPS than those in other education categories (OR=0.253, p=0.012, C.I.=0.087-0.741), all other variables held constant. This finding was expected since existing findings as in Bloom (2004); Blumberg & Nichols (2002); Juetting (2003); Trujillo (2003) have indicated that higher level of education positively correlates with demand for any type of insurance with health insurance inclusive. This is due to

the fact that individual's ability to understand the benefits of insurance increases with the level of education and therefore education is regarded as an important determinant of the consumption of health insurance as confirmed by the studies of these authors. Other supporting studies also indicated that individuals with longer years of education were more likely to insure against sickness than individuals with lower years of schooling (Owusu-Sekyere & Chiaraah, 2014). This work confirms the expectation that individuals with higher education tend to better appreciate the operation of health insurance schemes. The implication of this finding is that health insurance enrollment and retention through proposed MPPS is more likely to increase in population with higher education background.

The empirical results further pointed out that the minority of respondents (41%) as seen in Table 4.3 who said that *one lump sum premium payment is affordable* with the current payment method is less likely to participate in the mobile phone payment system than those who said otherwise holding other variables constant. This presupposes that the greater proportion of the respondents who responded otherwise are more likely to demand Ghana's NHIS through the MPPS. This result could be attributed to the potential of the proposed MPPS of making the current premium affordable. This finding is moreover consistent with the study that lump sum payment (non-flexibility) of the current Ghana's insurance premium may not be affordable to the informal sector (Atinga et al., 2015; Amporfu, 2013; Osei-Boateng & Ampratwum, 2011).

Finally, the significant effect of *travel for about 30 minutes to NHIS office for enrollment or renewal* variable at 1% confidence level was also expected (OR=2.668, $p=0.005$, CI=1.348-5.277). This result showed that individuals who travel for an average of 30 minutes to NHIS office for registration or renewal are more than 2 times as likely to pay health insurance premium by mobile

phone than those who travel less than 30 minutes, all things being equal. This result implies that the assertion that the proposed MPPS shall minimize travelling cost holds for individuals who travel relative long distance to National Health Insurance Scheme office. The reason being that one of the challenges with the current payment method is the issue of travelling relatively long distances to NHIS office for registration or renewal.

Table 5. 3: Logistic Results of Determinants of Paying NHIS Premium by MPPS

WTP by Mobile Phone	OR	S.E.	z	P>z	95% C.I.	
Middle Age	0.824	0.432	-0.370	0.711	0.295	2.301
Old Age	0.308	0.208	-1.740	0.082	0.082	1.160
KMA	4.691	1.931	3.760	0.000	2.094	10.512
Female	1.962	0.671	1.970	0.049	1.004	3.834
Single	0.473	0.219	-1.610	0.106	0.191	1.174
Married	0.735	0.346	-0.650	0.514	0.292	1.850
Income	1.001	0.001	1.740	0.082	1.000	1.002
Premium	1.071	0.034	2.160	0.031	1.006	1.139
Primary Education	0.253	0.139	-2.510	0.012	0.087	0.741
Tertiary Education	1.829	0.806	1.370	0.171	0.771	4.340
Private Employee	1.798	0.684	1.540	0.123	0.853	3.789
Dependants	1.142	0.122	1.240	0.214	0.926	1.409
Lump sum Premium Affordable	0.159	0.081	-3.590	0.000	0.058	0.433
Min1_30	2.668	0.929	2.820	0.005	1.348	5.277
Constant	1.126	1.166	0.110	0.909	0.148	8.568
No. of Observation = 925						
R ² = 0.2915						
Test	Categories		X²	P-Value		
Overall model evaluation	Likelihood ratio test		-149.72209	0.0000		
Goodness-of-fit test	Hosmer & Lemeshow		15.39	0.2208		

Source: Survey Data, 2016

5.3 Effect of Preference of Individuals' Participation in ADPS or MMPS and CPS

The probability of individuals to participate in the proposed two mobile phone payment preferences (ADPS or MMPS) together with the existing payment method (CPS) were analyzed with a Multinomial Logistic Model (MNL). The individual's potential participation in the

Automatic Deduction Payment System (ADPS), Mobile Money Payment System (MMPS) and the Conventional Payment System (CPS) was simultaneously estimated. Since the magnitudes of the coefficients are difficult to interpretate, marginal effects were computed to provide a better interpretation of the estimated results as recommended by Wooldridge (2002). The marginal effects of the determinants of individuals' participation in the proposed two (2) different mobile phone payment systems plus the conventional payment system are presented in Table 5.5. To test whether the MNLM fits the data well, the Independence from Irrelevant Attributes (IIA) assumption was conducted.

To check for the Independence from Irrelevant Attributes (IIA) assumptions, the Hausman test was used and results are presented in Table 5.4.

Table 5. 4: Hausman Test for Independence of Irrelevant Alternatives (IIA) assumptions

	Coefficient		(b-B) Difference	Sqrt (diag(V_b-V_B)) S.E.
	B Partial	B All		
Middle Age	0.2645	0.2421	0.0223	0.0225
Old Age	0.1130	0.0892	0.0238	.
Male	-0.0878	-0.1045	0.0167	0.0174
Income	-0.0012	-0.0011	-0.0001	0.0001
Premium	-0.0425	-0.0478	0.0052	.
Primary Education	-0.3770	-0.3480	-0.0290	0.0274
Tertiary Education	0.3655	0.3085	0.0569	0.0524
Private Employee	-0.0522	-0.0576	0.0054	0.0121
Dependants	0.0778	0.0798	-0.0020	0.0063
Affordable Premium	0.6261	0.6070	0.0191	0.0423
MIN1_30	-0.3552	-0.3352	-0.0200	0.0239
Constant	-0.0773	0.0309	-0.1081	.

b = consistent under Ho and Ha; obtained from mlogit: B = inconsistent under Ha, efficient under Ho; obtained from mlogit

Test: Ho: difference in coefficients not systematic

Chi2 (11) = (b-B)'[(V_b-V_B) ^ (-1)](b-B) = 0.57; Prob>chi2 =1.0000

(V_b-V_B is not positive definite)

The independence of irrelevant alternatives (IIA) means that, all things being equal, an individual's choice between two alternative outcomes is unaffected by the availability of the other choices (Cheng & Long, 2007). The IIA holds when the estimated coefficients of the full model are statistically similar to those of the restricted one. This means that if the test statistic is significant, the assumption of IIA is rejected, and the conclusion is that the MNLM is inappropriate. The result from Table 5.4 means that IIA is not violated, an implication that the multinomial logistic regression is a good fit.

The positive significant marginal effect of the variable representing *income* in the ADPS indicates that an increase in income of the individual has greater probability to influence participation in the ADPS as compared to the CPS ($P < 0.001$, $CI = 0.0001 - 0.0003$). This finding lends support to the theory of demand for normal good, hence, the positive but less than one income elasticity of demand coefficient for the ADPS. Reason cited for this finding is that the individual's marginal propensity to save becomes positive since the cost of paying premium is relatively likely to decrease in ADPS as compared to CPS. However, individuals with high income are less probable to pay health insurance premium through the MMPS as compared to the CPS since there is a minimal cost incurred by walking or travelling to mobile money vendor. This has the tendency of decreasing the level of income of individuals with high income.

Furthermore, the relationship between the individuals who believe that lump sum payment of insurance premium is affordable i.e., not expensive, and participation in ADPS was found to be negative and significant at 1% confidence level ($p < 0.0001$, $CI = -0.2335 - 0.1027$). The result implies that individuals who believe that the lump sum payment of insurance premium is affordable are

less likely to pay NHIS premium through the ADPS. This result met the study's prior expectation since the individuals are contempt with the current payment system hence their decline in the participation of additional perceived affordable payment system like ADPS. This result too is in conformity of existing study which reported that respondents who did not view the insurance premium as high were more likely to renew their insurance (Boateng & Awunyor-Vitor, 2013).

These individuals on the other hand are also more likely to pay NHIS premium through the MMPS as the study found a positive significant relationship between the *MMPS* and *lump sum payment* variable at 5% significant level ($p < 0.0380$, C.I=0.0036-0.1251). The implication of this finding is that the greater number of respondents who otherwise said that the lump sum premium payment is expensive (not affordable) as confirmed already in the studies of Amporfuo (2013); Osei-Boateng & Ampratwum (2011); Atinga, Abiir, & Kuganab-Lem (2015) are less probable to participate in the MMPS. This is because these individuals will rather find a more affordable payment alternative.

Finally, the study again found out that the marginal effects of the variable representing individual's *travelling a maximum of 30 minutes to NHIS office for registration or renewal* is positive and significant for ADPS ($p < 0.0030$, C.I=0.0311-0.1465). The empirical results of the positive relationship with ADPS was expected since it has been identified that there is a perceived inconvenience cost of travelling relatively long distance to NHIS office for registration or renewal hence leading to low enrollment and retention rates. This is what the proposed MPPPS-ADPS seek to address, therefore it is not surprising that participation in the system is likely to increase for these individuals.

Table 5. 5: Multinomial Logistic Results of Individuals Paying Health Insurance Premium with ADPS and MMPS

	ADPS					MMPS				
	M.E.	Z	P>Z	95%	CI	M.E.	Z	P>Z	95%	CI
Middle Age	-0.0338	-0.9300	0.3520	-0.1051	0.0374	0.0381	1.1200	0.2640	-0.0287	0.1048
Old Age	-0.0419	-0.6500	0.5150	-0.1682	0.0844	0.0025	0.0400	0.9650	-0.1090	0.1140
Male	-0.0051	-0.1800	0.8600	-0.0617	0.0515	-0.0237	-0.8800	0.3800	-0.0765	0.0292
Income	0.0002	3.8500	0.0000	0.0001	0.0003	-0.0002	-3.1300	0.0020	-0.0003	-0.0001
Premium	0.0094	2.4600	0.0140	0.0019	0.0170	-0.0065	-1.8100	0.0710	-0.0135	0.0006
Primary Education	0.0091	0.1700	0.8660	-0.0965	0.1147	-0.0692	-1.3300	0.1820	-0.1709	0.0325
Tertiary Education	-0.0351	-0.8100	0.4190	-0.1201	0.0499	0.0514	1.2500	0.2130	-0.0295	0.1322
Private Employee	0.0287	0.9200	0.3590	-0.0327	0.0900	-0.0014	-0.0500	0.9620	-0.0591	0.0563
Dependants	-0.0064	-0.6800	0.4960	-0.0248	0.0120	0.0143	1.6600	0.0970	-0.0026	0.0311
Lump sum affordable	-0.1681	-5.0400	0.0000	-0.2335	-0.1027	0.0643	2.0800	0.0380	0.0036	0.1251
MIN1_30	0.0888	3.0100	0.0030	0.0311	0.1465	-0.0370	-1.3200	0.1850	-0.0918	0.0178
No. of Observation	915									
Likelihood ratio	-573.50777									
Prob > chi2	<0.001									
R-square	0.0873									

Source: Survey Data, 2016

CHAPTER SIX

EMPIRICAL FINDINGS II

6.0 Introduction

This section determines *the effect of pro-rata premium payment on National Health Insurance Scheme enrollment and retention in Ghana*. The analysis and interpretation of results and discussion are outlined.

In investigating the effect of pro-rata health insurance premium payment with mobile phone on enrollment and retention on Ghana's National Health Insurance Scheme, the following questions were asked specifically;

- *What was the effect of the pro-rata insurance premium payment with mobile phone on the decision of the insured individual to remain on Ghana's National Health Insurance Scheme?*
- *What was the effect of the pro-rata insurance premium payment with mobile phone on the decision of the uninsured to enroll onto Ghana's National Health Insurance Scheme?*

Under this, the study seeks to achieve the following objectives:

- *To estimate the magnitude of the effect of pro-rata insurance premium payment with mobile phone on the decision of insured individuals to remain on the Ghana's National Health Insurance Scheme*
- *To estimate the magnitude of the pro-rata insurance premium payment with mobile phone on the decision of uninsured individuals to enroll onto the Ghana's National Health Insurance Scheme*

6.1 Logistic Regression Results

The current study presents results of the effect of pro-rata health insurance premium payment with mobile phone on enrollment onto the Ghanaian National Health Insurance Scheme (NHIS) per the advice of Peng & So (2002). Two models were specified. The first model estimated the effect of paying health insurance premium on pro-rata with mobile phone on the retention of insured individuals. The second model on the other hand determined the effect of paying health insurance premium on pro-rata with mobile phone on the enrollment of uninsured individuals.

6.1.1 Retention of Insured Individuals and Pro-rata Insurance Payment

6.1.1.1 Overall Model Evaluation

The significant difference shown by the likelihood ratio test of ($LR = -336.82769$, $p < 0.001$) between the fitted models with and without the independent variables (see Table 6.2) is an indication that at least one of the independent variables contributes to the prediction of the attitude of the insured towards paying premium with mobile phones which is in line with a finding elsewhere (Hyeoun-Ae, 2013).

From Table 6.2, the insignificant p-value for the Hosmer and Lemeshow goodness-of-fit test is 0.5242. This suggests that the null hypothesis, which states that the model fit the data well, was not rejected. This moreover implies that our model passed the test.

6.1.1.2 Predictive Accuracy and Discrimination

6.1.1.2.1 Classification table

In order to evaluate the predictive accuracy of the logistic regression model, the classification table by Peng & So (2002) was adopted. Using a cut-off value of 0.5, all predicted values above 0.5 were classified as predicting the likelihood of pro-rata payment system influencing an insured

individual to remain in NHIS while all values below 0.5 represent the converse. According to Table 6.1, the overall percent correct value of 89.49% shows an increased predictive accuracy of the insured individuals remaining on NHIS when payment of NHIS premium is on pro-rata basis (flexible) through mobile phones. The sensitivity and specificity values of 99.90% and 4.88% indicate a better fit of the model as found in a finding elsewhere (Hyeoun-Ae, 2013). The sensitivity results indicated that the probability of the model to correctly identify those insured individuals who will remain on NHIS when health insurance premium payment is on pro-rata is about 99.90%. Out of this, the predictive positive value of 89.51% denotes the actual number of insured individuals who are willing to remain on NHIS when health insurance premium is paid on pro-rata. On the Other hand, the specificity results show that the probability of the model to correctly identify those insured individuals who will not remain on NHIS when health insurance premium payment is on pro-rata (flexible terms) through mobile phones is 4.88%. Out of this, the negative predictive value of 85.71% represented the proportion of insured individuals who will not remain on the scheme.

Table 6. 1: A Classification Table of Paying Health Premium on Pro-rata

Observed	Predicted		% Correct
	Yes	No	
Yes	994	117	1111
No	1	6	7
Overall % Correct	995	123	89.45%

Sensitivity = 99.90%, Specificity =4.88%, Positive predictive value = 89.47%, Negative predictive value= 85.71%

Source: Surveyed Data, 2016

6.1.1.2.2 Discrimination with Receiver Operating Characteristics (ROC) curves

The full range of threshold values ranging from 0 to 1 was examined with a Receiver Operating Characteristics (ROC) curve unlike the classification table of just selecting a single threshold point.

The ROC better discriminates those insured individuals who will remain on the NHIS when

payment is on pro-rata with a mobile-phone-payment system. From Figure 6.1, the larger area under the curve (AUC=75%) and above 45° line for the policy variable *pro-rata* and other variables including *age*, *sex*, *marital status*, *education*, *employment*, *dependents*, *amount spent recharging phone* and *average talk time* depicted better predictability of the model.

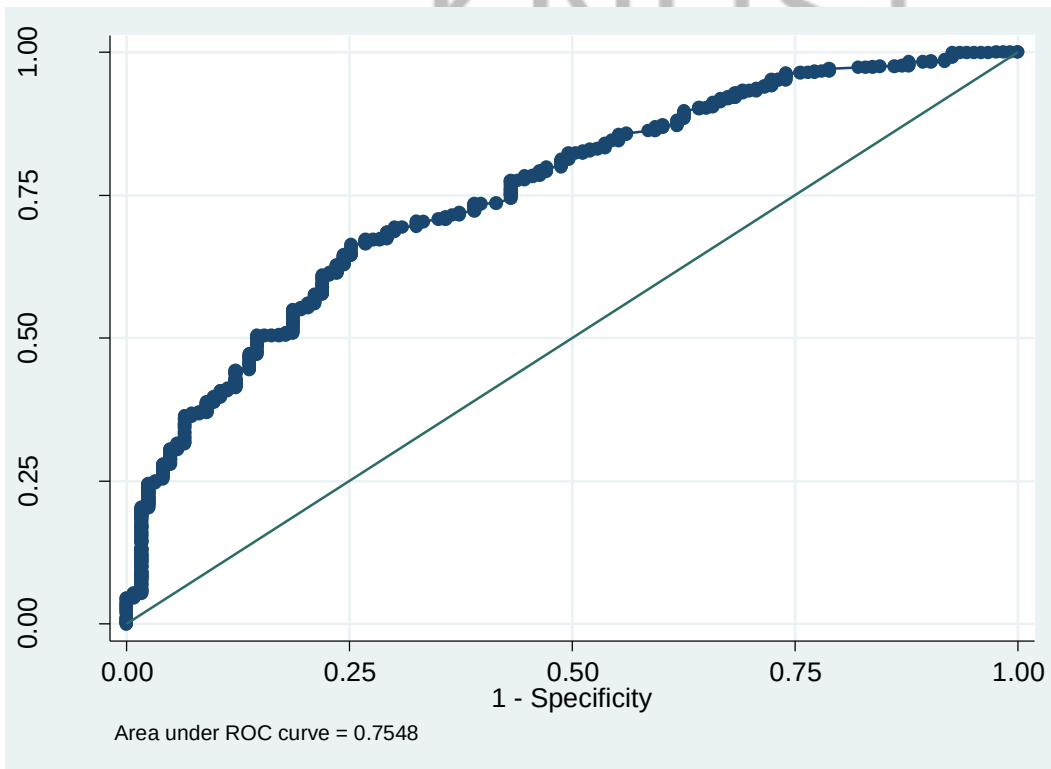


Figure 6.1: ROC of Insured Paying Health Insurance Premium on Pro-rata

This finding agrees with the assertion of Bewick et al (2004) that larger AUC and points above and further away from 45° line indicate a better predictability of the model.

6.1.1.3. Effect of Pro-rata Payment System on Retention of Insured on NHIS

Table 6.2 presents the statistical significance of insured individuals logistic regression odds ratios tested using the logistic regression model.

Table 6. 2: Logistic Results of Effect of Pro-rata on Retention of the Insured on NHIS

Remained Insured	OR	S. E.	Z	P>z	95% C.I.	
PRORATA	2.2662	0.6782	2.7300	0.0060	1.2606	4.0740
Middle Age	2.0930	0.6577	2.3500	0.0190	1.1305	3.8748
Old Age	5.1653	3.8851	2.1800	0.0290	1.1826	22.5600
Sex	0.6143	0.1358	-2.2000	0.0280	0.3983	0.9475
Divorced	1.3172	0.9861	0.3700	0.7130	0.3037	5.7134
Married	1.9900	0.7793	1.7600	0.0790	0.9237	4.2873
Separated	2.0494	1.2810	1.1500	0.2510	0.6020	6.9772
Single	0.9040	0.3011	-0.3000	0.7620	0.4706	1.7366
Widowed	3.2869	3.6969	1.0600	0.2900	0.3626	29.7960
Primary Education	3.8234	2.4831	2.0600	0.0390	1.0706	13.6544
JHS	2.6770	1.4415	1.8300	0.0670	0.9317	7.6915
SHS	5.1824	2.7965	3.0500	0.0020	1.7998	14.9226
Tertiary Education	5.2761	3.0999	2.8300	0.0050	1.6680	16.6891
Government Employee	3.3677	1.7960	2.2800	0.0230	1.1840	9.5783
Self Employed	1.6906	0.4267	2.0800	0.0370	1.0309	2.7725
Dependant	0.8758	0.0610	-1.9000	0.0570	0.7639	1.0040
Amount for Recharge	1.0315	0.0264	1.2100	0.2250	0.9811	1.0845
Constant	0.5309	0.3486	-0.9600	0.3350	0.1466	1.9226
No. of Observation	=	1118				
R ²	=	0.1306				
Test	Categories		X²	P-Value		
Overall model evaluation	Likelihood ratio test		-336.82769	<0.0001		
Goodness-of-fit test	Hosmer & Lemeshow Chi (17)		15.23	0.5242		

Source: Survey Data, 2016

According to Table 6.2, the policy variable *Pro-rata* and other control variables including *middle age*, *old age* *sex*, *primary education*, *SHS*, *tertiary education*, *government employee* and *self-employed* were significant predictors for insured individuals' likelihood to remain on the NHIS. These control variables are included in the model to take care of other factors that could affect the retention of insured on National Health Insurance Scheme (NHIS) in Ghana aside the policy variable.

As recommended by Peterson (1984), cited in Peng & So (2002) that when a predictor variable is continuous, the logit coefficient is discussed. However, if the predictor turns out to be categorical, the odd ratio is discussed. Since all the significant variables are categorical, the odd ratios are discussed.

The significant effect and odd ratio of 2.3 of the policy variable *pro-rata payment* indicated that the individual who is willing to pay NHIS premium on pro-rata with mobile phone is more than 2 times likely to remain on NHIS than those not willing to pay NHIS premium on pro-rata with mobile phone when all other variables are held constant (OR=2.3, $p=0.006$, CI=1.2806-4.0740). This result was expected since it is relatively less expensive to pay NHIS premium on pro-rata, the demand for health insurance is likely to rise as the premium has decreased due to substitution effect. This result moreover is consistent with previous findings as in Allegri et al., (2006); Pauly & Herring (2001). The implication of this finding is that retention rate of NHIS is likely to double if payment will be done on pro-rata with mobile phone. There is an evidence to support this claim as it has been established that requiring that the premium be paid all at once for the entire household constitutes an important barrier to enrollment and retention (Allegri et al., 2006).

The significant effect of *Middle Age* and *Old Age* and odd ratios of 2 and 5 respectively implies that the individuals who are within these age groupings are more than 2 and 5 times as likely to remain insured than young individuals holding all other variables constant. This finding could be attributed to the fact that as health deteriorates with an increase in age (Grossman, 1972), the demand for health-care increases as the individual is susceptible to age-related illnesses (Kemp, 2012). It is also noted that older people use more medical care than younger people (Cutler & Reber, 1996). A finding to suggest the cost of health care among the elderly appears to be higher

than in younger individuals. In this regard, the individual invests in health (Folland, Goodman, & Stano, 2003) as these diseases are major triggers of health-care expenditures according to Kemp (2012). Therefore, the finding goes to suggest that the elderly is likely to secure a financial protective cover to respond to the uncertain health-care expenditure, hence the insured elderly individual may remain on the NHIS which may lead to increase in retention rate.

The empirical results also revealed that with all other variables held constant, males are less probable to remain insured as compared to their female counterparts. This is because men are less risk averse as compared to their female counterparts (Bernasek & Shwiff, 2001). This high risk attitude of female goes to lend support to an existing study that suggests that females have the tendency to consume more health care services more frequently than males (Gómez, 2002). In this regard, females would therefore seek health-care financial risk protection against unexpected healthcare cost hence remain insured if payment of premium is on pro-rata.

Furthermore, the significant effect and odds ratios of 3, 5 and 5 of primary, *SHS* and *tertiary education background respectively*, indicate that individuals with these educational background are more than 3, 5 and 5 times likelier to remain insured than those with no educational background, all things being equal. This finding could be attributed to the fact that people's ability to understand the benefits of risk management and even long term savings as a precautionary measure increases with the level of education and therefore increases their risk aversion. Thus, education is seen as an important determinant of the consumption of health insurance. This reason is therefore consistent with existing findings as found in Bloom (2004); Blumberg & Nichols (2002); Juetting (2003); Trujillo (2003). These authors argue that a higher level of education is

positively related with the demand for any type of insurance product with health insurance inclusive. The results therefore imply that the implementation of pro-rata payment system with mobile phone for raising retention rate of NHIS may be successful in a population of insured individuals with educational background.

Finally, the study again found out from the empirical results that the government employees are more than 3 times as likely to remain on the NHIS as compared to the individuals who are not working. This finding was expected since government employees who are insured do not pay a premium directly from their pocket to be retained on the NHIS. Similar result was also obtained for insured individuals who are self-employed. The result depicted that the self-employed individuals are 69% more likely to remain on NHIS than the individuals who are unemployed. This finding supports earlier assertion that individuals who are gainfully employed also take insurance package more than the unemployed (Butler, 1997; Savage & Wright, 1999). The implication of this result is that for the pro-rata payment system to be effective in its implementation, the insured population should be gainfully employed.

6.1.2 Enrollment of Uninsured Individuals and Pro-rata Insurance Payment

The likelihood ratio test conducted on the model showed a strong relationship between all of the independent variables taken together, and the enrollment of uninsured individual variable ($LR = -339.6275$, $p < 0.001$) as seen in Table 6.5. Hence, the null hypothesis that states that, the model without independent variables fits well to the data than the model with independent variable was rejected. This presupposes that at least one of the independent variables contributed to the prediction of the uninsured individuals' attitudes towards paying premium with mobile phone as found in a study elsewhere (Hyeoun-Ae, 2013). From Table 6.5, the insignificant p-value for the

Hosmer and Lemeshow goodness-of-fit test is 0.4991. This indicates that the null hypothesis, which states that the model fits the data well, was not rejected. This moreover implies that our model passed the test.

6.1.2.1 Predictive Accuracy and Discrimination

6.1.2.1.1 Classification Table

The classification table by Peng & So (2002) was used to evaluate the predictive accuracy of the logistic regression model. Using a cut-off value of 0.5, all predicted values above 0.5 were classified as predicting the likelihood of uninsured enrolling on NHIS with a mobile phone when payment is on pro-rata basis (flexible), while all values below 0.5 represent otherwise.

As indicated in Table 6.3, the overall percent correct value of 89.49% depicted an increased predictive accuracy of the uninsured individuals enrolling on NHIS when health insurance premium payment is on pro-rata basis (flexible) through mobile phones. The sensitivity and specificity values of 4.92% and 99.90% indicated a better fit of the model as seen in a finding elsewhere (Hyeoun-Ae, 2013). The sensitivity results indicate that the probability of uninsured individuals to remain uninsured or not enrolling on NHIS when health insurance premium payment is on pro-rata is only about 4.92%. Out of this, the positive predictive value of 85.75% denotes the actual number of uninsured individuals who are willing to pay premium with mobile phone. On the other hand, the specificity results show the probability that the uninsured individuals will not remain uninsured or enroll on NHIS when health insurance premium payment is on pro-rata and it is about 99.90%. Out of this, negative predictive value of 89.51% is the actual number of uninsured individuals who will not remain uninsured i.e., enroll on the scheme.

Table 6. 3: A Classification Table Uninsured Individuals and Pro-rata Insurance Payment

Observed	Predicted		% Correct
	Yes	No	
Yes	6	1	7
No	116	990	1106
Overall % Correct	122	991	89.40%

Sensitivity = 4.92%, Specificity =99.90%, Positive predictive value = 85.71%, Negative predictive value= 89.51%

Source: Surveyed Data, 2016

6.1.2.1.2 Discrimination with Receiver Operating Characteristics (ROC) Curves

The full range of threshold values ranging from 0 to 1 were examined with a Receiver Operating Characteristics (ROC) curve unlike the classification table of just selecting a single threshold point. The ROC better discriminates those uninsured individuals who will enroll onto the NHIS when payment is pro-rata with a mobile-phone-payment system.

As indicated in Figure 6.2, the larger area under the curve (AUC=76%) and above 45° line for the policy variable *Pro-rata* and other variables including *age*, *sex*, *marital status*, *education*, *employment*, *dependants*, *amount spent recharging phone* and *average talk time* showed better predictability of the model. This finding agrees with the assertion of Bewick et al, (2004) that larger AUC and points above and further away from 45° line indicate a better predictability of the model.

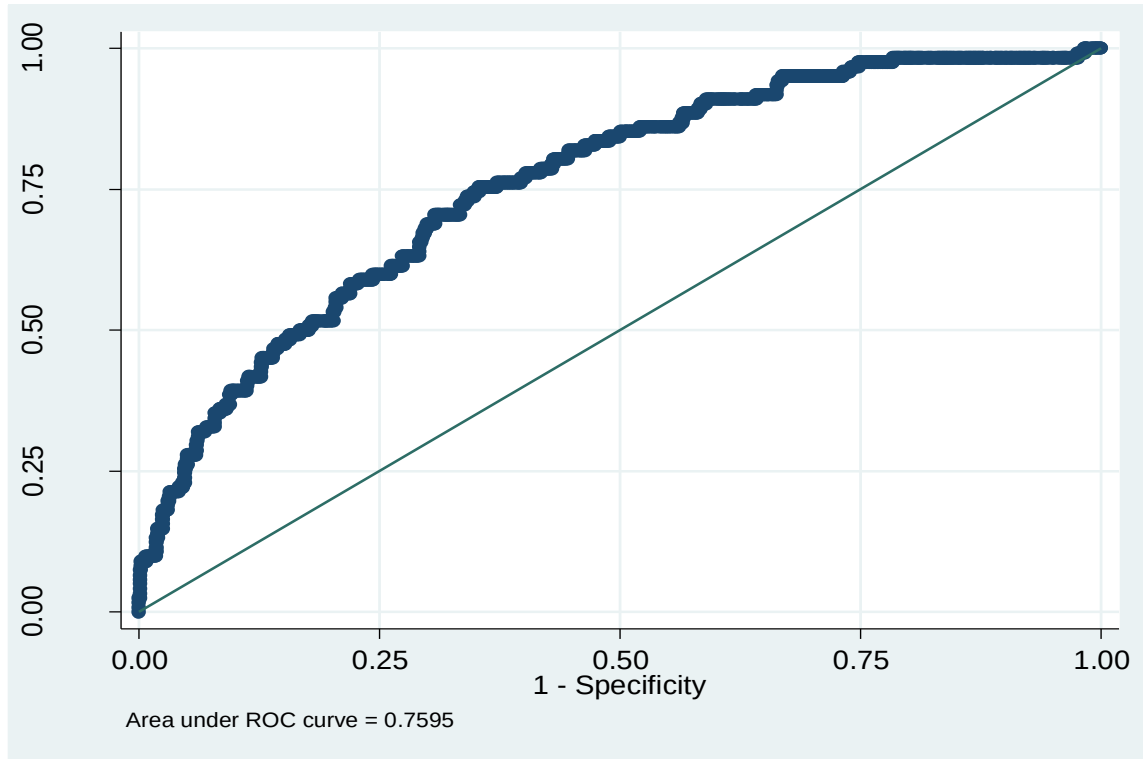


Figure 6.2: ROC of Uninsured Individuals and Pro-rata Insurance Payment

6.1.2.2 Effect of Pro-rata Payment System on Enrollment of Uninsured on NHIS

The results of logistic estimates of factors influencing the uninsured individuals to remain uninsured or enroll onto the NHIS are presented in Table 6.4. From the Table, the variable *pro-rata basis* and other confounding variables including *age*, *sex*, *education*, *employment* and *dependents* were significant predictors for an uninsured individual's likelihood to enroll onto the NHIS or remain uninsured. According to Peterson (1984), recommendation cited in Peng & So, (2002) that when a predictor variable is continuous, the logit coefficient is discussed. However, if the predictor is categorical, the odds ratio is discussed. Since all the significant variables in the present study were categorical except for the dependent, their odd ratios are discussed.

Table 6. 4: Logistic Results of Effect of Pro-rata on Enrolling on NHIS by the Uninsured

Remain Uninsured	OR	S. E.	Z	P>z	95% C.I.	
PRORATA	0.4413	0.1321	-2.7300	0.0060	0.2455	0.7933
Middle Age	0.4778	0.1501	-2.3500	0.0190	0.2581	0.8846
Old Age	0.1936	0.1456	-2.1800	0.0290	0.0443	0.8456
Sex	1.6279	0.3599	2.2000	0.0280	1.0555	2.5107
Divorced	0.7592	0.5684	-0.3700	0.7130	0.1750	3.2930
Married	0.5025	0.1968	-1.7600	0.0790	0.2332	1.0826
Separated	0.4879	0.3050	-1.1500	0.2510	0.1433	1.6612
Single	1.1062	0.3685	0.3000	0.7620	0.5758	2.1250
Widowed	0.3042	0.3422	-1.0600	0.2900	0.0336	2.7580
Primary Education	0.2616	0.1699	-2.0600	0.0390	0.0732	0.9341
JHS	0.3736	0.2012	-1.8300	0.0670	0.1300	1.0733
SHS	0.1930	0.1041	-3.0500	0.0020	0.0670	0.5556
Tertiary Education	0.1895	0.1114	-2.8300	0.0050	0.0599	0.5995
Government Employee	0.2969	0.1584	-2.2800	0.0230	0.1044	0.8446
Self Employed	0.5915	0.1493	-2.0800	0.0370	0.3607	0.9700
Dependant	1.1419	0.0796	1.9000	0.0570	0.9961	1.3090
Amount for Recharge	0.9695	0.0248	-1.2100	0.2250	0.9221	1.0193
Constant	1.8834	1.2365	0.9600	0.3350	0.5201	6.8201
No. of Observation = 1118						
R ² = 0.1306						
Test	Categories		X²		P-Value	
Overall model evaluation	Likelihood ratio test		-336.82769		<0.0001	
Goodness-of-fit test	Hosmer & Lemeshow Chi (19)		18.67		0.3479	

Source: Survey Data, 2016

The odd ratio less than 1 and the significant effect of policy variable *pro-rata* implies that the individuals are less likely to remain uninsured when payment of NHIS premium is on pro-rata than individuals who are not willing to pay NHIS premium on pro-rata, holding all other variables constant (OR=0.44, p=0.0060, C.I. = 0.2455-0.7933). This finding was expected and consistent with the theory of demand for health insurance. The relative fall in the premium as a result of pro-rata payment system with mobile phone is likely to increase demand for health insurance by the uninsured due to substitution effect. The result further lends support to a previous study that paying

health premium on pro-rata will not be a barrier to enrollment (Allegri et al., 2006). Therefore, more uninsured individuals shall enroll on NHIS in an era of pro-rata payment system.

With regard to *age*, the empirical results point out that middle aged (36-55 years) and old aged (55-95) individuals have the lower probability to remain uninsured than young aged individuals. This result could be attributed to the fact that as health deteriorates with an increase in age (Grossman, 1972), the demand for health-care increases as the individual is susceptible to age-related illnesses (Kemp, 2012). In this regard, the individual invests in health (Folland et al., 2003) as these diseases are major triggers of health-care expenditures according to Kemp, (2012). Therefore, in order for the uninsured individual to protect himself against this uncertain health-care expenditure, the individual may enroll onto the NHIS which may lead to increase in enrollment.

The empirical result further points out that males were about 63% more likely to remain uninsured as compared to their female counterparts, all other variables remaining constant (OR=1.63, $p=0.00280$, C.I.= 1.0555-2.5107). This finding implies that females are more likely to be insured on NHIS. This finding confirms an existing study that females frequently seek more health care than males (Gómez, 2002) because females are more risk averse than male (Bernasek & Shwiff, 2001). Therefore, the result implies that female individuals who is uninsured is more likely to seek health-care financial risk protection against unexpected healthcare cost thereby enroll on NHIS.

The significant effect and odd ratios less than 1 of primary, *SHS and tertiary education background*, imply that individuals who have attained such levels of education are unlikely to remain as uninsured as compared to those without such educational background. This is due to the

fact that people's ability to understand the benefits of risk management and even long term savings as a precautionary measure increases with the level of education and therefore increases their risk aversion. Thus, education is regarded as an important determinant of the consumption of health insurance. This result is consistent with existing findings as in Bloom (2004); Blumberg & Nichols (2002); Juetting (2003); Trujillo (2003). These authors assert that a higher level of education correlates positively with the demand for any type of insurance with health insurance inclusive.

The study again noted from the empirical results that the individuals who are government employees are less likely to remain uninsured as compared to the unemployed uninsured when all other variables are held constant ($OR=0.297$, $P=0.0230$, $CI=0.1044-0.8446$). This finding was expected since government employees do not pay a premium directly from their pocket to enroll on NHIS. The government employee only pays for processing fee to register or renew NHIS membership. Similar finding was obtained for individuals who are self-employed.

Finally, the result indicated that the self-employed individuals are less likely to remain uninsured than individuals who are unemployed ($OR=0.59$, $P=0.037$, $CI=0.3607-0.9700$). This finding does not dispute earlier assertion that individuals who are gainfully employed also take insurance package more than the unemployed (Butler, 1997; Savage & Wright, 1999). Since self-employed individuals are mostly found at the informal sector of the economy which their income flow is irregular (Amporfufu, 2013a; Osei-Boateng & Ampratwum, 2011), they are less likely to enroll on NHIS to secure financial protection against unexpected health care expenditure.

CHAPTER SEVEN

EMPIRICAL FINDINGS III

7.0 Introduction

This chapter examines the effect of savings on cost of medical care by the insured on enrollment onto the Ghanaian health insurance scheme. In investigating the effect of knowledge of savings on cost of medical care by the insured on enrollment and retention onto Ghana's health insurance scheme, specifically, the study sought to address the following questions;

- *What was the proportion of individuals who will enroll or remain on NHIS based on the knowledge of savings on medical fee in the insurance scheme in Ghana?*
- *What was the effect of knowledge of savings on cost of medical care when insured on the enrollment of uninsured in NHIS?*
- *What was the effect of knowledge of savings on cost of medical care when insured on the retention of insured in NHIS?*

Under this, the study specifically sought to achieve the following objectives:

- *To identify the proportion of individuals who will enroll or remain on NHIS based on the knowledge of savings on medical fee in the insurance scheme.*
- *To determine the magnitude of the effect of the characteristics of insured individuals on the retention rate of NHIS based on the knowledge of savings on medical fee in the insurance scheme.*
- *To estimate the magnitude of the effect of the characteristics of uninsured individuals on the enrollment rate of NHIS based on the knowledge of savings on medical fee in the insurance scheme.*

7.1 Computing Savings on Medical Fee by the Insured

From the exploratory study, the study first computed the rate of savings on medical cost by the insured when they sought out-patient care services. The results from the exploratory study are presented in Table 7.1.

Table 7. 1: Summary Statistics of Hospital Bill for Insured and Uninsured Groups

Insurance Status	Observation	Hospital bill (GHS)			
		Mean	Std. Dev.	Minimum	Maximum
Uninsured	59	53.83	38.30	15	210
Insured	59	33.47	47.23	0	170

Source: Exploratory Data, 2016

In computing the savings rate on medical fee S_M in health insurance, the present study derived motivation for the computation of savings rate from the fundamental definition of saving rate. According to a report by Audenis et al.,(2002), the saving rate is defined as the fraction of income that is not consumed. By inference, the present study defined savings rate on medical fee S_M as that fraction of medical fee not consumed through out-of-pocket payment by the insured but through NHIS M_N . In addition, in the case of National Health Insurance Scheme (NHIS) in Ghana, there is asymmetric information on the M_N and the total cost of medical fee M to the insured individual. What the insured pays is $1 - M_N$. However, M is observed by the uninsured individual since he has to pay the full cost of medical fee.

Therefore, the saving rate on medical fee is calculated as the ratio of difference between the total cost of medical fee paid by uninsured and the fraction of medical fee paid by the insured through out-of-pocket to the total cost of medical services paid by uninsured.

$$S_M = \frac{M - (1 - M_N)}{M} * 100 \quad (7.1)$$

$$S_M = \frac{M - G}{M} * 100 \quad (7.2)$$

S_M = Savings rate

M = Mean medical fee paid by the uninsured

$1 - M_N = G$ = Mean medical fee paid by the insured

From Table 7.1 and equation (7.2), the saving rate is computed as 38 percent. This implies that as the individual moves from uninsured state to the insured state, the cost of medical care reduces by 38 percent. The current study's result deviates much from what was obtained in 2011 as 86% published in 2016 by Aryeetey et al., (2016). The difference may be as a result of larger coverage of NHIS in the initial stages of its implementation as compared to the current coverage level. However, savings in the cost of medical fee as found by the current study is consistent with earlier study conducted in Ghana that insured pay less than uninsured (Sekyi & Domanban, 2012).

Table 7. 2: Test of Mean Difference between the Insured and Uninsured

Variable	Obs	Mean Medical Fee (GHS)	S.E.	S.D.	95% C.I.	
Uninsured	59	53.83	4.99	38.30	43.85	63.81
Insured	59	33.47	6.15	47.23	21.16	45.77
Combined	118	43.65	4.05	44.02	35.62	51.67
Difference		20.36	7.92		4.68	36.04
Diff = mean fee (uninsured) - mean fee (insured)					t = 2.5723	
Ho: diff = 0						
Ha: diff < 0		Ha: diff != 0			Ha: diff > 0	
Pr(T < t) = 0.9943		Pr(T > t) = 0.0114			Pr(T > t) = 0.0057	

Source: Exploratory Data, 2016

The table above further depicts that, as it stands currently, there is significant difference between the medical fee paid by the insured and uninsured for outpatient services. It is possible to infer that the purchase of health insurance by the insured may be associated with the difference in the cost of medical services. By this result, the uninsured is motivated to enroll on NHIS by this information since there is significant difference in the medical fee among the two groups. On the other hand, the insured has the incentive to retain his/her membership due to the same reason as identified in the case of the uninsured.

7.2 Effect of Knowledge of Savings Rate in NHIS on Enrollment or Retention

This section presents the finding of both the insured who are likely to remain and uninsured individuals who are likely to enroll on the National Health Insurance Scheme given that a saving rate of 38% is saved on cost of health-care. This was aided by chi-square test of association (See Table 7.3).

Table 7. 3:Chi-square Test of Effect of Savings Rate in NHIS on Enrollment or Retention Rate

Statement	Savings of 38%	Frequency	Percent	P-value
Ever enrolled on NHIS	No	72	6.02	
	Yes	1125	93.98	
Enroll in NHIS	No	5	6.94	<0.001
	Yes	67	93.06	
Retain NHIS	No	5	0.47	<0.001
	Yes	1049	99.53	

Source: Survey Data, 2016.

The data presented in Table 7.3 indicate that about 93.98% of the sampled population had ever enrolled onto the National Health Insurance Scheme (NHIS). This finding agrees with a report that the Ghanaian health insurance scheme has ever enrolled about twenty-million (22,000,000)

Ghanaians representing 88.05% of the population (Universal Access to Health-care Campaign Coalition, 2013) as of 2012.

The present study found a statistical relationship between those who had never enrolled in NHIS and the saving rate of 38% at 1% confidence level as seen in table 7.3. The result means that when those 6.02% of individuals who had never enrolled in NHIS i.e. uninsured, were asked whether they shall enroll based on the knowledge of savings of 38% on the cost of medical care (outpatient services) when sick, greater percentage of about 93.06% responded "Yes". Similar trend was also noticed for those who had ever enrolled. There was statistical relationship between those who had ever enrolled in NHIS i.e. insured, and the saving rate of 38% at 1% confidence level. This finding indicates that about 99.53% of those who had ever enrolled on NHIS is likely to retain their membership based on the knowledge of savings of 38% on cost of medical care when insured.

An earlier study conducted in Vietnam also obtained a savings rate of 50% on the cost health-care through health insurance (Sepehri, 2014) which is slightly higher than what the current study obtained. What is limited in Sepehri (2014) study is the absence of population unit on which the sample was taken unlike the current study that focused on the outpatient services. This could have led to the differences in the savings rate between the two studies.

From this point forward, the present study further found the effect of the characteristics of both insured and uninsured individuals who are likely to enroll or remain on NHIS based on the knowledge of savings in the insurance scheme based. This was estimated with logistic regression model.

7.3 Characteristics of Insured Individuals and Retention on NHIS based on the Knowledge of Savings on Medical Fee when Insured

Under this section, the effect of the characteristics of the insured individuals who are likely to remain on the Ghanaian health insurance scheme given that the cost of medical care is reduced by 38 percent is estimated with logistic regression model.

7.3.1 Overall Model Evaluation

The likelihood ratio test conducted on the model indicated a strong relationship between all of the independent variables joined together and the retention of insured individual variable. The significant likelihood ratio test ($LR=-18.289122$, $p=0.0004$) shows that the null hypothesis that the model without independent variables fits well to the data than the model with independent variable was rejected (see Table 7.5). This presupposes that at least one of the independent variables contributes to the prediction of the uninsured individuals' attitudes towards paying premium when there is savings on cost of hospital bill when insured (Hyeoun-Ae, 2013).

From Table 7.5, the significant difference ($p=0.0003$) of the Hosmer and Lemeshow goodness-of-fit test indicates that the null hypothesis which states that the model fits the data well was rejected. This moreover implies that our model did not pass the test. This could be attributed to the low degree of freedom noted in the analysis.

7.3.2 Predictive Accuracy and Discrimination

7.3.2.1 Classification table

The predictive accuracy of the logistic regression model was evaluated with the classification table by Peng & So (2002). Using a cut-off value of 0.5, all predicted values above 0.5 were classified

as predicting the likelihood of insured individual remaining on NHIS with a mobile phone given knowledge of savings of 38 % on cost of medical care when insured, while all values below 0.5 represent otherwise.

Per the results from Table 7.4, the overall percent correct value of 99.60% depicted an increased predictive accuracy of the insured individuals remaining on the NHIS due to the knowledge of saving of 38% on cost of medical care. The sensitivity and specificity values of 100% and 20% indicate a better fit of the model as found in a finding elsewhere (Hyeoun-Ae, 2013). The sensitivity results indicated that the model was able to predict that the probability of insured individuals who will remain on NHIS given that a rate of 38% is saved on the cost of medical care when insured is about 100%. Out of this, 99.60% represents the actual number of insured individuals who shall remain on the NHIS as indicated by the predictive positive value. On the

Other hand, the specificity results showed the model was able to correctly predict that the probability of insured individuals who will not remain given that a rate of 38% is saved on the cost of medical care when insured is about 20%. Out of this, negative predictive value of 100% is the actual number of insured individuals who will not remain on the scheme.

Table 7. 4: A Classification Table of Retention of Insured Individuals and their Characteristics

Observed	Predicted		% Correct
	Yes	No	
Yes	1002	4	1006
No	0	1	1
Overall % Correct	1002	5	99.60%

Sensitivity = 100%, Specificity = 20%, Positive predictive value = 99.60%, Negative predictive value= 100%

Source: Surveyed Data, 2016

7.3.2.2 Discrimination with Receiver Operating Characteristics (ROC) curves

The ROC examined the full range of threshold values ranging from 0 to 1 unlike the classification table of just selecting a single threshold point. The ROC better discriminates those insured individuals who will remain on NHIS given that a rate of 38% is saved on the cost of medical care.

From Figure 7.1, the larger area under the curve (AUC=92%) and above 45° line for the policy variable including *age, sex, dependants, marital status, education and employment* showed better predictability of the model. This finding agrees with the assertion of Bewick et al, (2004) that larger AUC and points above and further away from 45° line indicate a better predictability of the model.

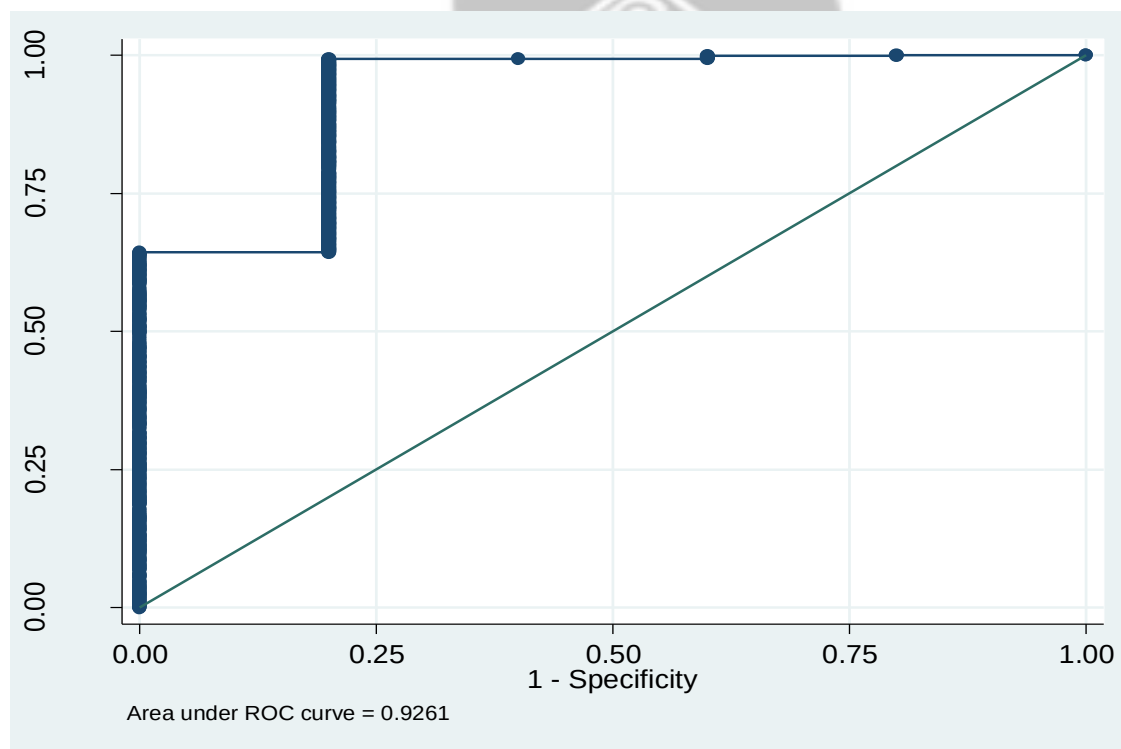


Figure 7.1: ROC of Insured individuals to Remain on NHIS

7.3.3 Logistic Results of Effect of Characteristics of Insured Individuals on Retention Rate of NHIS based on the Knowledge of Savings on Medical Fee when Insured

According to Table 7.5, the variables including *dependants, marital status and employment* were significant predictors for insured individual's likelihood to remain on the NHIS based on the knowledge of 38% savings on medical cost if insured.

Table 7. 5: Logistic Estimates of Retention of Insured Individuals and their Socio-economic Characteristics

NHIS Renewal	OR	SE	Z	P>z	95% C.I.	
Age ²	1.0260	0.0139	1.9000	0.0580	0.9991	1.0535
Age	0.1352	0.1424	-1.9000	0.0580	0.0171	1.0662
Sex	0.2563	0.3339	-1.0500	0.2960	0.0199	3.2935
Dependants	0.5971	0.1389	-2.2200	0.0270	0.3785	0.9422
Married	0.3001	0.1647	-2.1900	0.0280	0.1024	0.8797
Education	1.0529	0.1770	0.3100	0.7590	0.7574	1.4638
Employment	0.0683	0.0870	-2.1100	0.0350	0.0056	0.8287
Constant	7.20E+24	1.65E+21	2.50	0.012	246541.4	2.10E+44
No. of Observation	= 1007					
R ²	= 0.4197					
Test	Categories			X ²	P-Value	
Overall model evaluation	Likelihood ratio test			-18.289122	0.0004	
Goodness-of-fit test	Hosmer & Lemeshow (5)			44.45	0.0003	

Source: Survey Data, 2016

The significant relationship of *dependants* (OR=0.59, P=0.027, CI=0. 3785-0. 9422) depicts that insured individuals with high number of dependants are less likely to renew their NHIS status given that about 38% of medical fee is saved when insured as compared to those insured with lower number of dependants, all things being equal. Individuals with high number of dependants have a corresponding increase in household consumption expenditure (Sekhampu & Niyimbanira, 2013). This result implies that the individuals are likely to investment less in health insurance. Therefore, the individual will be unwilling to renew their NHIS membership.

With regards to *marital status*, the empirical results also showed that insured married couples are less likely to renew their health insurance based on the knowledge of 38% savings of medical cost when insured as compared to insured single individuals, holding all other variables constant (OR=18, P=0.019, CI=1.6186-209.2387). The present study disputes the findings of existing studies as found in Kirigia, Lin, & Greane (2005); Liu & Chen, (2002). Their study found a significant positive relationship between marital status and demand for health insurance. They concluded that compared with unmarried individuals, married couples demand health insurance more due to the need to provide protection against the risk of unaffordable health expenditures of their children. The different finding from the current study could be due to the fact that most of the married individuals are in the informal sector of the economy which find the current cost of paying health insurance unaffordable. In this regard, the married individual is less likely to renew his or her NHIS membership.

Lastly, the high number of individuals in the informal sectors might have accounted for the *employment* negative influence on retention rate. The result shows that generally, employment status of the individuals can affect the decision to remain on NHIS. The fact that the informal sector is characterized by low income according to Atinga et al., (2015) could explain why employment status of the individuals has the tendency to result in unlikely event of remaining on Ghana's NHIS.

7.4 Characteristics of Uninsured Individuals and Enrollment on NHIS based on the Knowledge of Savings on Medical Fee when Insured

The effect of the characteristics of uninsured individuals on the retention of NHIS based on the knowledge of savings on cost of medical care when insured is estimated with logistic regression model.

7.4.1 Overall Model Evaluation

The significant difference shown by the likelihood ratio test ($LR = -17.268415$, $p = 0.0005$) between the fitted models with and without the independent variables (see Table 7.7) indicates that the null hypothesis that the model without independent variables fits well to the data than the model with independent variable was not rejected. This presupposes that at least none of the independent variables contributed to the prediction of the uninsured individual attitudes towards paying premium when the asymmetric information on how much the insured saves on medical fee is eliminated (Hyeoun-Ae, 2013). This result could be attributed to the small sample size of the uninsured population in the sampled area. The Hosmer-Lemeshow test was not performed since the sample size is less than 400 (Hosmer & Lemeshow, 2000). However, the study went further to conduct other test to determine whether our observed data fit the model well.

7.4.2 Predictive Accuracy and Discrimination Test

7.4.2.1 Classification table

From Table 7.6, the overall percent correct value of 95.10% depicts an increased predictive accuracy of the uninsured individuals enrolling on NHIS given that 38% is saved on the cost of medical care when insured. The sensitivity and specificity values of 100% and 16.67% indicated

a better fit of the model as found in a finding elsewhere (Hyeoun-Ae, 2013). The sensitivity results indicated the model was able to predict correctly that the probability of uninsured individuals who will enroll on NHIS given that 38% is saved on the cost of health-care when insured is about 99.15%. Furthermore, the predictive positive value of 95.05% denotes the actual number of uninsured individuals who will enroll onto the NHIS. On the other hand, the specificity results showed the model was able to predict correctly that the probability of uninsured individuals who will not enroll on NHIS is about 16.67%. Out of this, the negative predictive value is an indication that the model is able to identify about 100% of the number of uninsured individuals who will not enroll on the scheme.

Table 7. 6: A Classification Table Enrollment of Uninsured Individuals and their Characteristics

Observed	Predicted		% Correct
	Yes	No	
Yes	96	5	101
No	0	1	1
Overall % Correct	96	6	95.10%

Sensitivity = 100%, Specificity =16.67%, Positive predictive value = 95.05%, Negative predictive value= 100%

Source: Surveyed Data, 2016

7.4.2.2 Discrimination with Receiver Operating Characteristics (ROC) curves

While the classification table just selects a single threshold point to determine the predictive accuracy of the model, the full range of threshold values ranging from 0 to 1 was examined with a Receiver Operating Characteristics (ROC). The ROC well discriminates those uninsured individuals who will enroll onto the NHIS given that a rate of 38% is saved on the cost of medical care when insured. From Figure 7.2, the larger area under the curve (AUC=88%) and above 45⁰ line for the variable *income* showed better predictability of the model. This finding agrees with the

assertion of Bewick et al, (2004) that larger AUC and points above and further away from 45° line indicate a better predictability of the model.

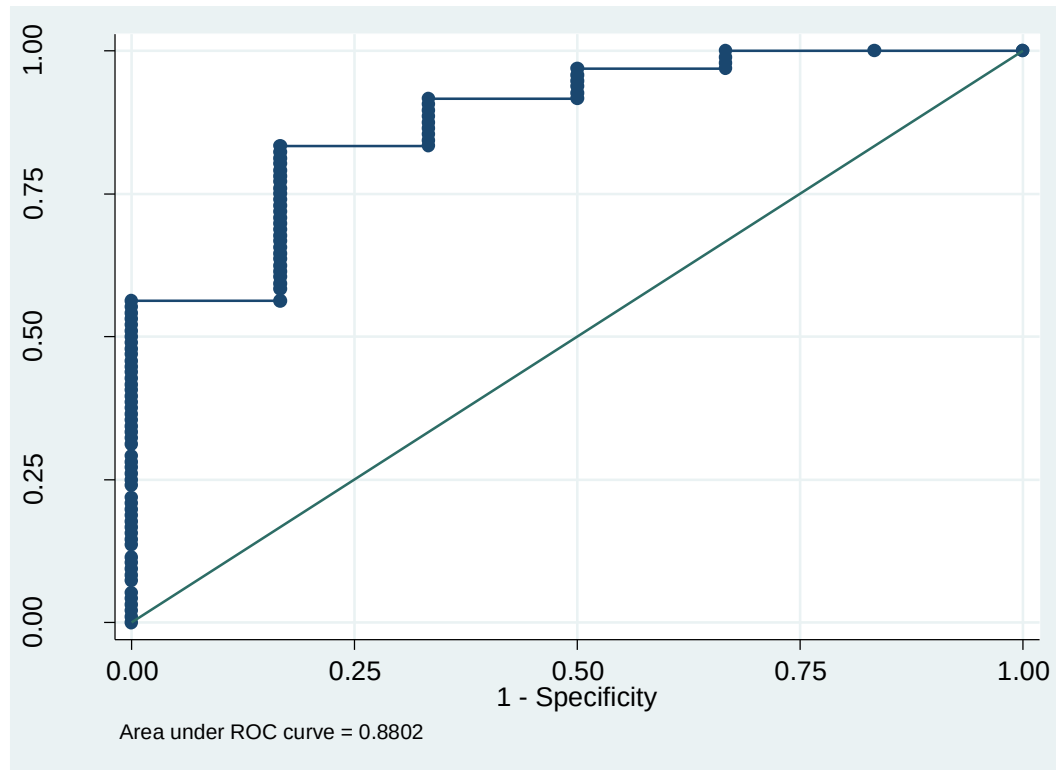


Figure 7.2: ROC of Uninsured Individuals to Enroll on NHIS

7.4.3 Logistic Results of Effect of Characteristics of Uninsured Individuals on NHIS enrollment Rate based on the Knowledge of Savings on Medical Fee when Insured

The results of logistic estimates of factors influencing the uninsured individuals to enroll onto the NHIS is presented in Table 7.7.

From the Table, the variable *gross income* was a significant predictor for uninsured individual's likelihood to enroll onto the NHIS given that a rate of 38% is saved on the cost of medical care when insured.

The empirical findings indicated a significant effect of the *gross income* and enrolling on NHIS by the uninsured based on the knowledge of savings rate of 38% on the cost of medical care when insured. The result shows that high income earners who are uninsured are less likely to remain uninsured. Submissions by Browne & Kim (1993) also found a positive relationship between life insurance consumption and the level of income. Owusu-Sekyere & Chiaraah (2014) also shows that individuals' earning higher incomes were more likely to take up health insurance than individuals with low income. As expected, health insurance consumption should rise with an increase income as per the theory of demand for normal good. The demand curve for health insurance contingent on income is expected to shift outwardly, hence, increases the demand for health insurance.

Table 7. 7: Logistic Estimates of Enrolling of Uninsured Individuals and their Socio-economic Characteristics

Remain Uninsured	OR	S.E.	Z	P>z	95% C.I.
Age	0.9618	0.0774	-0.4800	0.6290	0.8215
Sex	0.3515	0.4358	-0.8400	0.3990	0.0309
Dependants	2.2206	1.1121	1.5900	0.1110	0.8321
Marital Status	1.6719	0.5936	1.4500	0.1480	0.8337
Education	1.0178	0.2198	0.0800	0.9350	0.6666
Employment	0.5700	0.3706	-0.8600	0.3870	0.1594
Tenure Status	102.4772	282.6559	1.6800	0.0930	0.4601
Income	0.9949	0.0022	-2.2900	0.0220	0.9905
Constant	0.6260	2.3136	-0.1300	0.8990	0.0004
No. of Observation = 102					
R ² = 0.3235					
Test	Categories			X²	P-Value
Overall model evaluation	Likelihood ratio test			-15.437723	0.0639

Source: Survey Data, 2016

CHAPTER EIGHT

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

8.0 Introduction

Presented under this section are the summary of findings, conclusion and policy recommendations of the present study.

8.1 Summary of Findings

Regarding the proposed MPPS, the National Health Insurance Scheme will find it feasible to participate if the cost of collecting the premium under the Conventional System is less or equal to the cost of collecting health insurance premiums through mobile phones. The study found out that the feasible cost of collecting the premiums through mobile phone was between 0-22%.

Furthermore, the study found out that about 92% of the surveyed population are willing to pay health insurance premium with their mobile phones. The motivation for the participation in the proposed MPPS was found to be influenced by the factors including *residing in Kumasi metropolis, female, premium, primary education, affordability of lump sum premium payment and travelling distance to NHIS*. The study further proposed two (2) payment preferences under the MPPS in addition to the conventional system of paying health insurance premium (CPS). These MPPS payment preferences were Automatic Deduction Payment System (ADPS) and Mobile Money Payment System (MMPS). The study again indicated that out of the number willing to pay health insurance premium through mobile phone, about 74% prefer the ADPS to both MMPS and the CPS. The study found out that factors such as *income, premium, lump sum payment and travelling distance to NHIS office* were significant predictors for participating in the Automatic

Deduction Payment System (ADPS) while *premium, and lump sum payment* were found to influence participation in Mobile Money Payment System (MMPS).

On the decision of both insured and uninsured individuals to enroll or remain on NHIS when payment is on pro-rata, the empirical results have revealed that the insured individual is more than 2 times as likely to remain on the NHIS when payment is on pro-rata as compared to the situation of paying insurance premium through the existing system, all other things remaining constant. On the other hand, the uninsured is less likely to remain uninsured if payment is on pro-rata as compared to the current system of paying health insurance premium, holding all other variables constant. More to it, other factors such as *sex, educational background and employment status* of respondents were found to significantly influence the decision of individuals to enroll or remain on NHIS.

Lastly, the present study has revealed that the rate of savings on cost of medical care received by the insured individual when sick was computed as 38%. The study findings further revealed that about 94% of individuals who have never enrolled are likely to enroll onto the NHIS based on the knowledge of savings on medical fee when insured. Furthermore, about 99% of those who have ever enrolled are likely to remain on the NHIS based on the knowledge of savings on medical fee when insured. Furthermore, the empirical results showed that the insured individual's decision to remain on the NHIS is influenced by *marital status, dependants and employment status*. However, the decision of uninsured individuals to enroll onto the NHIS is entirely influenced by their *income*.

8.2 Conclusion

This work has extensively and critically examined the strategies to increase Ghanaian National Health Insurance Scheme's (NHIS) enrollment or retention rates. The proposed strategies are the Mobile Phone Payment System (MPPS) and design of an educational tool based on the savings gained on cost of medical care when insured. The main objective of the study was to determine the effect of these proposed strategies on the enrollment and retention levels of NHIS. In order to achieve the main objective, sub-objectives were structured.

Firstly, in the event of determining the feasibility of paying health insurance premium through the proposed MPPS in Ghana, the study opted to compute the optimum cost of collection of health insurance premium through mobile phone in Ghana that will be acceptable to NHIA. The study found out that the maximum cost of collecting the premiums per unit should increase not more than 11% and 22% if cost of collecting premium through the proposed MPPS is 0.5 and 1.0 respectively. Furthermore, to assess the factors that influence the decision of individuals to participate in the Mobile Phone Payment System (MPPS), the study revealed that about 92% of the surveyed population are willing to pay health insurance premium with their mobile phones. This finding was found to be influenced by factors including *residing in Kumasi metropolis, female, premium, primary education, affordability of lump sum premium payment and travelling distance to NHIS*. The study also found that factors such as *income, premium, lump sum payment and travelling distance to NHIS office* were significant predictors for participating in the Automatic Deduction Payment System (ADPS). On the other hand, factors such as *premium, and lump sum payment* were found to influence participation in Mobile Money Payment System (MMPS).

Secondly, in investigating the effect of pro-rata health insurance premium payment with mobile phone on enrollment and retention on Ghana's National Health Insurance, the study showed that the insured individual is more than 2 times as likely to remain on the NHIS while the uninsured is less likely to remain uninsured when payment is on pro-rata. In controlling for other factors, the study identified *age, sex, educational background and employment status* as significantly influencing individuals' enrollment or retention on NHIS.

Finally, to determine the effect of savings on medical fee when insured on enrollment and retention on Ghana's National Health Insurance Scheme, the present study has noticed that the decision of both insured and uninsured individuals to enroll or remain on NHIS was statistically influenced by a savings of 38% received on the cost of medical fee when insured. Specifically about 94% of individuals who have never enrolled are likely to enroll on NHIS based on the knowledge of savings in NHIS. On the other hand, about 99% of members who have ever enrolled are likely to remain on the NHIS based on the knowledge of savings rate of 38% gained on medical fee when insured. Furthermore, the insured individual's decision to remain on the NHIS based on the knowledge of savings rate of 38% gained on medical fee is influenced by factors such as *marital status, dependants and employment status* while the uninsured individual decision to enroll on NHIS based on the knowledge of savings rate of 38% gained on medical bill is influenced by *income*.

8.3 Policy Recommendations

Based on the understanding of the findings of the study, the following policy interventions could be pursued;

- It is recommended that the National Health Insurance Scheme consider this payment system that has the potential of attracting greater proportion of individuals in the informal sector to be enrolled onto the scheme.
 - ❖ This is because a greater percentage of the surveyed population is willing to pay their premium through the proposed Mobile Phone Payment System (MPPS).
 - ❖ Again, the study found out that both the insured and uninsured individual are more than 2 times as likely to remain or enroll on the NHIS respectively if payment is on pro-rata.
- Policies regarding the consideration of the mobile phone payment system in Ghana should not neglect the socio-economic characteristics such as *residing in Kumasi metropolis, female, premium, primary education, affordability of lump sum premium payment and travelling distance to NHIS*, of individuals because statistically the study found significant relationships between these characteristics and the decision to participate in the proposed MPPS as well as the MPPS options.
- As per the study findings, it is recommended that the National Health Insurance Scheme should design an appropriate educational tool based on the knowledge of savings on medical cost when insured since the study indicated that about 92.75% of individuals who have never enrolled are likely to enroll onto the NHIS while about 99.43% of those who have ever enrolled are likely to remain on the NHIS.
- Policies regarding the consideration of this educational tool should not disregard the socio-economic characteristics including *marital status, dependants and employment status and*

income, of individuals because statistically the study found significant relationships between these characteristics and the decision to remain or enroll on the Ghanaian NHIS.

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APPENDIX

Appendix I: Survey Questionnaire

No.	Variable	Responses	Code
PART I: SOCIO-DEMOGRAPHIC CHARACTERISTICS			
	District:	001=KMA 002=Atwima Nwa 003=Sekyere Central	
1.	Locality:		__/_/_/
2.	Age (years)		__/_/_/
3.	Sex	1=Male 0=Female	__/_/_/
4.	Marital Status	1=Single 2=Married 3=Co-habiting 4=Separated 5=Divorced 6=Widowed	__/_/_/
5.	Education	015=Tertiary 012=S.H.S/MSLC 009=J.H.S 006=Primary 000=None	__/_/_/
6.	Current Employment Status	001=Unemployed 02=Government Employee 003=Privately Employed 004=Self Employed 005=Other, Specify.....	__/_/_/
7.	Number of dependants		
8.	Type of tenure	001=Own house 002=Hired Apartment	__/_/_/
9.	What is your Gross Income for the month (GHS)?		
PART II: NHIS STATUS			
10.	Have you ever been enrolled onto the NHIS before?	001=Yes, go to 13 002=No, go to 11 & cont 21	__/_/_/
11.	Why have you not registered?	001= Don't have money 002= Long queues/waiting time 003= Don't have enough time 004= I don't often fall sick 005= Not interested 006= Low coverage 007= Due to capitation	

		008= Poor customer (client) service	
		009= Premium is expensive	
		010= Others (Specify.....)	
12.	Will you enroll given that you will make a savings on the cost of health-care when sick?	001=Yes	
		002=No	
13.	Currently, are you a registered biometric card bearing member of NHIS? (if possible, respondent should show card)	001=Yes	__/__/__
		002=No, go to 19	__/__/__
14.	Why did you register for NHIS?	01=Access free healthcare	
		002=Access healthcare at subsidized/affordable rate	
		003= Pregnancy	
		004=Chronic disease situation eg BP, diabetics	
		005= Everyone was registering it	
		006= Government advised us to do	
		007=Emergency Healthcare situation eg Accident	
		008= To get quality healthcare	
		009= As a national identity card	
		010= Others (Specify.....)	
15.	Where did you register	001= NHIS office	
		002= Registration centre at place of worship	
		003= Registration centres in community	
		004= Registration centre at work place	
		005= Others (specifiy).....	
16.	How much did you pay as premium?		
17.	How many minutes do you have to walk to the registration centres (write answer in figures only eg 4)		
18.	Do you wish to always remain on the NHIS given that you save (38%) some money when seeking health?	001=Yes	
		002=No	
19.	Why have you not registered?	001= Don't have money	
		002= Long queues/waiting time	
		003= Don't have enough time	
		004= I don't often fall sick	
		005= Not interested	
		006= Low coverage	
		007= Due to capitation	
		008= Poor customer (client) service	
		009= Premium is expensive	
		010= Others (Specify.....)	
20.		001=Yes	__/__/__

	Do you wish to renew it one day given that you will make a savings of about 38% on the cost of health care?	002=No	__/_/_/
PART III: NHIS Statu			
21.	How do you currently rate your health status?	1=Very Good	__/_/_/
		0=Average	__/_/_/
		-1=Bad	__/_/_/
22.	Are the number of diseases currently covered by NHIS enough?	1=Yes	__/_/_/
		0=No	__/_/_/
23.	Are the number and types of drugs currently served under NHIS enough?	1=Yes	__/_/_/
		0=No	__/_/_/
24.	Are the number and types of laboratory services currently served under NHIS enough?	1=Yes	__/_/_/
		0=No	__/_/_/
25.	Overall, how do you rate the current level of coverage provided by NHIA	1=Very Good	__/_/_/
		0=Average	__/_/_/
		-1=Bad	__/_/_/
PART IV: Challenges of NHIS			
26.	Is one lumpsum premium payment affordable to you?	1=Yes	__/_/_/
		0=No	__/_/_/
27.	Do you spend or anticipate spending more hours in queue at NHIS offices	1=Yes	__/_/_/
		0=No	__/_/_/
28.	How many hours do you spend or will spend in queue at NHIS office for registration or renewal		
29.	How many hours do you spend or will spend in travelling to NHIS office for registration or renewal		
30.	How is the attitude of NHIS staff towards you?	1=Very well	__/_/_/
		2=Well	__/_/_/
		3=Not well	__/_/_/
PART V: Mobile Phone Usage			
31.	Do you have a mobile phone	1=Yes, <i>cont. from 31</i>	__/_/_/
		0=No, <i>go to 29,30</i>	__/_/_/
32.	Why are you not using mobile phone	01=Don't have money	
		02=Can't Operate it	
		03= Spoilt	
		04=Stolen/Missing	
		05= Can't buy credit	
		06=No reason	
		07= Others (Specify	
33.	Do you wish to use mobile phone in future	1=Yes	__/_/_/
		0=No	__/_/_/
34.	In your estimation, how frequent do you recharge your phone in a week? (<i>write response in figures eg 2</i>)		

35.	How much do you spend recharging your phone in a week? (write response in figures without the cedi sign eg 2)		
36.	What is the common credit voucher do you use in recharging your phone?	001= 0.6	
		002= 1	
		003= 2	
		004= 5	
		005= 10	
		006= 20	
37.	In your estimation, how many times do you make a call in a day? (write response in figures eg 2)		
38.	In your estimation, what is your average talk time		
39.	What is/are the name(s) of the mobile phone lines		
40.	Has your chip being registered in your name?	1=Yes	
		0=No	
41.	If it becomes possible, will you be using your mobile phone for the rest of your life	1=Yes	__/_/_/
		0=No	__/_/_/
Mobile Phone Payment System			
42.	Will you be willing to use your mobile phone to pay NHIS premium given that payment can be done on installment basis?	1=Yes	__/_/_/
		0=No	__/_/_/
43.	Will you enroll or renew insurance with payment system that minimizes long queues at NHIS office	1=Yes	
		0=No	
44.	Will you enroll or renew insurance with payment system that minimizes the cost of transportation from your house to NHIS office	1=Yes	
		0=No	
45.	Will you enroll or renew insurance with payment system that minimizes the occasional quarrels with NHIS staff	1=Yes	
		0=No	
Two new mobile phone payment systems are proposed together with the conventional or existing payment method. They are Automatic Deduction Payment System (ADPS) and Mobile Money Payment System (MMPS). ADPS- An agreed amount will be deducted from your stock of credit upon every call made as your insurance premium on flexible terms, no traveling to NHIS office to make payment as well as no queue to join. Regarding the MMPS, this system follows the mobile money system and also allows you to pay on flexible terms basis. However, this system involves traveling to mobile money vendor to make payment and a minimal waiting time at the vendor's office.			
46.	Among these 2 new systems plus the conventional system of paying insurance, which one will you prefer to pay your insurance premium with?	001= ADPS	
		002= MMPS, go to 43	
47.	Do you have mobile money vendor close to your house	1=Yes	
		0=No	
48.	How many minutes will it take you to walk/travel to the vendor		__/_/_/
			__/_/_/
49.		1=Agree	__/_/_/

	You will become NHIS member when your deduction/contribution equals the price of premium?	0=Don't agree	__/_/_
50.	Do you agree that the use of mobile phone can increase enrollment or retention rate	1=Yes	__/_/_
		0=No	__/_/_

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Appendix II: Interview Guide for Focus Group Discussion

Lead Discussant	Student Researcher	
Issues	Discussant	Duration (Minutes)
Intentions of the Study	Students Researcher	10
Understanding the Concept of the Proposed Mobile Phone Payment System (MPPS); - What is it, - The Understanding of Telecoms' terms and reference - The understanding of the Design of the system - Proposed Payment Preferences - Conditions of the proposed MPPS	ICT Specialist	60
Economic Implications - Feasible Cost of collecting premiums through the proposed MPPS	Thesis Supervisor and Student Researcher	20
Conclusion Remarks	Student Researcher	30

Appendix III: Interview Guide for Key Informant Interview- NHIS personnel

Issues	Response
Introduction of the Concept of proposed MPPS	
Challenges of Current Payment System	
Process of Registration	
Current Enrollment Rate	
Components of Processing Fee	
Premium Amount	
Cost of Collection of premium	

