EVALUATING THE UTILIZATION OF THE NATIONAL HEALTH INSURANCE SCHEME IN RURAL GHANA

by

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A dissertation submitted to the faculty of
The University of Utah
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in

Public Health

Department of Family and Preventive Medicine

The University of Utah

August 2013

The University of Utah Graduate School

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ABSTRACT

Like most nations of the world, the leadership of Ghana, irrespective of political regime, has both formulated and subsequently implemented several national development policies in the quest of improving the lives of her citizenry. These procedures, in some cases, have been aligned with global goals of bridging the disparities that exist in the healthcare delivery system. Immediately following independence, the newly formed government implemented free access to primary healthcare in every public health facility. However, the economic challenges over time led to policy changes that introduced the infamous "Cash-and-Carry" program, which numerous empirical studies have concluded was detrimental to the healthcare seeking behaviors of residents. Through this system, patients were made to pay instantly out of pocket the total cost for their treatments.

The National Health Insurance Scheme (NHIS) was introduced in 2005 with the policy objective of getting all residents in Ghana access to quality, affordable healthcare services within a limited period of time. Despite some landmark progress that has been achieved since its implementation, complete coverage through this scheme has not been met and the membership rates tend to vary among the administrative regions of the country. Other findings indicate that many economically disadvantaged citizens are being left behind. The primary purpose of this study is to evaluate the NHIS and predict membership among households in the Barekese subdistrict of the Ashanti Region of Ghana.

Chapter 1 of this dissertation provides a brief introduction to the content of this series of projects. Chapter 2 is devoted to a historic narrative on the financing of the healthcare delivery system in the context of the subregion where Ghana is geographically located, including the past and present trends in the country, with some direct insight into the context of the Barekese subdistrict. Chapter 3 and 4, respectively, provide an analysis of both nonspatial and spatial factors that predict complete household enrollment into the mandatory health program, taking into consideration the rural nature of the study settings and socioeconomic indicators of the inhabitants of the included communities. Chapter 5 summarizes conclusions and lessons drawn from this research and provides recommendations for future work.

The primary audience for this project is policy and decision makers, who have a responsibility for helping to make the scheme a success and a model for others to emulate, and the scientific community at large.

This work is dedicated to Christiana and Elias Manortey, my dear wife and son respectively, for their unflinching support during moments when hopes seem to dwindle. Also to my mum, Madam Grace Buer for her determination to support her children in achieving academic heights for which she has never had the opportunity.

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ACRONYMS

BCCDP	Barekuma Collaborative Community Development Project
CBHI	Community-Based Health Insurance
CBPR	Community Based Participatory Research
GDHS	Ghana National Demographic and Health Survey
GIS	Geographic Information System
GPS	Global Positioning System
KATH	Komfo Anokye Teaching Hospital
KNUST	Kwame Nkrumah University of Science and Technology
MDG	Millennium Development Goal
MOH	Ministry of Health
NCD	Noncommunicable Disease
NDC	National Democratic Congress
NHIA	National Health Insurance Authority
NHIF	National Health Insurance Fund
NHIL	National Health Insurance Levy
NHIS	National Health Insurance Scheme
NPP	New Patriotic Party
PCA	Principal Component Analysis
SES	Socioeconomic Status
SSA	Sub-Saharan Africa
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UofU	University of Utah
WHO	World Health Organization

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the guidance and the help of all members of my Dissertation Committee and several individuals who in one way or another contributed and extended their valuable assistance and time towards the preparation and completion of this study.

I sincerely owe a heartfelt appreciation to John and Ann Jackson for their love, friendship, and resolute support that helped propel me through my time of studies. I do also acknowledge the enormous help from Jack and Judy Rasmussen, Neil and Nelda Dukes, student colleagues, family members and a countless set of individuals that I cannot single out by name who kept urging me on to the end. I just couldn't have made it without your encouragements.

I am also very appreciative to the staff of the Research & Development Unit of the Komfo Anokye Teaching Hospital (Kumasi-Ghana) and the numerous fieldworkers of the Barekuma Collaborative Development Project (BCCDP) that helped in the data collection phase and all residents of the research participating communities who willingly offered their time away from their busy work schedules to respond to the survey questions.

Lastly but not the least, to my Heavenly Father for answering my prayers by giving me the strength to stride on in the face of innumerable challenges. Thanks, Lord for making yet another dream a reality.

CHAPTER 1

INTRODUCTION

The affordability of high quality basic healthcare services has been a significant determinant of health conditions throughout the world [1,2]. This phenomenon is especially applicable to resource limited settings such as in Sub-Saharan Africa (SSA), which is not only resource challenged but has the heaviest burden of disease in the world [3]. For example, 90 percent of the world malaria related deaths occur in SSA [4] Sanchez-Padilla et al., in a meta-analysis and review on rotavirus infection, concluded that the African subregion has the highest burden of diarrheal diseases and rotavirus-related deaths than any other part of the world [5]. In 2010, estimates from the World Health Organization (WHO), in collaboration with the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA) and the World Bank, suggested that globally about 260 women die per 100,000 live births, with the largest part of these deaths occurring in SSA [6]. Despite the reported global decline in HIV/AIDS related deaths as a result of the introduction of the antiretroviral therapy, the WHO reported an estimated 1.9 million people were newly infected with the deadly virus in SSA alone in 2010 [7].

Furthermore, Africa is now reported to have a shifting disease burden that adds noncommunicable disease (NCD) to the historical burden of communicable diseases. Cancer now reportedly constitutes 17 percent of its NCD mortality burden (715,000 new

cases and 542,000 deaths in 2008) [8]. In SSA, it is estimated that 19 percent of cancers in men and 29 percent in women are attributable to nine (9) modifiable factors including behaviors such as smoking [9].

1.1 Regional Effort in SSA

In an effort to gain better understanding of the health-related problems in this region of the world, many local health ministries, health service providers, and researchers have identified the following major contributing factors: insufficient funding, inefficient use of available but limited resources, lack of incentives for health workers, inadequate regulation of the private sector involvement in the providing of healthcare services, inequitable distribution of health resources between urban and rural areas and between poor and better-off populations, and high household health expenditures even in the midst of "free care" systems [10].

To deal with these problems, most African governments in the recent past decades have used cost recovery mechanisms through user fees for health services as one of the primary means of health financing reform. Other measures include the institution of national, social, and private health insurance schemes using the Bismarckian model that cover mostly formal sector employees with joint contributions by the employee and employer [11]. The Bismarck-type health insurance plan is often used in welfare state systems such as Germany, France, Belgium, the Netherlands, Japan, etc. It is mainly designed to be premium-financed, nonprofit oriented and tends to cover everybody.

To provide some form of health insurance coverage to the self-employed and the majority of people in the informal sectors, private and community-based health insurance (CBHI) schemes have recently emerged, with over 600 such functional schemes operating

in 11 West African countries [3]. For example, in Cote D'Ivoire the number of operational CBHI schemes grew from nine (9) in 1997 to 47 in 2006, covering more than half a million beneficiaries [10].

In CBHI schemes, community members pool their resources together and share the financial burden associated with healthcare services for individual community members [12]. Community members directly own the scheme and control its management, including the collection of premiums, the payment of healthcare providers, and the negotiation of the benefits package. Unlike private insurance, premiums are paid by households and are not based on individual risk assessments. CBHI schemes, also called "prepayment schemes," "micro-insurance schemes," "medical aid societies," or "mutual health organizations" [13] have the advantage of dissociating the time of payment from the time of use of the services, which is clearly better adapted than user fees considering the seasonal nature of revenue and expenditure flows of rural households [14]. It is therefore considered an effective and promising tool for healthcare delivery in resource challenged settings like those in SSA [15].

1.2 Local Effort in Ghana

Presently, Ghana is a leader in SSA, and to a very large extent, the whole of the African continent, that has effectively and successfully implemented a national socialized insurance scheme to help address the healthcare needs of its citizenry [16]. To meet the goals of attaining better health for all and eradicating extreme poverty and hunger by 2015 as outlined in the Millennium Development Goals [17], the Parliament of Ghana promulgated the National Health Insurance Act 650 in August 2003 and a subsequent Legislative Instrument (LI 1809) in 2004 leading to the implementation of the National

Health Insurance Scheme (NHIS) in 2005. The National Health Insurance Authority (NHIA) was then established as an administrative and autonomous body at a nationally centralized level to regulate all activities of the scheme, including accreditation of providers, determination of contribution rates, resolution of disputes, management of the National Health Insurance Fund (NHIF), and approving membership. The policy objective of the NHIS,(2003) states; *"Within the next five years, every resident of Ghana shall belong to a health insurance scheme that adequately covers him or her against the need to pay out-of-pocket at the point of service use in order to obtain access to a defined package of acceptable, quality health services"* [18].

1.3 Purpose of the Study

The purpose of this research is to evaluate the extent of complete household coverage and utilization of the NHIS in rural communities located in the Barekese subdistrict of the Atwima Nwabiagya District in the Ashanti Region of Ghana. We define complete household coverage as a household in which all members are formally enrolled in the NHIS. Literature review on related studies is used as the basis for a written background description of the NHIS. Additional data were gathered from national budget statements, the Ministry of Health's financial statements and the NHIA's annual reports. Data related to the study aims were gathered from surveys conducted within the 20 participating research communities. Survey data from the structured interviews were used to determine predictors of complete household participation in the NHIS for residents of communities within the subdistrict. Global Positioning System (GPS) waypoints of the locations of homes and the designated registration center in the subdistrict were also collected. Geographic Information System (GIS) technology was used to assess the

relationship between the places of residence and the registration point for either first time enrollment or renewal of membership into the insurance program with focus on total travel time, cost and distance.

1.4 Specific Aims

All household level data gathered from the research participating communities were analyzed to achieve the following specific aims:

1. **To describe the development and implementation of National Health Insurance Scheme in Ghana in the context of subregional, national and local health systems**.

The focus for this aim was to review existing literature and official documents and information regarding the development and implementation of the NHIS. This was done with an attempt to recount a comprehensive historical background narrative of healthcare financing in the broader context of the African continent and then narrow it to the NHIS implementation in Ghana with a focus on Barekuma Collaborative Community Development Project (BCCDP) operational areas in the Barekese subdistrict.

2. **Use logistic regression modeling to assess household-level nonspatial determinants within the BCCDP area that predict membership in the NHIS.**

Using complete household subscription to the NHIS as an outcome measure from the gathered quantitative data, an evaluation was done by creating statistical models to detect possible social, demographic and economic variables associated with participation of household membership in the government mandated NHIS in a typical rural setting. The proposed hypothesis for this aim is that household participation in the mandatory insurance scheme is strongly associated to the key socioeconomic determinants.

3. **Use spatial analysis to identify determinants among households from within the BCCDP that predict membership in the NHIS.**

Spatial data analysis techniques were used to detect possible clusters of households with complete enrollment versus no enrollment and also to explore potential associations between household participation in the NHIS and all spatial variables, including household location and NHIS registration points. We hypothesized that the farther a community is from the point of registration, the less likely it will be for the dwellers there to participate in the program which is projected to cover every citizen irrespective of place of abode.

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CHAPTER 2

DEVELOPMENT AND IMPLEMENTATION OF THE NHIS IN GHANA IN THE CONTEXT OF CONTINENTAL, NATIONAL AND LOCAL HEALTH SYSTEMS

2.1 Introduction

In an effort to address resource constraints that contribute to insufficient quality healthcare, most developed countries have used tax-based systems to finance their healthcare delivery system and/or have health insurance schemes through which participants pool their resources together to address the needs of members at a point in time. Unfortunately, many developing countries are unable to generate sufficient funding from domestic sources to meet all of their health financing needs. For instance, some governments have no systematic way to collect taxes or health insurance premiums from their citizenry who work in the informal sector, thereby forgoing potential contributions from a substantial proportion of the population [1,2].

Many studies have shown that health insurance can reduce financial barriers that hinder access to quality healthcare, including providing protection for individuals and families against the risk of unpredictable and unaffordable healthcare expenditures [3,4]. Nevertheless, insurance schemes are also complicated due to complex contracts that are difficult to enforce, have low participation due to limited literacy and experience high communication and transport costs due to poor infrastructure [5]. These type of features

lead to high insurance premiums that many poor and vulnerable citizens are unable to afford [6]. Insurance in such contexts is often provided through mutual help relationships and solidarity efforts, otherwise known as informal insurance arrangements, where people pool their resources together when one or more members of the community incur a healthcare cost in order to reduce the impact on an individual household.

Recently, many countries including several in Sub-Saharan Africa (SSA) have introduced the concept of the Community Based Health Insurance (CBHI) model to leverage the existing solidarity among community members in offering helping hands to their neighbors in times of need. After piloting a version of the CBHI, Ghana has moved to formalize this approach on a national basis through the National Health Insurance Scheme (NHIS), which is mandatory for her citizenry. Evaluation of the NHIS indicates that this program has greatly improved access to healthcare for the rural poor [7]. These results seem to confirm the idea that community-financing through prepayment and risk-sharing reduces financial obstructions to healthcare, as evidenced by higher utilization.

As a leader among most countries in SSA [8,9], Ghana is often looked to for direction on national policy making. Despite the associated challenges in the implementation of the NHIS, it is still unique within the subregion. The main focus of this paper is to describe the formulation and implementation of insurance schemes in SSA generally and in the country of Ghana specifically, especially with respect to the NHIS and the subsequent impact on inhabitants of small, largely subsistence farming communities in the Barekese subdistrict of the Ashanti Region of Ghana.

2.2 Health Insurance in the Context of SSA

By the late 1990s, most countries in SSA adapted strategies aimed at making healthcare accessible. This included such strategies as implementing "user fees" policies in state owned health facilities and imposing of payroll tax on public and formal private sector employees to fund national health budgets (**Fig. 2.1**). Evaluation of these policies showed growing evidence that they were unfavorably affecting access to and equity in healthcare, thereby compelling policy makers and stakeholders to search for alternative health financing mechanisms [10,11]. In an attempt to decrease barriers to healthcare access for poor citizens, fee waiver and exemption systems have been introduced. However, these systems have had limited success generating the resources and infrastructure that are necessary to provide care to all who need it or to sufficiently mitigate costs for resource challenged families [11,12].

In 2000, the World Health Organization (WHO) indicated in its annual report that one practical way to help meet the health needs of the people in the developing world, including SSA, is by promoting pooling of financial capital at the community level where only part of the labor force is engaged in the formal sector [13]. The CBHI approach was recognized as a way to increase healthcare access and guard households from economic shocks due to expenditures on health services [14]. CBHI is largely viewed as an improvement over approaches based on user fees and has since been identified as the best alternative for healthcare financing in settings where taxes are collected on only a small proportion of national income [15,16]. In addition, the principle of pooling resources to show commonality in times of need is a motivating factor [17] in many communities for residents to accept the concept of CBHI.

CBHI has been operationalized through a variety of health insurance schemes, across multiple settings and population groups. Common characteristics of CBHI schemes include [18];

a) solidarity, where risk sharing is inclusive and membership premiums are independent of individual health risks;
b) community based social dynamics, where the schemes are organized by and for individuals who share common characteristics (e.g., geography, occupation, ethnicity, religion, gender, etc.);
c) participatory decision making and management;
d) nonprofit financial model;
e) voluntary participation.

An example of the CBHI structure is depicted in **Fig. 2.2.** Contributing members pay premiums to the scheme and access healthcare services in designated health facilities within their geographical areas. Noncontributing members can also access services from the same facilities but have to pay the full cost for consultation and treatment. The government intermittently contributes to the health facilities to defray some primary care costs for nationwide programs such as immunization and maternal healthcare. To help motivate enrollment in the program, governments also contribute to help subsidize the premium paid by participants.

The CBHI movement in SSA was initiated to support health facilities that offer healthcare to impoverished sections of the population who are also excluded from formal social security systems. Well-known examples include the provider-driven Bwamanda district hospital scheme in the rural north-west region of the Democratic Republic of Congo and the *Mutuelle Pharmaceutique de Tounouma* scheme in Burkina Faso [18,19].

Over time, other governments and donors in most subregions of the African continent have become interested in the prospect of the capacity of insurance programs to support access to healthcare in resource challenged settings. This led to the formation of an operating network of insurance programs, mainly in the Francophone West and Central African counties, known as *La Concertation.* This network was established at a 1998 meeting in Abidjan to help monitor and support the development of the insurance schemes across the region [20]. Membership to *La Concertation* was reported to have increased dramatically [21]. For example, in Ivory Coast the number of functional CBHI schemes grew from 9 in 1997 to 47 in 2006 covering more than five hundred thousand beneficiaries [21,22]. However, it is notable that most of the schemes were established in urban communities (**Fig. 2.3**).

To motivate and ensure enrollment in these insurance schemes some CBHI programs in West Africa coordinated with microcredit agencies to provide soft loans to financially challenged families to enable consistent participation. As an enforcement strategy, most functional microcredit agencies in SSA required registering their members to ensure their clients have access to some form of health services when the need arises. Criel et al. reported in a study conducted in 2008 that 33 percent of microcredit schemes reported having health insurance as an associated activity [18].

Throughout SSA, the coverage of CBHI schemes remains small. Indeed, the majority of African CBHI schemes only cover a few hundred members, with 95 percent of the schemes having less than 1,000 members [23]. While numerous questions remain about the effect of CBHI, taking into account the scope of coverage, some studies reported that the demand-side mechanism of this approach significantly increased access to maternal healthcare [24]. It also had positive effect on utilization of facility-based

healthcare during episodes of illness and reduced out-of-pocket expenditures at the point of service. Finally, the CBHI immensely contributed to the general infrastructure and healthcare delivery systems [25].

Currently Rwanda and Ghana are among the few African countries in SSA that have taken health insurance to great lengths resulting in increased scope and coverage area. Rwanda has achieved a coverage of 91 percent (up from 7 percent in 2003) [26], and the nationalized version in Ghana has reached a coverage of 68 percent (18 million people) since its establishment in 2003 [27].

2.3 Health Insurance in the Ghanaian Context

At the time of Ghana's independence in 1957, the newly elected government, under the leadership of Dr. Kwame Nkrumah, committed itself to a welfare state system which mandated that healthcare services be made free in all public health facilities throughout the country [28–31]. By 1969, however, the nation's rapidly increasing population growth, inadequate human resources, poor infrastructure, lack of requisite drugs and other medical supplies and other national economic challenges resulted in difficulties treating the sick, paying commensurate salaries to healthcare providers and ultimately, the collapse of the healthcare system [32–34]. In particular, the increasing financial costs drastically limited the ability to deliver both curative and preventative interventions to segments of the nation's population in most need. Hence, the enactment of the Hospital Fee Decree-1969 (NLCD 360) [30] and the Hospital Fees Act-1971 (Act 387) [33] whose primary objectives were to help address the aforementioned challenges. In 1985, another legislative instrument, the Hospital Fees Regulations (L.I.1313) was promulgated to augment the earlier ones. These instruments were meant to offer legislated

support to administrators of health institutions and to guide healthcare providers on fees to be charged for surgical, diagnostic and laboratory services, consultation, hospital accommodation, catering, and other related healthcare services [31]. The goal was to help recover at least 15 percent of recurrent costs incurred to operate public healthcare facilities [35,36].

The institution of the "Cash-and-Carry" program in 1992, formally known as the Revolving Drug Fund, then followed [37]. This scheme, in addition to the 1985 instrument, mandated that patients make only partial payment for consultation and diagnostic procedures but paid fully for the cost of all drugs and other medical supplies. Despite the fact that there were some underlying exemptions for the poor, under the "Cash-and-Carry" system, for services such as immunization, antenatal and postnatal, and general treatment in child welfare clinics [38], the effect on larger society was detrimental [36] as most people could still not afford the cost of basic healthcare [39,40]. In some cases, healthcare providers were compelled to limit prescriptions based on patients' ability to buy the drug [41] and more severely, some patients were detained in treatment facilities until they were able to pay for the full cost of the services offered them [34]. This resulted in changes in healthcare seeking behaviors that translated to delays in reporting sicknesses [33] to health facilities, thereby resulting in the more costly care of addressing neglected health issues with many resulting in untimely and preventable deaths. Other consequential effects, as noted in a study by Asenso-Okyere et al., from the "Cash-and-Carry" policy involved an increase in self-medication and the use of untested treatment methods with the goal of saving money [42].

By the early 1990s, user fees were recognized as a key national and political issue. The government, led by the National Democratic Congress (NDC) party, began to

experiment with the rapidly growing CBHI schemes, resulting in expansion of the number of schemes from an initial handful to 168 by 2003 [43]. However, during the 2000 election, the New Patriotic Party (NPP) promoted user fees as a weakness of the incumbent administration with the promise to abolish the fees if voted into power. Following a contentious campaign, the NPP became the majority party and began an aggressive path towards fulfilling their campaign promise, which eventually led to the implementation of the NHIS [37,44].

The 2003 Parliament of Ghana promulgated the National Health Insurance Act 650 (**Table 2.1**) to address the financial constraints hindering access to the healthcare system and to align the nation's long term healthcare goals with the United Nations Millennium Development Goals (MDGs) [45] of expanding and improving healthcare coverage. The National Health Insurance Authority (NHIA) was consequentially established to regulate the health insurance market, including accrediting and licensing providers, determining premiums, resolving disputes, managing the NHIF, and distributing membership identity cards.

The primary aim of the NHIA was to establish an insurance fund for each of the existing 138 districts in Ghana. By the implementation policy of the NHIA, membership in the scheme is mandatory with an annual premium of about $8 per adult. It exempts all individuals under 18 years and over 70 years of age, and all those who are deemed unable to afford payment (primarily people who are indigent). Under this plan, an entire family unit must enroll – a family cannot simply enroll its exempt members [43]. The program developed under the NHIA officially became the NHIS.

The annual premium provides access to treatment until the next renewal date at no additional cost. All employees on government payrolls and their dependents are

automatically enrolled, with premiums deducted from their salaries. The benefits package for enrollees covers a wide range of health services including outpatient consultations, essential drugs, inpatient care and shared accommodation, maternity care (prenatal, delivery and postnatal), eye care, dental care, and emergency care. It, however, excludes cost associated with echocardiography, renal dialysis, heart and brain surgery, cosmetic surgery, organ transplantation and HIV antiretroviral drugs.

Beyond the premiums paid by households, the NHIS is financed through a National Health Insurance Levy (NHIL) instituted by the central government. This 2.5 percent sales tax is collected on most goods and services. In addition, 2.5 percent of the 17.5 percent social security contributions paid by formal sector employees are also diverted to the NHIS.

Membership in the NHIS is reported to have increased drastically from 7 percent of the population in 2003 to 68 percent in 2011 (18 million of the population), with a reflective utilization in both outpatient and inpatient services [29,30]. Notwithstanding these increasing rates, the NHIS is currently falling far short of its goal of universal coverage, with lower enrollment among the poor, the majority of who live in rural settings [26,28,40]. Dixon et al., using data from the 2008 Ghana National Demographic and Health Survey (GDHS), concluded that residents in rural areas are less likely to enroll in the NHIS than those in urban areas [46]. Further research is needed to identify factors that are associated with households that do not enroll in the NHIS, stratified by characteristics like urban versus rural residential settings [47].

2.4 Health Insurance in the Context of the BCCDP

The Barekuma Collaborative Community Development (BCCDP) is a community-based participatory research partnership among 20 rural Ghanaian communities, researchers and health professionals from the Komfo Anokye Teaching Hospital (KATH), the Kwame Nkrumah University of Science and Technology (KNUST) and the University of Utah (UofU) [48]. Over the past 10 years, collaborators from the BCCDP have worked with local community leaders to build a scholarly program of disease surveillance, census registries, qualitative research, and community development to assess and address pressing health issues including malaria [49], schistosomiasis, diarrhea, water quality, women's reproductive health [50] and the use of verbal autopsy to assess the cause of death among children under the age of 5 [51].

The most recent collaborative efforts included an update of census records for the residents of the communities, which included questions regarding household membership to the NHIS as well as other socioeconomic and health related indicators. A total of 3,228 household heads were interviewed for information regarding both household demography and participation in the NHIS. Interviews were mostly conducted in Twi, which is the local language of the area. The participation rate was more than 95 percent, with the absence of a household head being the primary reason for nonparticipation. The study received ethical approval from the Committees on Human Research Publications and Ethics of the KNUST College of Health Sciences, School of Medical Sciences, and the UofU Institutional Review Board.

The questionnaire used for the survey was adopted from the one used for the GDHS in 2008 with minimal modifications to enable comparability to data collected in other parts of the country [52]. Depending on the size of the household, an interview

lasted from 30 minutes to an hour. No immediate intervention was designed for the proposed study. Rather, the results will be used to inform discussions and decision making related to achieving the national goal of universal insurance coverage for all Ghanaians.

Of the 3,228, household heads that participated in the study, 1,489 of them (46 percent) reported farming as their main source of income. Further breakdown of the occupational distribution shows that only 84 household heads (3 percent) work in the formal sector where a premium can be deducted at source to enroll in the NHIS.

Research findings from national surveys have shown increased rates of enrollment into the NHIS over the years. However, there are outstanding regional variations in enrollment. In 2008, 5 years after its implementation, the membership rate ranged from 13 percent in the Central Region to 32 percent in the Greater Accra Region and to a much higher rate of 70 percent in the Upper West Region [44].

This finding was reflective in the BCCDP site, where several households as at the time of this study reported nonmembership. Of the 3,228 heads of households who participated in the study, 1,952 (60 percent) reported having every member of their households covered in the NHIS. However, close to 40 percent (n=1,276) of these houses have no health insurance coverage in any form.

2.5 Discussion

Research from several studies suggests that households employ different strategies to cope with health shocks [53]. When faced with medical bills, households may use savings, sell assets, borrow money from friends and family, or take out loans using other personal valuables as collateral to generate funds to meet such needs. Families may also

modify their labor allocation decisions; if a household head falls ill, family members previously not working may begin to do so to substitute for lost income and repay loans.

Formal health insurance in developing countries, and more specifically the rural settings, is uncommon. Many households also lack access to formal credit and savings arrangements. The impact from health shocks tend to be much stronger when the principal source of household income is from the subsistence farming system, which coincidently is the case in the study region. This translates to the poverty-health cycle, where the inability to overcome a health shock predictably leads to reduced output, followed by increased poverty and vulnerability to yet another poor health outcome.

The effects from the health-poverty cycle described above on rural poor inhabitants leads to adverse changes in health seeking behaviors, where various unorthodox measures, including self-medication and reliance on fate, tend to replace going to a health facility for treatment. This has contributed to the high morbidity and mortality in resource constraints settings such as SSA and Ghana.

An important policy implication of this study is to direct the attention of policy and decision makers to the need to focus on strategies to make the premiums more affordable to the poor and enforce policies, such as mass education, that will reinforce the benefits of enrolling in health insurance programs. If prepayment and risk-sharing can be encouraged, they are likely to have an instantaneous positive effect in breaking the health-poverty cycle. A direct impact will result through preventing impoverishment due to catastrophic health expenditures. The indirect effect will be ensuring access to health services and thereby improving health, thus permitting households to take advantage of economic and social opportunities.

2.6 Conclusions

Access to basic healthcare services of acceptable quality is still a major challenge to many of the world's poorest people, especially in developing countries. Against a backdrop of severely underfunded health systems, governments of these societies, including several in SSA, are faced with a dilemma as to the best option of getting their citizenry access to equitable and affordable healthcare services. Attempts to use the user fees system to finance healthcare delivery seems in many cases to have presented several barriers to access, causing many of the people to change their healthcare service seeking behaviors to the detriment of their lives.

Given the unique ethnic, extended family system and the cultural diversity within African nations, the CBHI approach based on the principle of showing intracommunity solidarity and using a nonprofit based approach makes it much easier for the inhabitants of the subregion to adapt and manipulate to fit their local needs. Ghana is one of Africa's forerunners in leadership, being the first SSA country to have gained independence [54] and having since committed to the use of CBHI scheme and now mandating this into NHIS for all its citizens. Yet, work still remains to effectively achieve universal enrollment.

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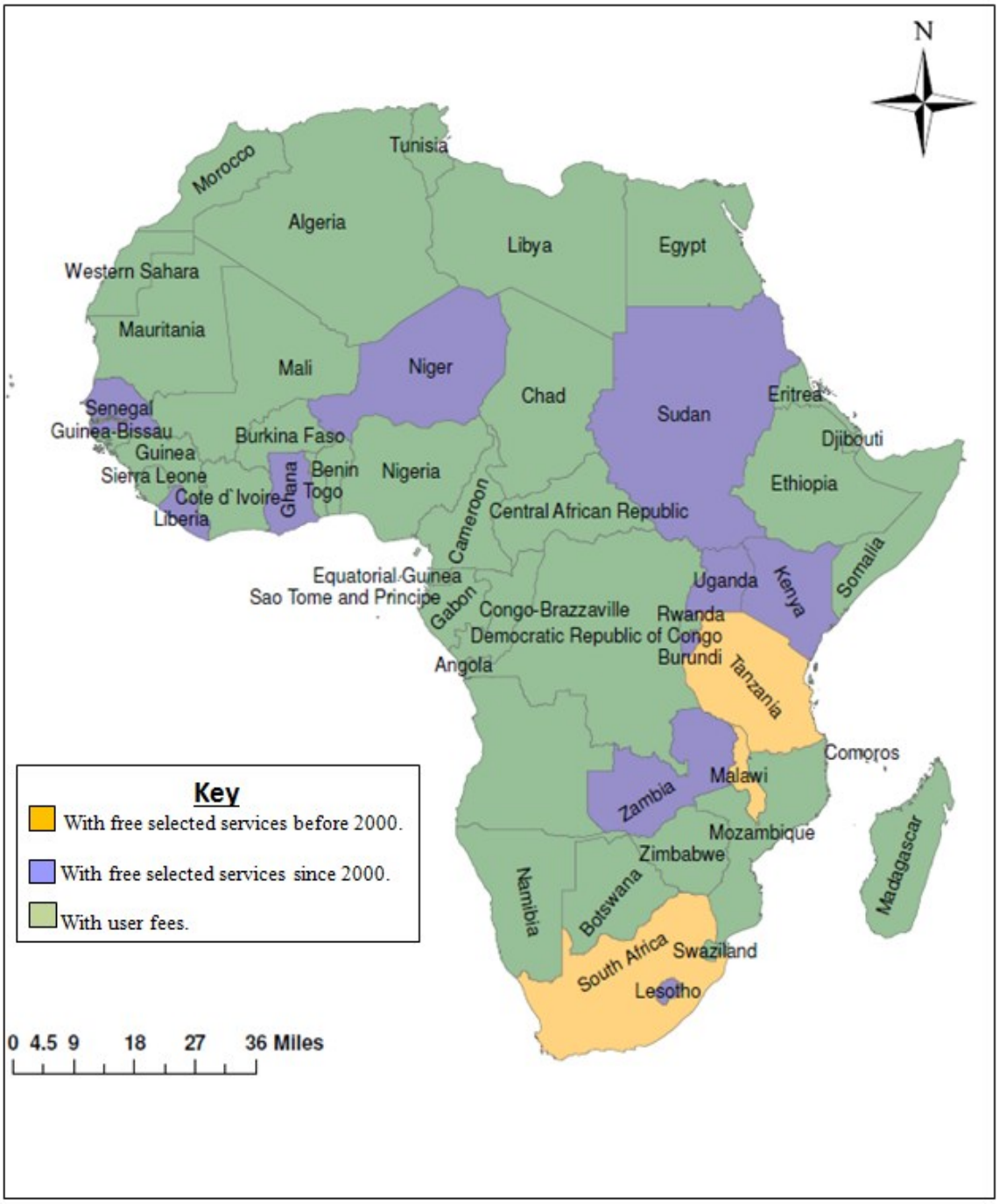

Fig 2.1: *Africa countries with and without hospital user fees*

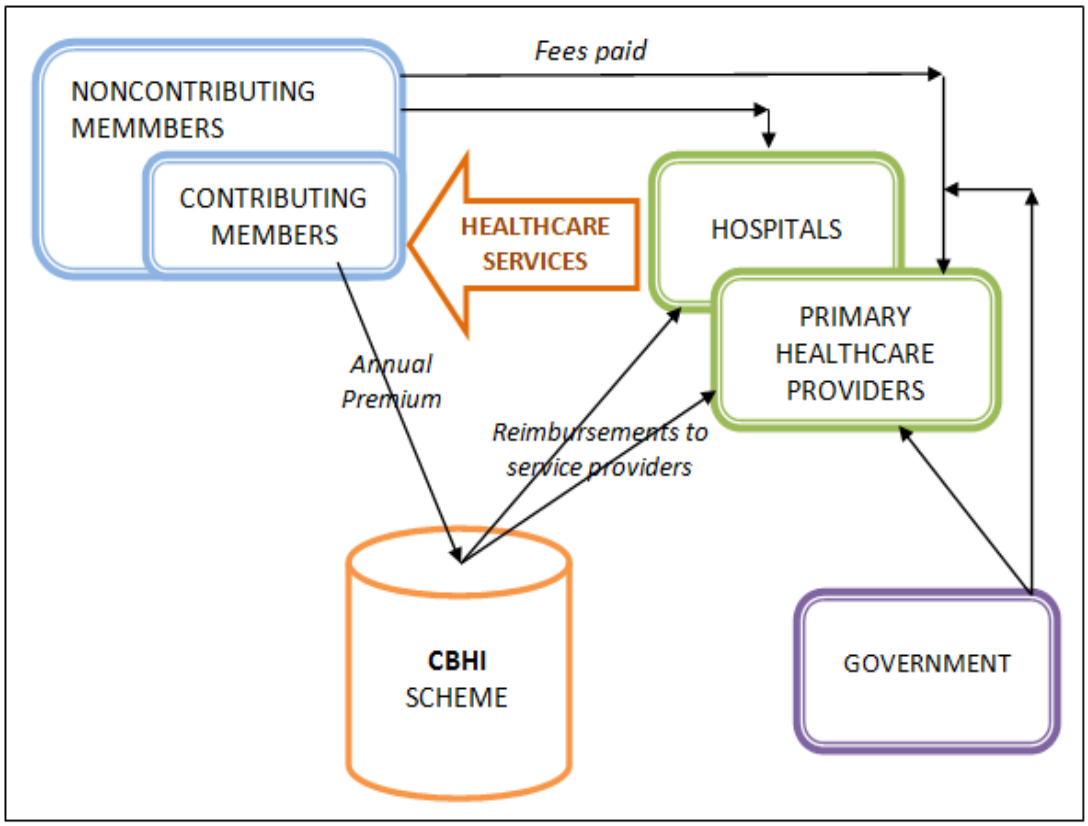

Fig. 2.2: *Premium contribution and healthcare service providing structure. Adapted from Bennett S. (2004).*

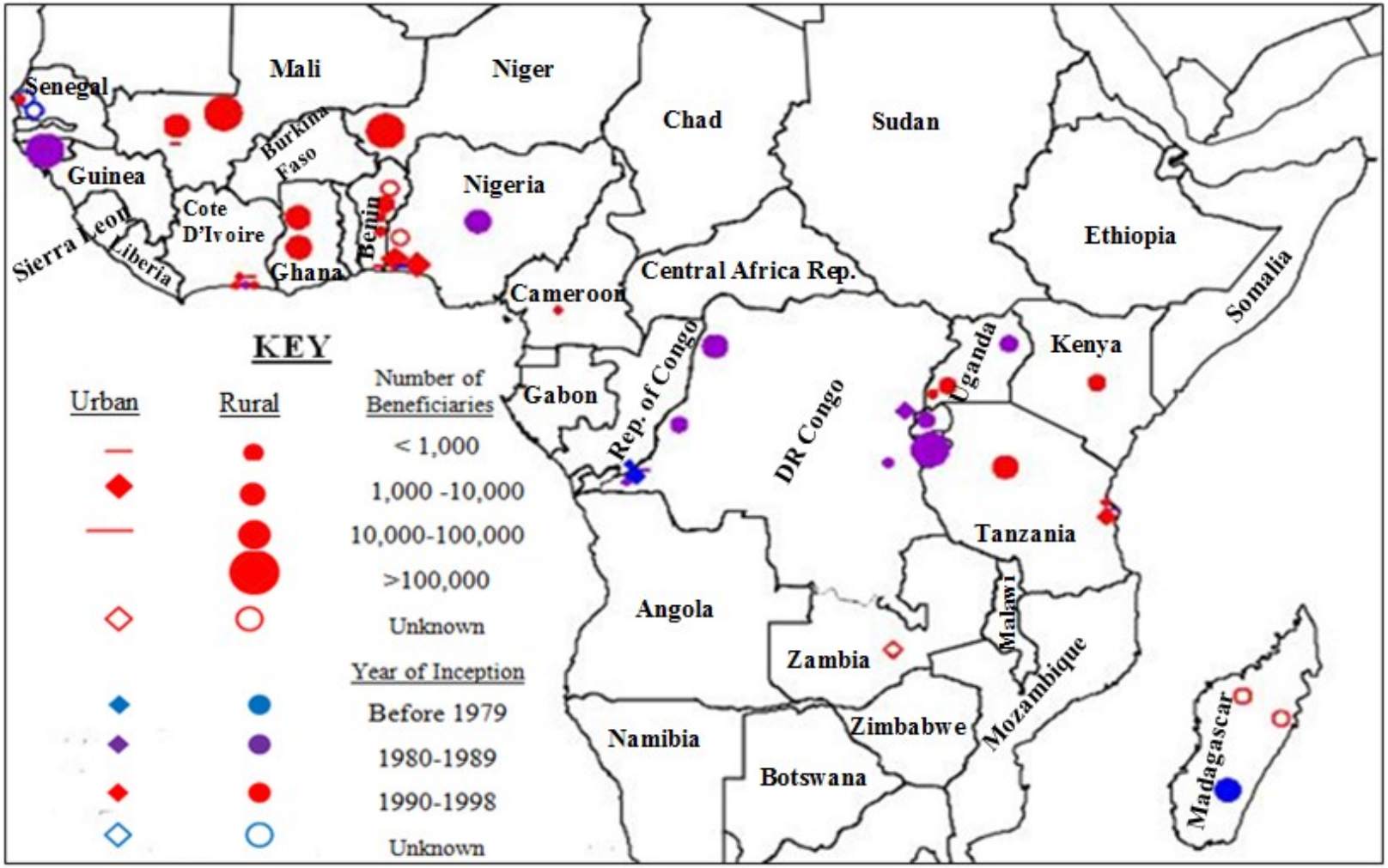

Fig 2.3: *Urban and rural health insurance schemes in SSA (year of inception and size) Adapted from Wiesmann, D. & Jütting, J. (2000).*

Table 2.1: *Summary description of the NHIS*

Feature	Description
Type	• District Mutual Health Insurance Scheme (DMHIS), one for each district, with a minimum of 2000 members. • Private commercial health insurance schemes. • Private mutual health insurance schemes (not eligible for subsidies from the National Health Insurance Authority (NHIA).
Membership	Membership is mandatory (either via the DHMIS or a private insurance policy). Formal sector workers have involuntary payroll deductions (Social Security National Insurance Trust (SSNIT) contributions. Informal sector are charged premium which should be income-related. Initially, there is a six-month gap between joining and being eligible for benefits.
Exemptions	Some groups will be exempt from paying for membership (originally SSNIT pensioners, over 70 yrs, under 18 yrs -where both parents are members; indigents). The NHIA will transfer subsidies to cover the cost of their enrolment. An indigent is defined as someone who meets four criteria: • is unemployed and has no visible source of income; • does not have a fixed place of residence according to standards determined by the scheme; does not live with a person who is employed and who has a fixed place of residence; and • does not have any identifiable consistent support from another person.
Benefits package	All providers must offer a minimum package, which is specified and broad. National Health Insurance Drug List is established. 95 % of all healthcare is covered – all services are included other than: rehabilitation other than physiotherapy; appliances and prostheses; cosmetic surgery; HIV retroviral drugs; assisted reproduction; echocardiography; photography; angiography; orthotics; kidney dialysis; heart and brain surgery other than those resulting from accidents; cancer treatment other than cervical and breast cancer; organ transplantation; non-listed drugs; treatment abroad; medical examinations for visas etc.; VIP wards; and mortuary services.
Eligible providers	All providers are eligible, once accredited. Accreditation is reviewed every five years. Quarterly reports to be sent to the NHIC by providers. Providers are to be paid within four weeks of claim being made to DMHIS.
Organization	NHIA was established to regulate the market, including accreditation of providers, agreeing contribution rates with schemes, resolving disputes, managing the NHIF, and approving cards. Each district to have a DMHIS (with a minimum of 2,000 members). Benefits to be transferable across district schemes. Each DHMIS to submit annual reports to NHIA and to undertake annual audit of accounts. Private MHIS not eligible for subsidies from NHIA.
Accountability	National Health Insurance Council (NHIC) established to oversee NHIA and license schemes (every two years). Includes representatives of main stakeholder groups, such as Ministry of Health, Ghana Health Services, regulatory bodies, consumers, and Executive Secretary of the NHIA. Chair and Executive Secretary appointed by the President. NHIC proposes formula for allocation of funds to Parliament for annual approval, and provides annual report to Parliament on its use of funds. Each DHMIS governed by a Board. Rules established for handling complaints against providers or schemes.

Source: *Compiled from Act 650 (2003) and LI 1809 (2004)* [44]

CHAPTER 3

SOCIAL DETERMINISTIC FACTORS TO PARTICIPATION IN THENHIS IN THE CONTEXT OF RURAL GHANAIAN SETTING

3.1 Abstract

- ***Objective:*** The primary purpose of this study is to identify predictors of household subscription to the National Health Insurance Scheme (NHIS) among the inhabitants of the Barekese subdistrict in the Ashanti Region of Ghana.
- ***Method:*** Data were gathered from 3,228 heads of households in 20 communities from the Barekuma Collaborative Community Project (BCCDP) site on various demographic and socioeconomic variables and household NHIS subscription status. The household was used as the unit of analysis. Logistic regression was used to predict NHIS subscription status.
- ***Results:*** Of the 3,228 heads of households that participated in the study, 60 percent reported having all members in their household enrolled in the NHIS. Of these, 36 percent were classified as Low, 48 percent as Middle and 15 percent as High socioeconomic status (SES) households. SES was significantly associated with NHIS subscription. Residents in the Middle and High socioeconomic brackets had 1.47 [95% CI: 1.21-1.77] and 1.66 [95% CI: 1.27-2.16] times higher odds, respectively, of complete household enrollment compared to their counterparts in the Low SES category. The odds of enrolling the entire

household membership in the NHIS also tend to increase progressively with the highest level of education attained by the head of the family unit.

- ***Conclusion:*** Eight years after the introduction of the mandatory national health insurance policy in Ghana, the subscription rate to the NHIS was about 60 percent in the 20 rural BCCDP communities that participated in the study. This is similar to the reported national enrollment rate of about 68 percent in 2010. These findings call for the need to step up national strategies that will help further increase NHIS coverage, especially among rural, poor and less educated citizens.
- **Key words**: NHIS, Barekese, odds ratio, socioeconomic status, BCCDP, Ghana.

3.2 Background

Health insurance, based on resource pooling, has gained favor in recent years as an effective tool for improving access to healthcare services among low-income and resource challenged countries around the globe, including Ghana [1,2]. Motivating this is the fact that many national policy decisions are being aligned with the goal of making healthcare services universally available as a component of poverty reduction [3].

Ghana has adopted several strategies in the past in efforts to make quality basic healthcare services available to its citizens. This included offering free healthcare services in all government owned health facilities soon after gaining independence in 1957 [4]. Through the 1980s and early 1990s, Ghana's population increased while several economic challenges emerged, thereby making it difficult for the government to financially support such a system.

In response to these circumstances, a nationwide hospital *user fee* policy, famously known as the "Cash-and-Carry" program, was implemented to supplement the revenue of

the healthcare system. Patients of these government-maintained health facilities and their families were made to share the cost for most prescribed health services (e.g., consultation, diagnostic studies, maternal care, hospitalization, etc.) and fully pay for all medications at the point of service delivery [5–7]. When care was sought at a private health facility, no reimbursement from government funds was available, with the resulting bills often creating an economic crisis for those receiving this care [4].

Empirical studies have documented the detrimental impact that this time period had on healthcare seeking behaviors of most Ghanaians, especially the majority who are unable to afford the high costs for healthcare services [8]. The consequential effects on the larger society included promoting the use of unorthodox drugs, often provided by unqualified practitioners, with the resulting high rate of adverse outcomes. People also delayed reporting to legitimate health facilities for treatment until their conditions had advanced, leading to delayed treatment, increased severity of disease, higher costs and higher mortality [8–10].

In an attempt to address these issues, Ghana adopted the Community Based Health Insurance (CBHI) scheme also known as “prepayment schemes” or “mutual health organizations” [11]. The CBHI is a health insurance program typically managed by contributing members, including setting and collecting premiums, negotiating benefits packages and payment schedules for service providers.

After several years of piloting the CBHI program in selected districts in Ghana, [12,13] the 2003 Parliament promulgated the National Health Insurance Act 650 and a subsequent Legislative Instrument (LI 1809) in 2004 leading to the implementation of the NHIS in 2005 as a nationalized health insurance program to help the citizenry gain more affordable access to healthcare services [4]. Ghana is recognized as a global leader in

implementing nationalized health insurance in Sub-Saharan Africa (SSA) and is currently striving for universal coverage among her citizens [14].

The NHIS was reported to have been instrumental in extending health insurance coverage to residents of Ghana with the cumulative membership of the scheme increasing from 1.3 million in 2005 to 18 million in 2010. This represents an average annual growth of 68 percent over the 5 year period [15]. In spite of this impressive progress, findings from recent studies show the NHIS is falling short of its equity goals, with lower enrollment among the poor, a majority of whom reside in the rural areas [4,16,17]. Further, in a 1995 study, Gilson et al. reported that identifying the very poor, classified as indigents, who are exempted from paying premiums was becoming problematic because of the seasonal and annual variations in household income and living conditions [18]. In 2008, a study conducted under the annual Ghana Demographic Health Survey (GDHS) concluded that those in the highest quintiles of the poverty index structure were more likely to be enrolled in the NHIS compared with those in the lowest quintile (43 percent and 23 percent respectively) [19].

To help address these challenges, Aikins et al. (2006) recommended that the poor in Ghana must be identified using area specific constructs that account for important local differences (e.g., needs of the rural poor compared to the urban poor) [20]. However, few studies have been conducted across the nation to quantitatively evaluate the predictive factors of enrolling into the insurance. Such studies need to be undertaken to gain insights into the successes and challenges of the newly implemented NHIS. Such information can help inform policy decisions aimed at promoting subscription to the scheme. The primary purpose of this study is to evaluate the socioeconomic factors that predict subscription to

the NHIS among residents in the Barekuma Collaborative Community Development Project (BCCDP) site.

3.3 Methods:

3.3.1 Study Participants

During the summer of 2011, a cross-sectional study was conducted in the 20 communities that constitute the BCCDP research site to evaluate the association between socioeconomic and demographic factors on household subscription to the mandatory NHIS. The BCCDP site is located about 25 kilometers north-west of Kumasi in the Barekese subdistrict of the Atwima-Nwabiagya district in the Ashanti Region of Ghana and includes approximately 18,500 people in typical rural and peri-urban settings, with individual communities ranging from a few hundred to over 4,000 inhabitants.

The BCCDP is a collaborative partnership, grounded on the principles of community based participatory research (CBPR) [21] among the leadership of the respective communities and researchers and health professionals from Komfo Anokye Teaching Hospital (KATH) and the Kwame Nkrumah University of Science and Technology (KNUST), both in Kumasi, Ghana, and the University of Utah (UofU) in Salt Lake City, USA. All stakeholders are considered to be equitable partners in the sharing and acquisition of knowledge. Over the past 10 years, stakeholders from the BCCDP have worked to address several health concerns to the communities and other partners such as sanitation, malaria, diarrhea, schistosomiasis, nutrition and reproductive health [22–24].

As part of the collaborative activities, a census of participating communities was conducted to build a database for the partnership including data elements intended to be used for tracking purposes and creating a sampling frame for research work. As part of the

census, data were gathered on both demographics of the household and whether all members in a family unit were enrolled into the NHIS. Most interviews were conducted in Twi, which is the local language for this area.

3.3.2 Data

Approximately 3,228 household heads in the study region were interviewed on questions related to subscription to the NHIS, socioeconomic variables (such as ownership of farmland, home, household items, etc.) and on demographic variables (such as sex, age, marital status, level of education, religious beliefs, occupation, etc.).

Only respondents clearly identified as head of households, living in the participating community with their families and providing informed consent were included in the study. The response rate was approximately 95 percent with the absence of the head of household after persistent effort to contact him or her being the primary reason for nonparticipation. We received ethical approval from the UofU Institutional Review Board and the Committees on Human Research Publications and Ethics of the KNUST College of Health Sciences, School of Medical Sciences.

3.3.3 Data Analysis

All analyses were conducted using STATA statistical software package (StataCorp. 2007. *Stata Statistical Software: Release* 12. College Station, TX: StataCorp LP). A univariate analysis of selected variables was conducted to calculate summary statistics. Subscription to the NHIS was used as the outcome variable for logistic regression modeling based on the research question, *"Is everyone in your household a registered member of the NHIS?"*

Given the difficulties in the collection of income and expenditure data to determine the socioeconomic status (SES) of the households, we developed a scale by assessing ownership of 14 household assets with weighting of each of these items based on factor scores from Principal Component Analysis (PCA) [25,26]. Variables with low standard deviations tend to carry low weights, so items that were routinely present or absent had less influence on differentiating SES among households [27]. Each household was assigned an aggregate SES scores. The ranked scores were then classified into tertiles of SES groups such as Low, Middle and High.

Travel cost from individual homes to the district registration center (Nkawie) to enroll in the NHIS were estimated taking into consideration both travel on foot from the home to a centralized point in the respective communities as well as the cost for travelling with public transport.

Bivariate analyses were used to establish associations among the SES groupings and selected demographic variables using Fisher's Exact or Pearson χ^2 tests. Multivariate logistic regression was used to create a statistical model to predict household subscription to the NHIS controlling for various socioeconomic and demographic variables.

3.4 Results

Of the 3,228 heads of households that participated in the survey, 2,087 (65 percent) were males while the remaining 1,141 (35 percent) were females. Assessment of NHIS enrollment revealed that 40 percent of households did not have health insurance coverage for every household member. About a third of the respondents reported not having any form of formal education. Farming was recorded as the main occupation in the study region. Of the total study participants, 1,489 (46 percent) reported farming as their

main occupation while 111 (3 percent) reported being teachers or students at higher educational institutions at the time of the interview. Religious classifications revealed that 927 (79 percent) were Christians while the rest reported other religions, such as Islamic or African traditional religion **(Table 3.1)**.

The results in **Table 3.2** show the means, standard deviations and factor scores derived for each household asset in the first linear component from the PCA. Since the code for response to ownership of an item was binary, a higher mean value indicates more homes owned such assets.

Bivariate analyses assessing associations among selected variables with SES indicated statistically significant associations between sex, age, marital status, educational level, religious affiliation, occupation and the travel cost to the registration center (**Table 3.3**). Similarly, results between subscription into the NHIS on unadjusted indicators, (such as occupation, educational level, household size, travel cost, and SES) also had significant association (**Table 3.4)**.

Using findings from the bivariate analyses, a multivariate logistic regression model was constructed to predict complete household enrollment into the NHIS. Subscribing to the NHIS tends to increase with the age of the head of household, with respondents aged 61 years and above having 1.87 [95% CI: 1.44-2.14] times the odds of enrolling every member of their households into the scheme compared to their counterparts aged 35 years and below. Similar findings were detected with the highest level of education attained by the responding heads of household, with those having a tertiary level of education having 2.14 [95% CI: 1.31-3.51] times the odds of enrolling their dependents into the insurance scheme compared with their counterparts that have no formal education.

The odds of subscribing to the NHIS tend to diminish with an increase in household size and the cost of travel to the registration center. Households with more than 12 members had 0.67 [95% CI: 0.24-0.45] times the odds of enrolling all members compared to those with less than 4 memberships. Households that spend more than 7.60GH¢ on a round way trip to the registration center had 0.59 [95% CI: 0.28-0.58] times the odds of enrolling all members compared to those that spend less than 3.90GH¢.

3.5 Discussion

Pooling resources through levies, premiums and donations to help mitigate and share the financial risk of healthcare is considered to have great potential for promoting an efficient health delivery system in the economic challenged countries around the globe [28]. It is an effective way of removing the impact of excessive health expenditures on the poor, and facilitating increases in health resource availability.

Comparing hospital utilization rates during the "Cash-and-Carry" regime in Ghana to what now prevails after the inception of the NHIS, suggests the latter is offering more equitable access to healthcare services [29]. The NHIA reported a cumulative membership increase in the insurance scheme from 1.3 million in 2005 to 18 million in 2010 [15]. Despite Ghana's success in this effort to form and implement a nationalized health insurance policy, challenges still undermine the policy objective of the NHIS for attaining nationwide coverage years after the introduction [30].

Eight years after the implementation of the program, our study detected an enrollment rate of 60 percent among the residents of the Barekese subdistrict, which is a typical rural setting in the Ashanti region of Ghana. This is similar to the national enrolled figure in 2009 as quoted in the NHIA annual report [28]. The Ghana Ministry of Health

(MOH) is reported to have noted some shortcomings of the program and working out strategies through national forums and debates to efficiently address the impediments [31].

This study indicates that subsistence farmers who rely solely on the weather for successful harvests constitute about 46 percent of the total respondents. Thus, a failure in a season will challenge most residents, including leaving them incapable of affording the cost to enroll into the scheme. In contrast, it was shown that households headed by teachers or family heads in the study area enrolled in school had 1.66 [95% CI: 0.93-2.95] times the odds of being more likely to enroll in the program compared to their farming counterparts. This could mean that teachers earned reliable monthly incomes and can afford registration at any time. Policy approaches that specifically target farmers are therefore necessary to improve enrollment.

Further analysis of the data revealed a progressive likelihood for an entire household enrolling in the program given the level of formal education attained by the respondent as compared to those with none. Heads of households that had up to a tertiary level of education were more than twice likely to subscribe to the program compared to their counterparts (about a third of the total respondents) who have no formal education.

Public misconception about features of health insurance schemes and the need to renew membership are major weaknesses that potentially affect coverage and need to be addressed [3]. Insufficient knowledge on the schemes' benefits among residents in the subdistrict might have contributed significantly to the observed nonparticipation rate. Since the level of education attained was detected as a significant determinant of enrollment, information on the scheme has to be disseminated in ways that it reaches those with less education to ensure that this segment of the population are not excluded.

In spite of the already existing government effort to subsidize the annual premium and exempt identified indigents from payment, it is worth noting that there are additional costs, including those associated with travel to a centralized location to enroll in the scheme. The inability to afford such cost deters a notable proportion of the population, especially in remote areas, from participating in the NHIS. Depending on the geographical location, some household heads incur close to 10GH¢ to make a round trip, which can also include walking part of the journey to register. It will therefore be appropriate to use findings in studies like this to guide premium packages for location specifics as an additional incentive for the rural poor. Scheme administrators should devise ways of reaching out to the remotest communities occasionally to register them right in their localities.

Indicators, such as occupation, marital status and religious beliefs, have no significant effect in determining participation in the program, implying that any target policy design as an intervention to get residents to enroll in the NHIS should pay less attention to such demographic variables. Policy decisions should focus on interventions directed generally at educating the masses (such as the poor, younger household heads, large households, residents with low educational levels and those working outside of the formal service sector) on the benefits of subscribing to the program using places such as churches, mosques and market centers.

3.6 Limitations

Findings from these analyses could be confounded by respondents' failure to recall requisite information asked of them. A classic example is the inability of some

interviewees to recall or substantiate their correct dates of births with birth records when such information was required either on themselves or the dependents they represented.

There was a series of measurement problems that particularly hindered the use of income and expenditure measures in the participating communities due to lack of good record keeping and the fact that most of the residents do not earn regular income from the formal sector. This is principally the situation in the deprived nations of the world where wealth index is debatably most significant [32]. The use of proxy measures as in our case was the best alternative, however, its usage also comes with a weakness since the investigator has no better means of authenticating every response to ownership of a household assets.

Another notable limitation to this study was the fact we did not ask about partial coverage in the NHIS within a household. Some households could have had a few, but not all, members enrolled. In such cases, the entire household membership was ruled out as not having complete health insurance coverage.

Finally, the trends observed during this evaluation still need to be confirmed with a larger sample size and longitudinal study over several years to extrapolate findings to the entire country.

3.7 Conclusions

Notwithstanding the steady increase in the enrollment patterns to the NHIS since its inception, it is worth pointing out that 8 years down the road, it has not achieved its full coverage rate as stipulated in the implemental policy objective. Enrollment to the scheme is still conditional on many factors of which the socioeconomic standing of the household, age, occupation, religion and education of the household head, household size, and travel

costs to the NHIS enrollment center are relevant. Increased effort to expand membership is critically needed if this benefit is to cover all Ghanaians. Since cost was found to be a major obstacle to enrollment, more effective methods for identifying citizens at risk for nonenrollment in NHIS for the purposes of premium exemption and discount are desirable. Besides the general low level of education, distance and cost to travel to the district office hinders the ability of residents to register or renew membership to the program.

It is appropriate for policy makers to consider implementing the recommended findings in localized settings in studies as this to help achieve the national and global effort in bridging the healthcare disparities in societies.

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Table 3.1: *Distribution of respondents' demographic characteristics*

VARIABLE	CATEGORY	N (%)
SEX	Female	1,141 (35.35)
	Male	2,087 (64.65)
AGE (yrs)	≤35 yrs	796 (25.56)
	36-45yrs	800 (25.69)
	46-60yrs	817 (26.24)
	≥61 yrs	701 (22.51)
MARITAL STATUS	Married	2,340 (72.49)
	Single	231 (7.16)
	Divorced	263 (8.15)
	Widowed	394 (12.21)
OCCUPATION	Farming	1,489 (46.13)
	Teachers/Students	111 (3.44)
	Trading	596 (18.46)
	Others	1,032 (31.97)
EDUCATIONAL LEVEL	None	1,085 (33.61)
	Primary	425 (13.17)
	Middle/ Junior High	1,353 (41.91)
	Senior High	200 (6.20)
	Tertiary	165 (5.11)
RELIGIOUS BELIEFS	Christianity	2,548 (78.93)
	Moslem	576 (17.84)
	Others	104 (3.22)
HOUSEHOLD SIZE	≤4	1,309 (40.55)
	5-8	1,394 (43.18)
	9-11	277 (8.58)
	≥12	248 (7.68)
SES	Low	1,874 (58.05)
	Middle	938 (28.97)
	High	419 (12.98)
NHIS ENROLLMENT	Yes	1,952 (60.47)
	No	1,276 (39.53)

Table 3.2: *Scoring weights derived from principal component analysis*

Household Item	Component 1	Unexplained Variance	Mean	SD
Electricity	0.3631	0.5129	0.5139	0.4999
Fan	0.3953	0.4227	0.2385	0.4263
Furniture	0.3037	0.6593	0.6391	0.4803
Radio	0.3173	0.6281	0.5638	0.4960
Television	0.4015	0.4045	0.3866	0.4871
Refrigerator	0.3586	0.5249	0.1568	0.3636
Cell Phone	0.3192	0.6236	0.7063	0.4555
Computer	0.2208	0.8200	0.0403	0.1966
Motorcycle	0.0958	0.9661	0.0229	0.1497
Car	0.1754	0.8864	0.0325	0.1774
Tractor	0.0082	0.9998	0.0015	0.0393
Camera	0.1260	0.9414	0.0115	0.1065
Sewing Machine	0.1498	0.9171	0.1090	0.3117
Generator	0.0170	0.9989	0.0198	0.1394

Table 3.3: *Bivariate analysis of selected indicators on SES.*

INDICATORS	Household SES (N= 3,228)			
	LOW **n=** 1,874 **(%)**	**MIDDLE** **n= 935 (%)**	**HIGH** **n= 419 (%)**	**p-value**
SEX				<0.001
Female	717(38.26)	319(34.12)	105(25.06)	
Male	1,157(61.74)	616(65.88)	314(74.94)	
AGE (yrs.)				0.002
≤35	425(23.72)	261(28.71)	110(26.63)	
36-45	441(24.61)	253(27.83)	106(25.67)	
46-60	484(27.01)	216(23.76)	117(28.33)	
≥61	442(24.67)	179(19.69)	80(19.37)	
MARITAL STATUS				<0.001
Married	1,314(70.12)	696(74.44)	330(78.76)	
Single	121(6.46)	80(8.56)	30(7.16)	
Divorced	174(9.28)	61(6.52)	28(6.68)	
Widowed	265(14.14)	98(10.48)	31(7.40)	
OCCUPATION				<0.001
Farming	1,096(58.48)	303(32.41)	90(21.48)	
Teachers/Students	31(1.65)	44(4.71)	36(8.59)	
Trading	304(16.22)	205(21.93)	87(20.76)	
Others	443(23.64)	383(40.96)	206(49.16)	
EDUCATIONAL LEVEL				<0.001
None	738(39.38)	271(28.98)	76(18.14)	
Primary	263(14.03)	116(12.41)	46(10.98)	
Middle/Junior High	744(39.70)	424(45.35)	185(44.15)	
Senior High	86(4.59)	69(7.38)	45(10.74)	
Tertiary Education	43(2.29)	55(5.88)	67(15.99)	
RELIGIOUS BELIEF				0.004
Christianity	1,500(80.04)	711(76.04)	337(80.43)	
Moslem	308(16.44)	202(21.60)	66(15.75)	
Others	66(3.52)	22(2.35)	16(3.82)	
HOUSEHOLD SIZE				0.840
≤4	775(41.36)	376(40.21)	158(37.71)	
5-8	801(42.74)	407(43.53)	186(44.39)	
9-11	160(8.54)	80(8.56)	37(8.83)	
≥12	138(7.36)	72(7.70)	38(9.07)	
TRAVEL COST				
≤3.90 GH¢	889(47.44)	849(90.80)	413((98.57)	<0.001
4.00-7.50 GH¢	812(43.33)	76(8.13)	6(1.43)	
≥7.60 GH¢	173(9.23)	10(1.07)	0(0.00)	

Table 3.4: *Multivariate logistic analysis of household subscription to the NHIS*

VARIABLE	CATEGORY	N (%)	Odds Ratio (Unadjusted)	p-value	[95% CI]	Odds Ratio (Adjusted)	p-value	[95% CI]
SEX	Female **(R)**	1,141 (35.35)	1.000	0.406	-	1.000	-	-
	Male	2,087 (64.65)	0.939	0.406	0.81-1.09	0.754	**0.008**	0.61-0.93
AGE (yrs)	≤35 yrs **(R)**	796 (25.56)	1.000	0.292	-	1.000	-	-
	36-45yrs	800 (25.69)	1.161	0.144	0.95-1.42	1.307	**0.017**	1.05-1.63
	46-60yrs	817 (26.24)	1.111	0.298	0.91-1.36	1.410	**0.003**	1.12-1.77
	≥61 yrs	701 (22.51)	1.211	0.071	0.98-1.49	1.866	**0.000**	1.44-2.14
MARITAL STATUS	Married **(R)**	2,340 (72.49)	1.000	0.489	-	1.000	-	-
	Single	231 (7.16)	0.843	0.219	0.64-1.11	0.686	**0.017**	0.50-0.93
	Divorced	263 (8.15)	0.895	0.399	0.69-1.16	0.807	0.170	0.59-1.10
	Widowed	394 (12.21)	1.046	0.686	0.84-1.30	0.912	0.536	0.68-1.22
OCCUPATION	Farming **(R)**	1,489 (46.13)	1.000	<0.001	-	1.000	-	-
	Teachers/Students	111 (3.44)	2.933	**0.000**	1.84-4.66	1.659	0.085	0.93-2.95
	Trading	596 (18.46)	1.344	**0.003**	1.11-1.63	1.046	0.698	0.83-1.32
	Others	1,032 (31.97)	1.498	**0.000**	1.27-1.76	1.110	0.297	0.91-1.35
EDUCATIONAL LEVEL	None **(R)**	1,085 (33.61)	1.000	<0.001	-	1.000	-	-
	Primary	425 (13.17)	0.886	0.294	0.71-1.11	0.991	0.941	0.77-1.27
	Middle/ JHS	1,353 (41.91)	1.246	**0.008**	1.06-1.47	1.295	**0.010**	1.06-1.57
	SHS	200 (6.20)	1.472	**0.017**	1.07-2.02	1.501	**0.024**	1.06-2.13
	Tertiary	165 (5.11)	3.153	**0.000**	2.10-4.72	2.142	**0.003**	1.31-3.51

Table 3.4 continued

VARIABLE	CATEGORY	N (%)	Odds Ratio (Unadjusted)	p-value	[95% CI]	Odds Ratio (Adjusted)	p-value	[95% CI]
RELIGIOUS	Christianity **(R)**	2,548 (78.93)	1.000	0.001	-	1.000	-	-
BELIEFS	Moslem	576 (17.84)	0.960	0.663	0.80-1.15	1.068	0.532	0.87-1.31
	Others	104 (3.22)	0.483	**0.000**	0.33-0.72	0.574	**0.010**	0.38-0.87
HOUSEHOLD	≤4 **(R)**	1,309 (40.55)	1.000	<0.001	-	1.000	-	-
SIZE	5-8	1,394 (43.18)	1.002	0.985	0.86-1.17	0.945	0.526	0.79-1.13
	9-11	277 (8.58)	0.685	**0.005**	0.53-0.89	0.605	**0.010**	0.45-0.81
	≤12	248 (7.68)	0.404	**0.000**	0.31-0.53	0.333	**0.000**	0.24-0.45
TRAVEL	≤3.90 GH¢ **(R)**	2, 151 (66.64)	1.000	<0.001	-	1.000	-	-
COST	4.00-7.50 GH¢	894 (27.70)	0.592	**0.000**	0.51-0.69	0.841	**0.037**	0.69-1.03
	≥7.60 GH¢	183 (1.67)	0.281	**0.000**	0.20-0.39	0.407	**0.000**	0.28-0.58
SES	Low **(R)**	1,874 (58.05)	1.000	<0.001	-	1.000	-	-
	Middle	938 (28.97)	1.738	**0.000**	1.05-1.43	1.467	**0.000**	1.21-1.77
	High	419 (12.98)	2.136	**0.000**	1.22-1.89	1.656	**0.000**	1.27-2.16

CHAPTER 4

SPATIAL ANALYSIS OF FACTORS ASSOCIATED WITH HOUSEHOLD SUBSCRIPTION TO THE NHIS IN RURAL GHANA

4.1 Abstract

- ***Background:*** The use of health insurance schemes in financing healthcare delivery and to minimize the poverty gap is gaining considerable recognition among the least developed and resource challenged countries around the world. With the implementation of the socialized health insurance scheme, Ghana has taken the lead in Sub-Saharan Africa (SSA) and is now working out further strategies to achieve the policy objective of gaining universal coverage among her citizenry. The primary goal of this study is to explore the spatial relationship between the residential homes and demographic features of the people in the Barekese subdistrict in Ghana with the probability of enrolling in the National Health Insurance Scheme (NHIS).

- ***Method:*** Household level data were gathered from 20 communities on the enrollment status in the NHIS alongside demographic and socioeconomic indicators and the spatial location of every household that participated in the study. Kulldorff's purely spatial scan statistic was used to detect geographic clusters of areas with participatory households that have either higher or lower enrollment patterns in the insurance program. Logistic regression models on selected demographic and socioeconomic indicators were

conducted to predict the effect on the odds of enrolling an entire household membership in the NHIS.

- ***Results:*** Three clusters significantly stood out as having either high or low enrollment patterns in the health insurance program when taking into account the number of households in those subzones of the study region. Households in the "Cluster 1" insurance group have very high travel expenses compared to their counterparts in the other identified clusters. Travel cost and time to the NHIS registration center to enroll in the program were both significant predictors to participation in the program when controlling for cluster effect. Residents in the High SES group have about 1.66 [95% CI: 1.27-2.17] times the odds for complete household enrollment in the insurance program compared to their counterparts in the low socioeconomic group.

- ***Conclusion:*** The study demonstrated the use of spatial analytical tools to identify clusters of household enrollment patterns in the NHIS among residents in rural Ghana. In the face of limited resources, policy makers can therefore use the findings as a guideline to strategically channel interventions to areas of most need. Furthermore, these analyses can be repeated annually to assess progress on improving insurance coverage.

- ***Keywords:*** Spatial scan statistic, Bernoulli model, NHIS, BCCDP, Ghana.

4.2 Introduction

Access to healthcare remains very difficult and debatable in the developing world due to limited economic resources, modest economic growth, constraints on the public sector and low institutional capacity [1]. In an attempt to address these challenges, Ghana adopted several strategies immediately after gaining independence in 1957, including making service delivery free at all government-owned health facilities [2]. However, by

the late 1990s, the nation could not sustain this "free" healthcare policy and introduced the pay-per-service model commonly referred to as the "Cash-and-Carry" system, where patients and their families were made to pay the full cost out-of-pocket for all services offered them [3,4].

In an effort to address the consequential effects associated with the out-of-pocket payment mode [5–8] and also align the nation's long term health care goals to the World Health Organization (WHO) call in its 58th World Health Assembly resolution (WHA58.33) for all member states to "*plan the transition to universal coverage of their citizens so as to contribute to meeting the needs of the population for healthcare and improving it quality*" [9], Ghana's 2003 Parliament promulgated the National Health Insurance Act 650 (HI Act) [11–13]. This legislative instrument led to the implementation of the NHIS with the policy objective of extending health insurance coverage to all residents in the country [13]. The National Health Insurance Authority (NHIA) was then established with the administrative role of accrediting and licensing providers, determining premiums, resolving disputes, and distributing membership identity cards.

To help understand the utilization trends of health services among patients, several empirical studies have been conducted globally to assess how factors like time, distance, economic status and users perception levels of health facilities has impacted attendance [14,15]. For example, Feikin et al. (2009) in a study assessing the impact of distance on pediatric healthcare utilization in rural Kenya concluded the rate of clinic visits decreases by 34 percent for every 1 km increase in distance travelled from the home to the clinic [16]. In a cross-sectional study conducted by Bour (2003) in the Ahafo-Ano district in Ghana, he alluded to the fact that the average travel cost from most rural areas to the nearest health facility is very high and could be half the daily minimum wage, thereby

playing a very significant role in accessing healthcare. Of the 400 respondents that participated in this study, 17 percent had to travel over an hour or more to the nearest health facility [17]. Hounton et al. (2008) also concluded that distance to a health facility is a major determinant in seeking healthcare among women in rural Burkina Faso [18].

However, despite the commitment to pursuing a universal healthcare delivery system in Ghana, there has been no known study that measured how time, cost or distance to get to the designated registration centers for enrolling into the NHIS are impacting the probabilities of subscription into the program; especially among those in the rural and peri-rural settings.

Spatial analytical techniques and Geography Information Systems (GIS) have been used in recent times to help explain the variability in events in epidemiology and health research [19] and have helped in directing limited resources efficiently to solve health related issues [20]. For example, network analysis for examination of patient referrals, modeling diffusion patterns, identification of environmental risks and risk assessment, detection of clusters, or any assessment of "distance" are techniques that have been used to explore the spatial aspects of healthcare, injury, and disease. Location of residential homes is a key indicator to enrollment or participation in any health program as it affects the time, distance or cost one needs to commit to in order to utilize services provided in a designated health facility. Adopting spatial analytical methodologies will therefore help visualize, manage and evaluate the impact of location on access [21].

This research thus seeks to explore the spatial relationship between locations of residential homes and the likelihood of having either no or partial versus complete enrollment of an entire household membership into the newly introduced health insurance program among residents in the study area. As part of this spatial analysis the study seeks

to understand the relationship between various aspects of "cost" of accessing the insurance enrollment center, both in terms of opportunity cost (i.e., time), fares for public transportation, and travel distance to the enrollment center.

4.3 Methods

4.3.1 Study Population

The study participants included all heads of households enrolled in a cross-sectional study conducted in 20 rural and peri-rural communities in the Barekese subdistrict of the Atwima-Nwabiagya district in the Ashanti Region of Ghana **(Fig. 4.1)**. The communities constitute the Barekuma Collaborative Community Development Project (BCCDP) site; a collaborative partnership between the community leadership and researchers from Komfo Anokye Teaching Hospital (KATH), Kwame Nkrumah University of Science and Technology (KNUST) both in Kumasi, Ghana, and the University of Utah (UofU) in Salt Lake City, USA.

4.3.2 Data

As part of the collaborative activities, a census was conducted in 2011 to build a database to be used for tracking purposes and to create a sampling frame for future research work. Most interviews were conducted in Twi, the local language of the area. A total of 3,228 heads of household were interviewed using a survey instrument adopted from the Ghana Demographic and Health Survey (GDHS) with minimal modifications. The questionnaire has items related to household subscription to the NHIS, socioeconomic variables (such as ownership of farmland, home, household items, etc.) and on demographic variables (such as sex, age, marital status, level of education, religious beliefs, occupation, etc.). The research team also used hand held Global Positioning

System (GPS) to gather geographic "waypoints" on the spatial location of each home and the designated registration center (at Nkawie) for enrollment in the NHIS for plotting of maps. We received ethical approval from the UofU Institutional Review Board and Committees on Human Research Publications and Ethics of the KNUST College of Health Sciences, School of Medical Sciences.

4.3.3 Data Analysis

The outcome variable of the study is a binary response to the question on whether all members of a participating household were fully enrolled in the health insurance program versus partial or no enrollment. The household for this purpose was used as the unit of analysis. Using Kulldorff's purely spatial scan statistic [22,23], a Bernoulli model was then developed to identify possible local geographic clusters of either complete or no households enrollment in the NHIS [24–26]. The method uses a circular window with a varying radius centered at each household and moves across the map so that at any given position the window includes different sets of neighboring households. The radius of the circular window varies repeatedly from zero up to a maximum radius set such that not more than 50 percent of the total study population was within the circle. This method allows the scanning window to continuously vary in both location and size, thereby creating a large number of distinct potential clusters. The test determines the location and statistical significance of clusters without prior assumptions about the factors affecting enrollment to the program in the study region [25].

Three clusters were detected as being statistically significant from the spatial scan test and were labeled as Cluster 1, 2, and 3. All other households outside the three significant clustered zones were grouped as "Outside" cluster. A bivariate analysis was

then conducted to assess the association of selected demographic and socioeconomic household indicators within the cluster grouping. Since all variables from the bivariate analysis came out to be statistically significant, several multivariate logistic regression models were built to assess which variable retained its significance in predicting the odds of a household enrolling the entire membership in the health insurance program and also to evaluate the effect of the detected geographic clusters on enrollment.

The socioeconomic status (SES) for the households was computed using factor scores generated from Principal Component Analysis (PCA) as weights on ownership of 14 selected household assets (such as furniture, television, fan, cell phone, sewing machine, etc.). Variables with low standard deviations tend to carry low weights [27]. Households were assigned aggregate scores based on the possession of an asset. The ranked scores were then classified into SES tertiles groups such as Low, Middle and High **(see Chapter 3 for details).** This approach was adopted due to the challenge of getting actual household income data in deprived settings and the fact that acquired household assets are good indicators to long term wealth [28].

Travel time and cost to the registration center were computed as the total duration and expense incurred, respectively, to make a round trip from a home to a centralized location within the respective communities on foot and then continue with public commercial transport. These were generated based on travel cost and duration estimates gathered from selected leaders in the communities. Travel time on foot was also estimated as the time it takes an average healthy person to travel a distance of 1 mile by using a stop-watch to time this out. Distance measuring tools in ArcGIS and Google Earth were used to estimate the distances from the homes to the registration. Cut-off points used in creating categories for total travel time and cost to make a round trip to register into the

insurance scheme were selected based on the observed distribution patterns of the variables. All data analyses were performed using SaTScan 9.1.1 *Sun Microsystems Inc.*, ArcGIS 10.1 (*Environmental Systems Research Institute* [ESRI], Redlands, California) and STATA statistical software package (StataCorp. 2007. *Stata Statistical Software: Release* 12. College Station, TX: StataCorp LP).

4.4 Results

Of the 3,228 total heads of households that participated in the cross-sectional study, 1,952 (60 percent) indicated they have health insurance coverage for every individual in their family units with the remaining 40 percent reported having partial or no coverage. Out of the total respondents, 1,141 (35 percent) were males and 65 percent were females. Seventy two percent reported being married, while 231 (7 percent) were single at the time of participation. A little over half the studied households were classified under low economic status. A significant proportion of the respondents (46 percent), reported farming as the the main occupation. About a third of them reported not having any form of formal education, while 2,548 (79 percent) professed faith in the Christian religion (**Table 4.1).**

The spatial scan statistic test identified three statistical significant clusters (Cluster 1, 2 and 3) of households with either high or low enrollment rates in the health insurance program within the BCCDP study region at significance level, $\alpha = 0.05$. The largest cluster area (Cluster 1) of lower than expected complete household enrollment rate into the insurance program covered 10 out of the 20 communities in the study region **(Fig. 4.2)**. This cluster consisted of a total of 320 (10 percent) households.

Cluster 2 and 3 had a total of 611 (19 percent) and 189 (6 percent) households, respectively. All other households outside the significantly detected clustered zones of residences with high and low enrollment clusters accounting for about 2,108 (65 percent), were grouped as the "Outside" cluster or houses in the region with no or random enrollment pattern.

The enrollment rate into the NHIS spanned from about 25 percent to 91 percent across the communities. The travel time and cost to the registration center varies by community and within clusters. The highest average cost to commute from the farthest community to and from the registration center with a public commercial transport was about 10GH¢. Based on the location of the community, it takes an average of 143 to 330 minutes in travel time for a head of household to register his or her dependents into the insurance program. The average family size ranges from about 5 to 8 persons per household within the communities (**Table 4.2).**

In exploring the relationship between the detected clusters, one can identified a positive linear correlation between travel time and cost, distance and cost and finally between time and distance to get to the enrollment center to subscribe to the program. Thus, a unit rise in one indicator leads to a corresponding increase in the other. However, there was a wide variability in the three indicators among clusters where households in the Cluster 1 setting for instance, tend to averagely spend more both in total travel time, distance and cost to make a round trip to and from the registration center compared to their counterparts in the other clusters. Conversely, households in Cluster 2 tend to spend much lower on average when comparing all significantly detected clusters, thereby confirming the identification of such group **(Fig. 4.3-4.5).**

A bivariate analysis to evaluate the relationship between selected household demographic indicators and the enrollment status of entire members of households in the NHIS within the identified cluster showed highly significant statistical association with all selected variables at an $\alpha = 0.05$ level of significance. An evaluation of the distribution pattern of the respondents by marital status and occupation across clusters revealed relatively similar trends with a very significant proportion of them either married or farmers. A greater proportion also reported middle/junior high level of education as their highest attained level of formal education across all detected cluster. However, the greatest proportional differences were noticed in travel cost and time where almost all respondents in Cluster 1 fell in the high ends of those variables with completely none of their counterparts in those ends **(Table 4.2).**

A comparison of the odds of enrollment appeared relative similar between the four models. For example, the results showed a statistically significant increase in the odds of enrollment regardless of the model with an increase in age, the level of education attained and higher socioeconomic level. Thus, heads of households with a tertiary level of education have 2.1 [95% CI: 1.29-3.53] times the odds of enrolling their entire dependents in the insurance program comapared to their counterparts who had no formal education. Residents in the Cluster 2 region had about 1.5 [95% CI: 1.19-1.86] times the odds of enrolling compared to their counterparts in the outside subzone. The odds to enroll, however, reduces with an increase in both travel time and cost when predicting enrollment rates without assessing for cluster effect **(Table 4.3).**

There was a significant protective effect against enrolling with an increase in the size of the household unit. For example, households with more than 12 members have about 0.67 [95% CI: 0.25-0.47] times the odds to enroll comapred to those with less than 4

members across all predictive models. The occupational background of the heads of households seemed not to have any effect on the likelihood of enrolling their dependents. However, those who reported to be teachers or students in school tend to have much higher odds compared to their farming counterparts.

There was some level of statistical significance detected for travel cost in predicting the probability of enrollment in the second model without the time component. However, this level of significance completely disappeared when time was added to the third model. A further evaluation to assess the effect of clustering in the forth model revealed that travel time and cost played very significant roles in predicting the odds of enrolling in the program given the location of the cluster. This finding therefore offers more credence to the existence of great variability in the detected clusters and should be a prominent factor in the allocation of resources when designing intervention programs for the study region. A likelihood-ratio test for model three and four yielded a $\chi^2(3) = 56$ with a p-value <0.001.

4.5 Discussion

Despite the progress made with the introduction of the nationalized health insurance scheme for helping Ghanaians access healthcare, some groups of the populace still lack the access anticipated in the policy objective that ushered in the NHIS. Studies of this kind, taking into consideration the effect of spatial factors on the subscription to the program, are therefore of high importance.

Using a Bernoulli-based spatial scan statistic, we have identified the existence of potential clustering in the enrollment pattern of households into the health insurance program. We found three significant clusters of households in the study region with either

high or low participatory rates in the program. Interestingly, the largest geographic cluster with very low enrollment rate (Cluster 1) appeared in the most difficult communities to access by road in the subdistrict. The implication of this in relationship to the NHIS policy objective will be the urgent call for setting further administrative strategies that will include locating registration centers much closer to such areas or using mobile registration centers that visit outlying regions.

From the study, we have identified SES, travel cost and time to the registration center as factors that are strongly associated with enrollment of entire household membership in the health insurance program. Additionally, efforts should be made to target the poor in educative programs that will help woo their interest and increase their understanding of the benefits in enrolling in a program that will help alleviate the heavy cost associated in accessing healthcare. Given that the inhabitants are predominantly farmers earning seasonal income from crop harvest, further strategies like premium payment in an installment fashion could be set in place to offer some relief during the between-harvest periods.

The use of spatial scan tests for locating potential clusters as done in this study has some limitations including the choice of perceived enrollment percentage of the study population one needs to use to effectively pick significant cluster groups. However, we think findings from this study are important to help identify areas for which more outreach is needed to increase enrollment in the insurance scheme.

4.6 Conclusions

Notwithstanding the positive impact of the nationalized health insurance program in Ghana in getting the citizenry access to healthcare, some residents in the research area

are still not participating in the program purported to pool resources together to help lessen the health shock and associated financial expenses to a household in times of need. Using spatial scan analysis, we have detected clusters of households with either low or high enrollment rates in the NHIS among residents in the study region with travel time and cost to the designated registration center from the research communities being the most significant predictors influencing those enrollment patterns. It is also worth noting that, the higher than expected cluster of households was detected around the only government-owned health facility (Barekese Community Health Post) in the entire subdistrict while the lower than expected clusters are in locations where access to health facilities is restricted.

To help improve equity in accessing healthcare and promote the NHIS's primary goal of achieving universal coverage, policy and decision makers need to understand that besides socioeconomic indicators, spatial elements on the decision to enroll in the program have an impact. This could help direct strategies that might inform how registrations centers are to be located to ease the cost and time element in order to motivate participation in the insurance program in the face of limited resource availability.

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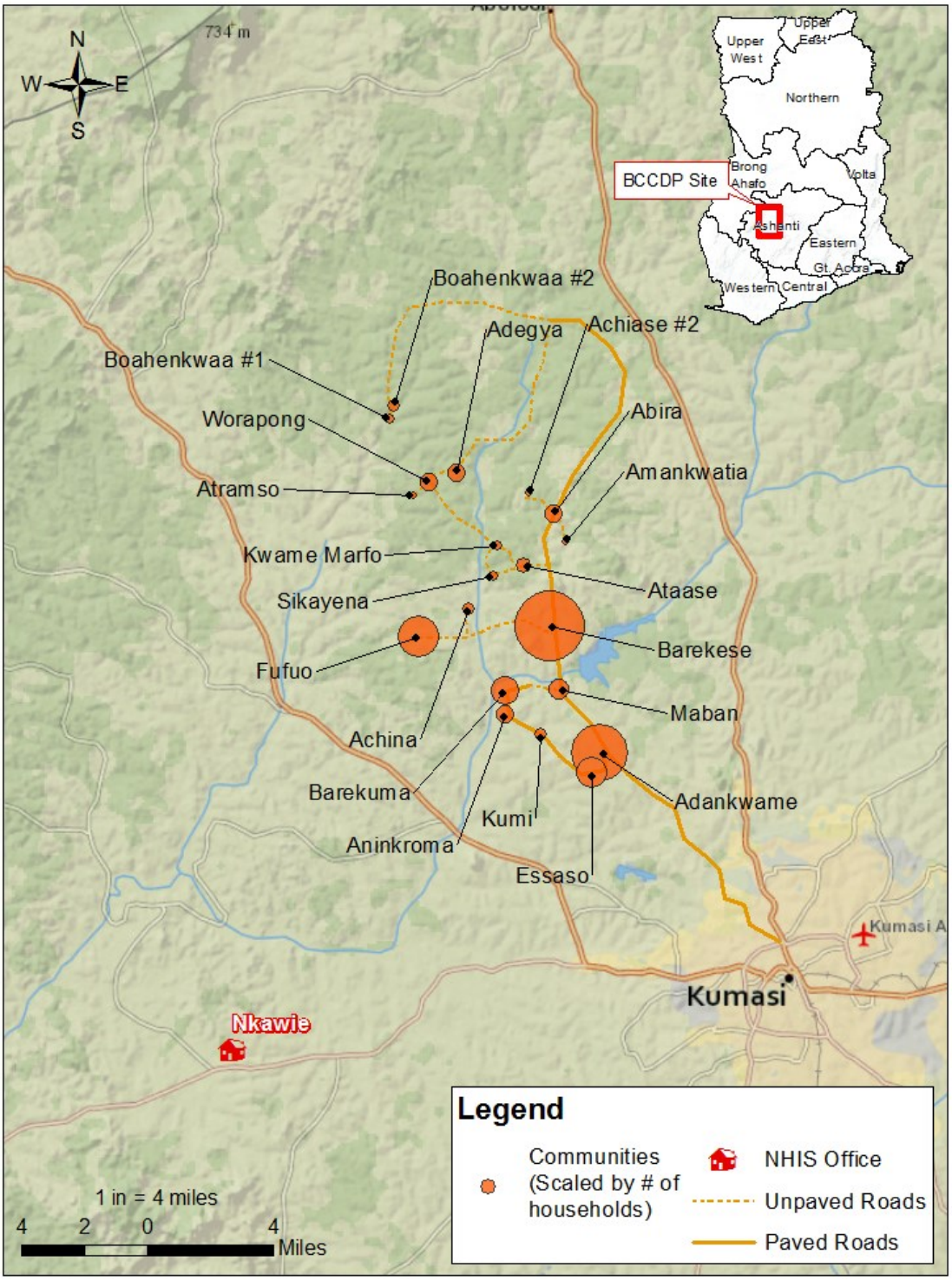
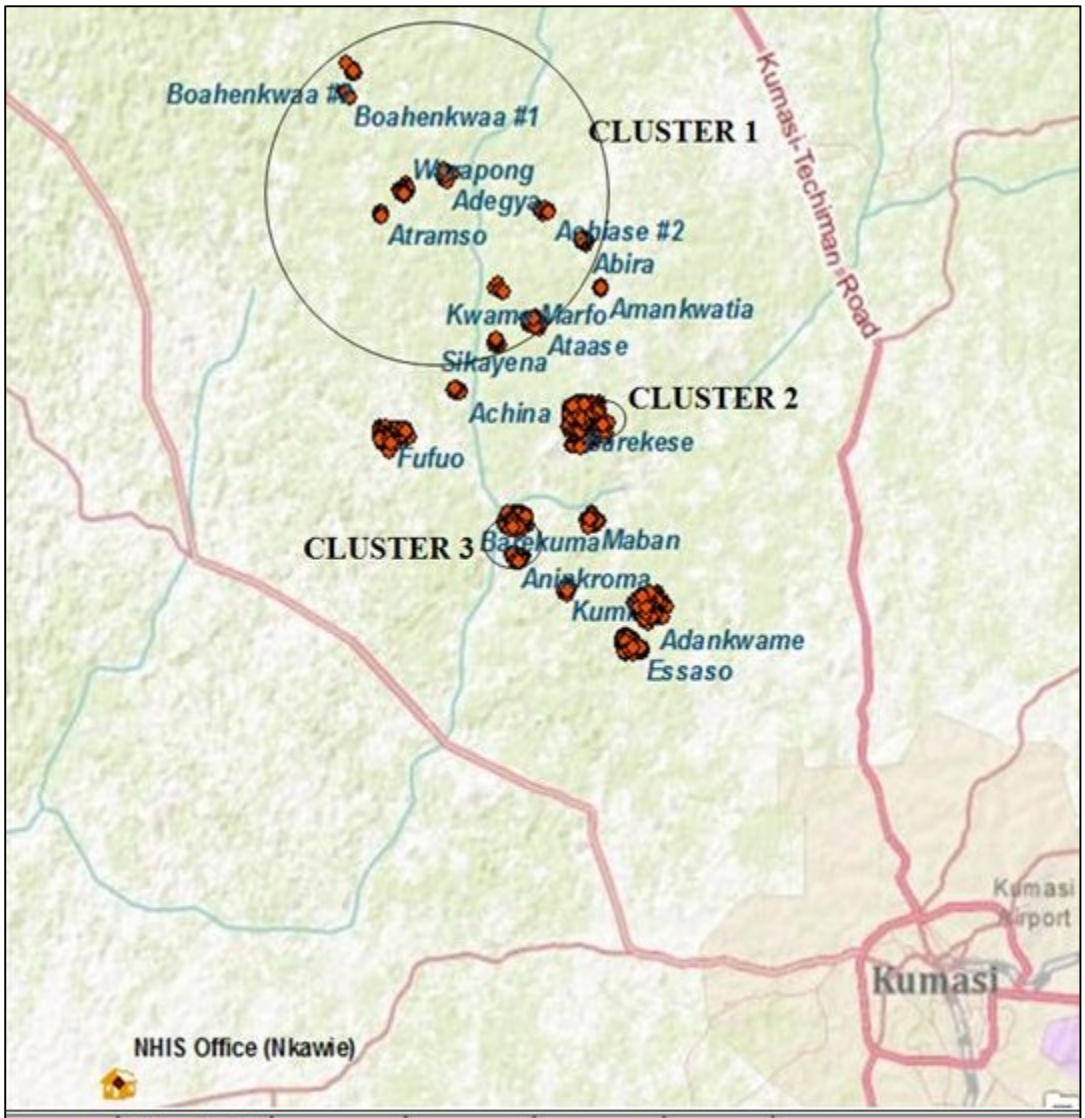


Fig. 4.1: *Location of the BCCDP study site and the NHIS Office at Nkawie.*



Cluster	Households Within Clusters	Observed Insured	Expected Insured	$\frac{Observed}{Expected}$	p-value	Description
1	320	102	194	0.53	<**0.001**	**Lower** than expected
2	611	438	369	1.19	<**0.001**	**Higher** than expected
3	189	80	114	0.70	<**0.001**	**Lower** than expected

Fig. 4.2: *Map of the identified clusters in enrollment patterns and the NHIS Office.*

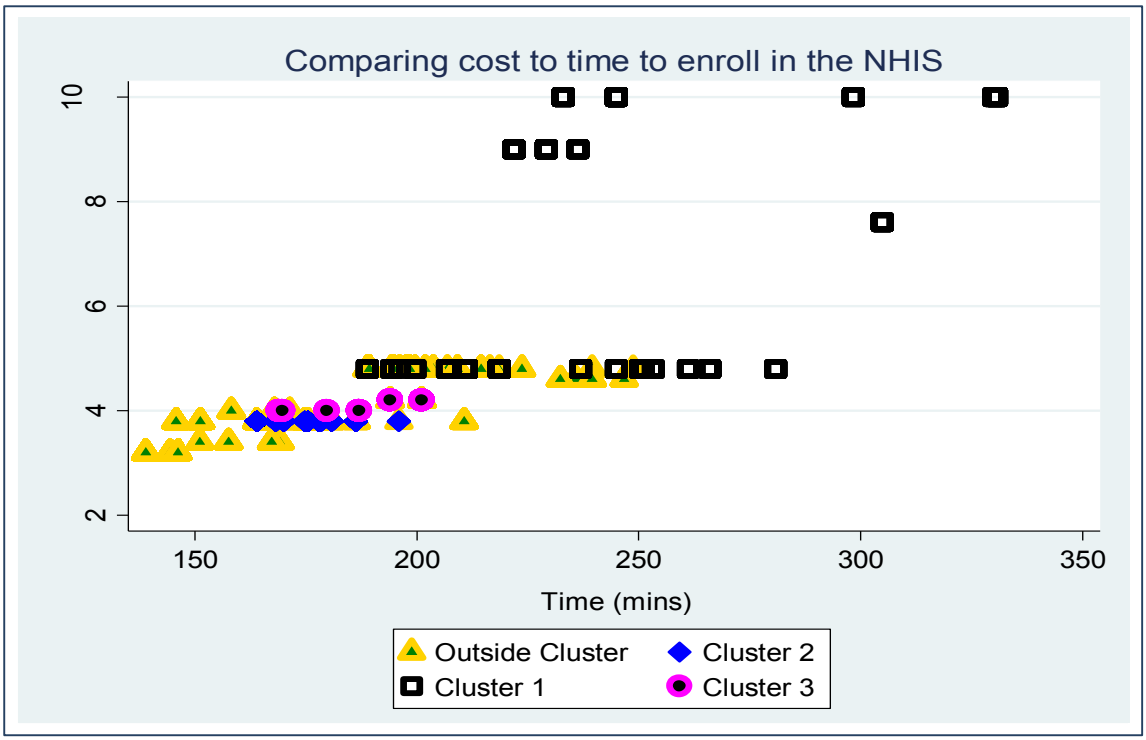


Fig. 4.3: *Plot comparing total travel cost to time to enroll in the NHIS.*

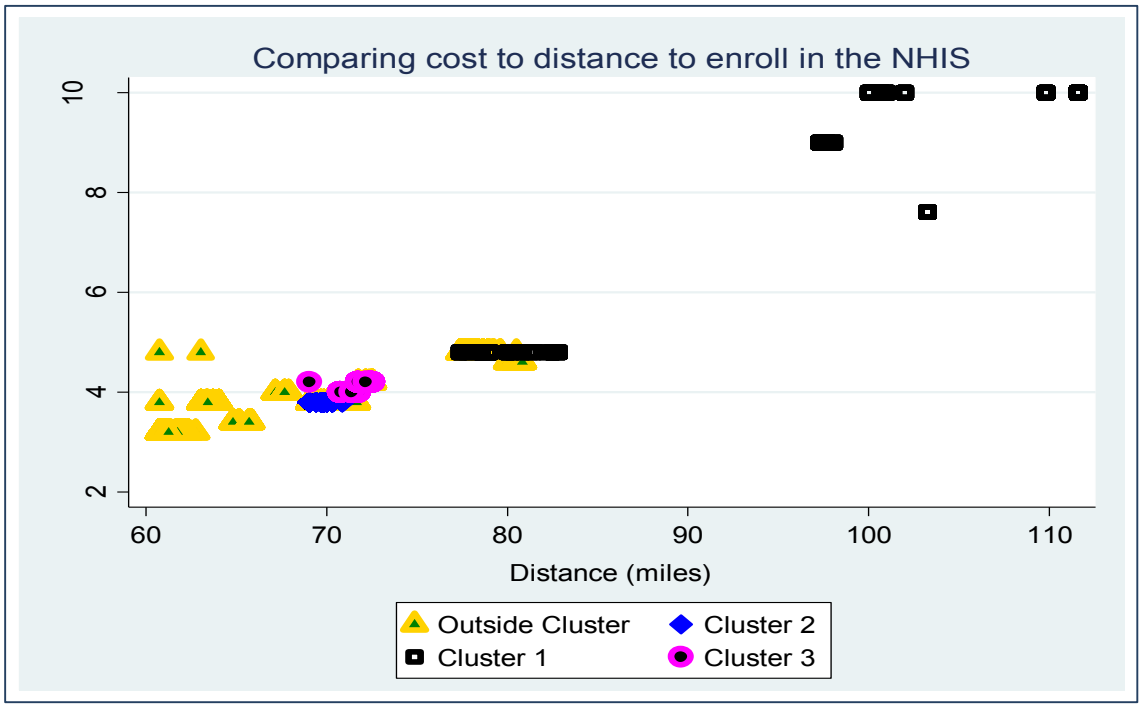


Fig. 4.4: *Plot comparing total travel cost to distance to enroll in the NHIS*

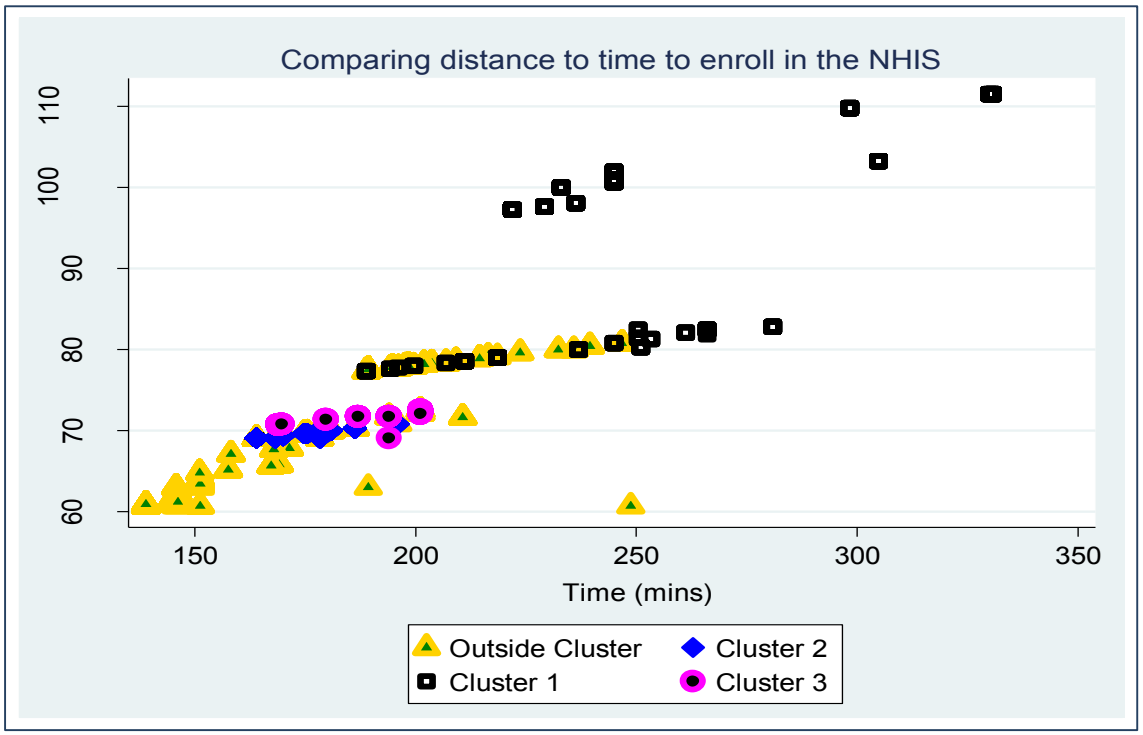


Fig. 4.5: *Plot comparing total travel distance to time to enroll in the NHIS*

Table 4.1: *Demographic characteristics of households*

VARIABLES	CATEGORIES	N (%)
SEX	Female	1,141 (35.35)
	Male	2,087 (64.65)
AGE(yrs)	≤35 yrs	796 (25.56)
	36-45yrs	800 (25.69)
	46-60yrs	817 (26.24)
	≥61 yrs	701 (22.51)
MARITAL STATUS	Married	2,340 (72.49)
	Single	231 (7.16)
	Divorced	263 (8.15)
	Widowed	394 (12.21)
OCCUPATION	Farming	1,489 (46.13)
	Teachers/Students	111 (3.44)
	Trading	596 (18.46)
	Others	1,032 (31.97)
EDUCATIONAL LEVEL	None	1,085 (33.61)
	Primary	425 (13.17)
	Middle/ Junior High	1,353 (41.91)
	Senior High	200 (6.20)
	Tertiary	165 (5.11)
RELIGIOUS BELIEFS	Christianity	2,548 (78.93)
	Moslem	576 (17.84)
	Others	104 (3.22)
HOUSEHOLD SIZE	≤4	1,309 (40.55)
	5-8	1,394 (43.18)
	9-11	277 (8.58)
	≥12	248 (7.68)
SES	Low	1,874 (58.05)
	Middle	938 (28.97)
	High	419 (12.98)
NHIS ENROLLMENT	Yes	1,952 (60.47)
	No	1,276 (39.53)
CLUSTER	Outside	2,108 (65.30)
	Cluster 1	611 (18.93)
	Cluster 2	320 (9.91)
	Cluster 3	189 (5.86)

Table 4.2: *Distribution of community and cluster features*

CATEGORY	VARIABLE	Enrollment Rate	Mean Household Size	Mean Distance (miles)	Mean Time (mins)	Mean Cost (Gh¢)
COMMUNITY	Sikayena	0.11	5.28	81.73	261.04	4.80
	Atramso	0.25	5.25	103.24	304.84	7.60
	Ataase	0.29	6.11	79.01	218.79	4.80
	Boahenkwaa #1	0.32	6.04	111.58	330.58	10.00
	Boahenkwaa #2	0.32	5.63	110.57	311.94	10.00
	Adegya	0.32	7.19	97.56	226.95	9.00
	Kwame Marfo	0.33	5.11	81.83	262.80	4.80
	Achiase #2	0.36	4.55	82.06	254.29	4.80
	Worapong	0.40	7.46	100.81	241.21	10.00
	Barekuma	0.44	8.07	72.18	199.05	4.20
	Aninkroma	0.50	8.00	71.17	176.42	4.00
	Marban	0.54	6.42	65.40	161.83	3.40
	Kumi	0.55	7.24	67.54	165.27	4.00
	Abira	0.58	7.85	77.72	194.92	4.80
	Essaso	0.60	5.90	63.31	149.10	3.80
	Fufuo	0.61	5.88	77.82	196.02	4.80
	Barekese	0.66	5.11	69.36	170.20	3.80
	Adankwame	0.68	5.47	61.15	142.61	3.20
	Achina	0.77	5.46	80.47	240.73	4.60
	Amankwatia	0.91	4.91	79.63	223.92	4.80
CLUSTER	Cluster 1	0.32	6.43	93.79	249.83	7.69
	Cluster 2	0.71	5.04	69.34	169.66	3.80
	Cluster 3	0.42	8.27	71.78	190.28	4.12
	Outside	0.63	5.68	67.81	165.80	3.81

Table 4.3: *Bivariate analysis of selected indicators*

VARIABLE	CATEGORY	All Households N (%)	ASSOCIATION WITHIN CLUSTERS				
			CLUSTER 1 n (%)	CLUSTER 2 n (%)	CLUSTER 3 n (%)	OUTSIDE n (%)	p-value
SEX	**Female**	1,141 (35.35)	87(27.19)	258 (42.23)	71(37.57)	725 (34.39)	**<0.001**
	Male	2,087 (64.65)	233(72.81)	353 (57.77)	118(62.43)	1,383 (65.61)	
AGE (yrs.)	**≤35**	796 (25.56)	61(20.54)	152 (25.63)	24(13.26)	559 (27.36)	**<0.001**
	36-45	800 (25.69)	72(24.24)	146 (24.62)	38(20.99)	544 (26.63)	
	46-60	817 (26.24)	94(31.65)	163 (27.49)	56(30.94)	504 (24.67)	
	≥61	701 (22.51)	70(23.57)	132 (22.26)	63(34.81)	436 (21.34)	
MARITAL STATUS	**Married**	2,340 (72.49)	238(74.38)	430 (70.38)	139(73.54)	1,533 (72.72)	**0.040**
	Single	231 (7.16)	13(4.06)	55 (9.00)	6(3.17)	157 (7.45)	
	Divorced	263 (8.15)	30(9.38)	49 (8.02)	12(6.35)	172 (8.16)	
	Widowed	394 (12.21)	39(12.19)	77 (12.60)	32(16.93)	246 (11.67)	
OCCUPATION	**Farming**	1,489 (46.13)	277(86.56)	199 (32.57)	136(71.96)	877 (41.60)	**<0.001**
	Teachers/Students	111 (3.44)	5(1.56)	22 (3.60)	4(2.12)	80 (3.80)	
	Trading	596 (18.46)	11(3.44)	138 (22.59)	17(8.99)	430 (20.40)	
	Others	1,032 (31.97)	27(8.44)	252 (41.24)	32(16.93)	721 (34.20)	
EDUCATIONAL LEVEL	**None**	1,085 (33.61)	139(43.44)	149 (24.39)	69(36.51)	728 (34.54)	**<0.001**
	Primary	425 (13.17)	43(13.44)	71 (11.62)	36(19.05)	275 (13.05)	
	Middle/Junior High	1,353 (41.91)	110(34.38)	314 (51.39)	71(37.57)	858 (40.70)	
	Senior High	200 (6.20)	21(6.56)	35 (5.73)	9(4.76)	135 (6.40)	
	Tertiary Education	165 (5.11)	7((2.19)	42 (6.87)	4(2.12)	112 (5.31)	
RELIGIOUS BELIEF	**Christianity**	2,548 (78.93)	235(73.44)	493 (80.69)	158(83.60)	1,662 (78.84)	**<0.001**
	Moslem	576 (17.84)	59(18.44)	97 (15.88)	30(15.87)	390 (18.50)	
	Others	104 (3.22)	26(8.13)	21 (3.44)	1(0.53)	56 (2.66)	

Table 4.3: continued

VARIABLES	CATEGORY	All Households N (%)	ASSOCIATION WITHIN CLUSTERS				
			CLUSTER 1 n (%)	CLUSTER 2 n (%)	CLUSTER 3 n (%)	OUTSIDE n (%)	p-value
HOUSEHOLD SIZE	**≤4**	1,309 (40.55)	102(31.87)	296 (48.45)	55(29.10)	856 (40.61)	**<0.001**
	5-8	1,394 (43.18)	144(45.00)	256 (41.90)	62(32.80)	932 (44.21)	
	9-11	277 (8.58)	34(10.63)	27 (4.42)	28(14.81)	188 (8.92)	
	≥12	248 (7.68)	40(12.50)	32 (2.24)	44(23.28)	132 (6.26)	
TRAVEL TIME (mins)	**≤ 163**	**1,635(50.65)**	**0(0.00)**	**366(59.90)**	**0(0.00)**	**1,269(60.20)**	**<0.001**
	164-245	1,420(43.99)	161(50.31)	245(40.10)	189(100.00)	825(39.14)	
	≥ 246	173(5.36)	159(49.69)	0(0.00)	00.00)	14(0.66)	
TRAVEL COST (GH¢)	**≤3.90**	2,151(66.64)	0(0.00)	611 (100.00)	0(0.00)	1,540 (73.06)	**<0.001**
	4.00-7.50	894(27.70)	137(42.81)	0 (0.00)	189(100.00)	568 (26.94)	
	≥7.60	183(5.67)	183(57.19)	0 (0.00)	0(0.00)	0 (0.00)	
SES	**Low**	1,874 (58.05)	295(92.19)	263(43.04)	165(87.30)	1,151(54.60)	**<0.001**
	Middle	938 (28.97)	24(7.50)	242(39.61)	24(12.70)	645(30.60)	
	High	419 (12.98)	1(0.31)	106(17.35)	0(0.00)	312(14.80)	
NHIS ENROLLMENT	**No**	1,276(39.53)	218(68.13)	177(28.97)	109(57.67)	772(36.62)	**<0.001**
	Yes	1,952(60.47)	102(31.87)	434(71.03)	80(42.33)	1,336(63.38)	

Table 4.4: *Logistic regression assessing for cluster effect on subscription odds to the NHIS.*

		All Households (Without Cost and Cluster Effect) (N=3,228)			All Households (Without Time and Cluster Effect) (N=3,228)			All Households (Without Cluster Effect) (N=3,228)			All Households (With Cluster Effect) (N=3,228)		
VARIABLE	**CATEGORY**	**Odds Ratio**	**p-value**	**[95% CI]**	**Odds Ratio**	**p-value**	**[95% CI]**	**Odds Ratio**	**p-value**	**[95% CI]**	**Odds Ratio**	**p-value**	**[95% CI]**
SEX	Female **(R)**	1.000	-	-	1.000	-	-	1.000	-	-	1.000	-	-
	Male	0.766	**0.012**	0.62-0.94	0.754	**0.008**	0.61-0.93	0.761	**0.010**	0.62-0.93	0.817	0.060	0.66-1.01
AGE (yrs)	≤35 yrs **(R)**	1.000	-	-	1.000	-	-	1.000	-	-		-	
	36-45yrs	1.303	**0.019**	1.04-1.63	1.307	**0.017**	1.05-1.53	1.304	**0.019**	1.04-1.63	1.297	**0.023**	1.04-1.62
	46-60yrs	1.400	**0.004**	1.11-1.76	1.410	**0.003**	1.12-1.77	1.407	**0.003**	1.12-1.77	1.391	**0.005**	1.01-1.75
	≥61 yrs	1.822	**0.000**	1.41-2.36	1.866	**0.000**	1.44-2.41	1.834	**0.000**	1.41-2.38	1.791	**0.000**	1.38-2.33
MARITAL STATUS	Married **(R)**	1.000	-	-	1.000	-	-	1.000	-	-	1.000	-	-
	Single	0.682	**0.016**	0.50-0.93	0.686	**0.017**	0.50-0.93	0.680	**0.015**	0.50-0.93	0.679	**0.015**	0.50-0.93
	Divorced	0.734	0.140	0.58-1.08	0.807	0.170	0.59-1.10	0.801	**0.156**	0.59-1.09	0.807	0.173	0.59-1.10
	Widowed	0.909	0.521	0.68-1.22	0.912	0.536	0.68-1.22	0.913	0.539	0.68-1.22	0.913	0.544	0.68-1.22
OCCUPATION	Farming **(R)**	1.000	-	-	1.000	-	-	1.000	-	-	1.000	-	-
	Teachers/Students	1.623	0.100	0.91-2.89	1.659	0.085	0.93-2.95	1.629	0.098	0.91-2.90	1.568	0.130	0.87-2.80
	Trading	1.042	0.715	0.83-1.30	1.046	0.698	0.83-1.32	1.040	0.736	0.83-1.31	1.043	0.723	0.83-1.31
	Others	1.098	0.339	0.91-1.33	1.110	0.297	0.91-1.35	1.097	0.356	0.90-1.34	1.063	0.549	0.87-1.30
EDUCATIONAL LEVEL	None **(R)**	1.000	-	-	1.000	-	-	1.000	-	-	1.000	-	-
	Primary	0.968	0.800	0.75-1.24	0.991	0.941	0.77-1.27	0.981	0.885	0.76-1.26	0.970	0.812	0.75-1.25
	Middle/ JHS	1.265	**0.018**	1.04-1.54	1.295	**0.010**	1.06-1.57	1.284	**0.013**	1.06-1.56	1.219	0.052	1.00-1.49
	SHS	1.469	**0.032**	1.03-2.09	1.501	**0.024**	1.06-2.13	1.504	**0.024**	1.06-2.14	1.471	**0.034**	1.03-2.10
	Tertiary	2.122	**0.003**	1.29-3.49	2.142	**0.003**	1.31-3.51	2.159	**0.002**	1.31-3.55	2.138	**0.003**	1.29-3. 53

Table 4.4: continued

VARIABLE	CATEGORY	All Households (Without Cost and Cluster Effect) (N=3,228)			All Households (Without Time and Cluster Effect) (N=3,228)			All Households (Without Cluster Effect) (N=3,228)			All Households (With Cluster Effect) (N=3,228)		
		Odds Ratio	p-value	[95% CI]	Odds Ratio	p-value	[95% CI]	Odds Ratio	p-value	[95% CI]	Odds Ratio	p-value	[95% CI]
RELIGIOUS BELIEFS	Christianity **(R)**	1.000	-	-	1.000	-	-	1.000	-	-	1.000	-	-
	Moslem	1.058	0.589	0.86-1.30	1.068	0.532	0.87-1.31	1.067	0.540	0.87-1.31	1.082	0.458	0.88-1.33
	Others	0.550	**0.005**	0.36-0.84	0.574	**0.010**	0.38-0.87	0.566	**0.008**	0.37-0.86	0.559	**0.008**	0.38-0.86
HOUSEHOLD SIZE	**≤4** (R)	**1.000**	-	-	**1.000**	-	-	**1.000**	-	-	**1.000**	-	-
	5-8	0.934	0.448	0.78-1.11	0.945	0.526	0.79-1.13	0.939	0.486	0.79-1.12	0.950	0.577	0.80-1.14
	9-11	0.596	**0.000**	0.45-0.80	0.605	**0.001**	0.45-0.81	0.597	**0.000**	0.45-0.80	0.625	**0.002**	0.47-0.84
	≤12	0.324	**0.000**	0.24-0.44	0.333	**0.000**	0.24-0.45	0.326	**0.000**	0.24-0.45	0.346	**0.000**	0.25-0.47
SES	Low **(R)**	1.000	-	-	1.000	-	-	1.000	-	-	1.000	-	-
	Middle	1.443	**0.000**	1.20-1.74	1.467	**0.000**	1.21-1.77	1.444	**0.000**	1.19-1.75	1.474	**0.000**	1.22-1.79
	High	1.639	**0.000**	1.27-2.12	1.656	**0.000**	1.27-2.16	1.637	**0.000**	1.26-2.13	1.662	**0.000**	1.27-2.17
TRAVEL TIME (mins)	≤ 163 **(R)**	1.000	-	-	-	-	-	1.000	-	-	1.000	-	-
	164-245	0.800	**0.009**	0.68-0.95	-	-	-	0.795	**0.033**	0.64-0.98	0.731	**0.005**	0.58-0.91
	≥ 246	0.316	**0.000**	0.22-0.46	-	-	-	0.376	**0.000**	0.24-0.60	0.556	**0.027**	0.33-0.93
TRAVEL COST (GH¢)	≤ 3.90 **(R)**	-	-	-	1.000	-	-	1.000	-	-	1.000	-	-
	4.00-7.50	-	-	-	0.841	0.087	0.69-1.03	1.047	0.720	0.81-1.35	1.700	**0.002**	1.27-2.27
	≥7.60	-	-	-	0.407	**0.000**	0.28-0.58	0.702	0.120	0.45-1.10	2.513	**0.000**	1.38-4.56
CLUSTER	Outside **(R)**	-	-	-	-	-	-	-	-	-	1.000	-	-
	Cluster 1	-	-	-	-	-	-	-	-	-	0.260	**0.000**	0.16-0.42
	Cluster 2	-	-	-	-	-	-	-	-	-	1.488	**0.000**	1.19-1.86
	Cluster 3	-	-	-	-	-	-	-	-	-	0.477	**0.000**	0.34-0. 68

CHAPTER 5

CONCLUSION

Ghana is one of the first countries in Sub-Saharan Africa (SSA) [1] to have responded to the recommendation from the World Health Organization (WHO) to its members states in the Assembly's resolution (WHA58.33) to "*plan the transition to universal health coverage of their citizens*" as a means of offering access to healthcare and a strategy to reduce global poverty [2]. By 2003, the country had initiated and subsequently followed with the implementation of the National Health Insurance Scheme (NHIS) with the policy objective of having all residents covered by the fifth year of operation [3].

Despite the steady improvement in the national enrollment rates into the program over the years [4,5], studies have shown a lot of regional variations within the 10 administrative regions of the country [6,7] and also the fact that, most of the poor were not adequately being covered [8,9]. This project included a history of insurance in this region and an evaluation of the utilization and predictive variables that influence the enrollment rate in the mandatory nationalized health insurance program in rural Ghana.

The study was conducted with emphasis on three specific aims. The first was to provide a detailed literature recount on the use of health insurance in the context of SSA, Ghana and among residents in the 20 rural and peri-rural communities that constitute Barekuma Collaborative Community Development Project (BCCDP) site in the Atwima

Nwabiagya district of the Ashanti region in Ghana. The second specific aim was devoted at exploring the demographic and socioeconomic indicators that could help predict the probability of household heads enrolling all their dependents in the NHIS. The third aim was directed at exploring the spatial relationship between location of the households and the probability of enrolling in the NHIS.

5.1 Findings from the Study

It was revealed that 8 years after the introduction of the mandatory nationalized health insurance, about 40 percent (1,276) of the responding households reported not having insurance coverage for all members in the family unit. This finding pointed out the shortfall of the NHIS implementing policy objective of getting everyone covered within the first 5 years of operation. To help improve the participatory rate from policy and decision making perspective, efforts need to be put in place to address the factors that lead to reduced enrollment in the program, including reaching those in the most remote communities throughout the country.

Another finding from this project pointed to the fact that residents with the highest level of education had about 2.14 times the odds of enrolling their dependents into the insurance scheme compared with their counterparts that have no formal education. A combined group of teachers and residents who reported being students in an institution of higher learning at the time of the study had about 1.6 times the odds of enrolling their dependents compared to their counterparts who were farmers. Households with more than 12 members had 0.67 times the odds of enrolling all members compared to those with less than 4 memberships. For an intervention strategy to achieve maximum subscription rate,

administrators of the program will likely need to target farmers and residents with no or little formal education.

Finally, it was detected in the spatial analysis that a larger cluster of households with lower enrollment rate is located within the peripheral of the study region. This coincidentally happens to be the very remote part of the BCCDP site that is difficult to access by road and residents had to pay a much higher cost to travel to the registration center to enroll and access clinical resources associated with the program. To help improve equity in accessing health care and promote the NHIS's goal of achieving universal health insurance coverage, policy and decision makers need to direct resources in either locating another registration center in the regions with "low enrollment" clusters or set in place a mobile registration center that will intermittently be sent out to enroll households in these areas.

5.2 Recommendations for Future Research

Despite the eminent contribution from this research in adding to the knowledge base in understanding predictive factors for enrolling entire households into the NHIS, much more could equally be done in the future to help address the acknowledged limitations by the author. Future research works may include adopting a qualitative research methodology (i.e., use of individual and focus group interviews) [10] to help deduce in more detail reasons why heads of households were not enrolling all their dependents in the insurance program.

Using spatial analysis, potential research work may include exploring the behavioral influence of neighboring households on the enrollment patterns to the NHIS.

This will involve using the *k*-nearest neighbor methodology [11] to assess if a household has enrolled in the program because all their neighbors are doing so or vice versa.

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