THE IMPACT OF HEALTH INSURANCE ON THE HEALTHCARE UTILIZATION OF CHILDREN BELOW THE AGE OF 18 YEARS: EVIDENCE FROM GHANA

By

AKAKPO, Kwame

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

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ABSTRACT

The Ghana National Health Insurance policy was established in August 2003 with an underlining objective of attaining a Universal Health Coverage. Low-income community who couldn't afford instant or cash payment for health services were the primary target. Under this policy, children below age 18 years were excluded from paying premium conditioned on their parents' enrollment. This study therefore evaluates the bearing of the health insurance policy on children's healthcare usage. Household data from the Ghana Demographic Health Survey was exploited to identify children whose parent were insured under the scheme. In order to minimize the possible bias arising due to self-selection into the scheme, propensity score matching was applied. It was identified that about 57.4 percent of household heads with children under 18 years had health insurance. The main independent variable used was health insurance enrollment of the household head. Four basic healthcare utilization measures were evaluated. Variables based on whether or not a person had a general health examination, paid a visit to the clinic/hospital, spent at least a night at the hospital and whether a person went for medical prescription during the last 12 months before the survey. There was positive correlation between state of wealth and health insurance subscription. Rural-urban residency also had a positive correlation with insurance. The findings from analyzing each outcome variable indicated a statistically significant effect of health insurance on healthcare use, where a child who is insured utilizes at least one measure of healthcare. In conclusion, the health insurance does encourage people to take their children to visit a health facility to access healthcare. The authorities therefore need to put in extra efforts to encourage all persons to be insured under the health insurance system in order to have access to medical services which they would otherwise cannot afford out of pocket for their children. This will ensure growing access to health insurance which will empower Ghana to continue to advance the health outcomes of all citizens.

Keywords: Healthcare utilization, children under 18 years, Early Healthcare for children, and Ghana health insurance

LIST OF ACRONYMS

EAs	- Enumeration Areas
DHS	- Demographic Health Survey
DMHIS	- District-level Mutual Health Insurance Schemes
GNHIS	- Ghana National Health Insurance Scheme
GOG	- Government of Ghana
MDGs	- Millennium Development Goals
NHIS	- National Health Insurance Scheme
NHIA	- National Health Insurance Authority
NHIC	- National Health Insurance Council
NHIF	- National Health Insurance Fund
NHIL	- National Health Insurance Levy
PSM	- Propensity Score Matching
SDG	- Sustainable Development Goal
SSNIT	- Social Security and National Insurance Trust
UHC	- Universal Health Coverage
USD	- United States Dollar
VAT	- Value Added Tax
WHO	- World Health Organization

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.0 Introduction

In recent times, child healthcare has received enormous attentions in all countries across the world. However, it is quite challenging for low income countries to ensure improvement of child health due to nutritional problems and poor healthcare service utilization. In 2015, according to the World Bank records, the assessment of the Millennium Development Goals (MDGs) recorded the global under age 5 death rate at 43 deaths per 1000 live births. This ratio is an indication of a 44 percent reduction since 2000. Despite the remarkable improvement globally, sub-Saharan Africa witnessed 81 deaths out of 1000 live births in 2015, whereas Europe and other high-income countries witnessed about 4 deaths out of 1000 live births (World Bank, 2015). This could be an indication that healthcare services in developing countries like Ghana are either underutilized or insufficient for the populace.

One main constraint faced by health policy-makers in Africa in recent times is increasing equitable access to healthcare. More so, out-of-pocket payment before utilizing healthcare service has been a major hindrance. It is a common knowledge that health insurance aids as a financial protection for households against the menace of health costs which sometimes is enormous comparative to non-assertive earnings (Doorslaer et al, 2007) that subjects households in low-earning countries to the malicious cycle of poverty (Wagstaff et al, 2003).

1.1 Background of the Study

The National Health Insurance Scheme in Ghana (GNHIS) was conventionalized in August 2003 with a legal backing under an Act of Parliament (Act 650). Since its establishment, the Government of Ghana has tremendously made a headway towards its target of universal healthcare for all citizens. As at 2014, 10.5 million people had insured under the NHIS, epitomizing 40 percent of the entire populace. Visits to health facilities has also increased from

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just below 0.5 per capita as at 2005 to 3 per capita in 2014 (Wang, Otoo, & Dsane-selby, n.d.). As part of the legal statement of the NHIS Act, membership is legally required by all citizens, but in actual practice the membership has been voluntary (Witter and Garshong, 2009). However, individuals are not automatically enrolled onto the scheme and inversely a person is not penalized for failure to enroll (Blanchet et al, 2012).

Any child below 18 years, with a parent or guardian who has enrolled under the NHIS, is entitled to the health insurance service for free without paying premium. This is completed after registering under a special scheme with a registration fee of Gh¢5 (Ghana Cedis) – equivalent to $1.04 USD – meant for just the processing fee and printing of the insurance card. Children below 18 years are therefore exempted from the payment of annual insurance premiums until they are 18 years and above. This package among others is to improve access to healthcare for children and help reduce child mortality rates aimed towards the MDGs 4 as well as 5, which is currently the Sustainable Development Goal (SDG) 3 (NHIA, 2008; MOH, 2009).

Nonetheless, it is almost two decades when the NHIS was introduced in Ghana and the scheme has been faced with some challenges like insufficient and unsatisfactory health financing strategies. The program has suffered inadequate refund to the facilities and no or limited monitoring of the implementation (Witter et al, 2013), these serves as a bottleneck in determining who receives an indemnified and who is not. This has affected the mode of health delivery to beneficiaries of which children are not excluded.

It is per the aforementioned framework that this study is expected to add onto the (limited) body of knowledge on the effect NHIS could have on children' healthcare usage, and precisely provide discernments into the effects based on socioeconomic status.

1.2 Problem Statement

The effect of health insurance, in general, ignited the interest of most researchers and policy makers in the health sector. A few studies have been conducted to deduce the correlation between health insurance programs and healthcare utilization within advanced and developing regions. In effect two major issues has, overall, been discovered by different empirical studies. To begin with, the outcome of health insurance on healthcare and its usage has not been identified as a prime priority. Also, almost all studies consider only the impact health insurance has on the entire population, and not specifically children under 18 years, for instance, Galarraga O, et al (2010), Davidoff A, et al 2005, Wagstaff A, (2010), etc.

Child healthcare and its related insurance has now been a major element introduced under some countries' – including Ghana' – national health insurance system (Escobar, Griffin, & Shaw, n.d.)

However, pragmatic findings regarding implications of health insurance on healthcare utilization of children, particularly in Ghana remains inadequate. This study is therefore poised to re-examine whether the health insurance introduced for children under 18 years – which is the exemption of premiums for children under 18 – has a positive effect on their healthcare use.

1.3 Objectives

The precise objectives expected to guide the analysis of the study are;

1. To describe parents'/guardians' participations in the NHIS and to evaluate correlations between insurance and timely healthcare-seeking for sick children.

2. To evaluate the NHIS' purpose of reaching the low-income earners by evaluating the differences between the income levels and educational levels amongst the insured and uninsured.

3. To measure the extent to which parents'/guardians' enrollment in NHIS facilitates access to healthcare services for children.

1.4 Hypothesis of the Study

With respect to the stated objectives, the following hypothesis will be tested:

H_o: National health insurance has no significant effect on children' healthcare utilization in Ghana.

H_1: National health insurance has significant impact on children' healthcare unitization in Ghana.

1.5 Significance of the Study

Considering the eminence of child healthcare, one main objective of the NHIS is that children who are registered in the scheme enjoy better use of all appropriate child health services to cause an increase in the total health outcomes of the country. Conversely, only a few studies have considered assessing the situation. One empirical study on the effect of NHIS in Ghana (Dzakpasu *et al*, 2012) concluded there was an increased use of facility delivery for mothers in the country, but failed to identify the facility utilization of children. The study also identified improvement in birth outcomes and lowered infant death rate amid insured and noninsured.

The deficiency in the measure of clear-cut timing of health insurance exposure for children has been identify as a drawback by Dzakpasu et al, (2012). This study therefore develops on the premise of describing parents' participation in the NHIS and to evaluate relations amongst insurance and seeking a timely healthcare service for children who are sick.

This study contributes to the inadequate publications on the topic by examining health outcomes of children through the use of exact measures of steadiness of health insurance coverage and some narratives about insurance experiences for children.

1.6 Organization of the Study

Away from the Introduction and Background described in Chapter One, Chapter Two streamlines the rationale forming the basis of the research topic by reviewing in-depth existing empirical works and literature on the correlation that exists between health insurance and healthcare utilization of children. Chapter Three details out the research methodology – comprising the models for solution adopted for the study. The outcome of the results is covered in Chapter Four, whiles discussion alongside conclusion are finally detailed in Chapter Five.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

With reference to the World Health Organization (WHO), the purpose of healthcare systems is to ensure an enhancement in the health status of all presons, promote equity in health access, responsiveness and efficiency as well as protecting households from financial risks (WHO, 2000). However, making the choice for healthcare service provider accompanied with the utilization of healthcare service is a complex and complicated process especially for the poor. Considering the perspective of global child health concern, there is an increasing need to estimate whether health insurance has supported a better usage of child healthcare. Exploiting findings from different studies, this chapter highlights disconcerting scenarios and presents a brief overview of publications on how health insurance—especially public health insurance—contributes to healthcare utilization exclusively for children.

2.1 Health Insurance Model in Ghana

Universal Health Coverage (UHC) is well-defined as guaranteeing that all persons enjoy equal access to basic health services – which can include avoidance, advocacy, treatment, and reformation – of satisfactory merit to be operative while making sure that using these services does not render the user to monetary adversity (WHO, 2000). Therefore, it is imperative that all people desire to receive quality and affordable healthcare. This ambition has in recent years stimulated requests for UHC which resulted into a global UHC campaign. The determination directed the World Health Assembly in 2005, to invite governments to "develop their health systems, so that all people have access to services and do not suffer financial hardship paying for them" (Giedion, Andrés Alfonso, & Díaz, 2013).

The crusade impelled the United Nations General Assembly in December 2012, to appeal to governments to "immediately and significantly step-up efforts to accelerate the

transition towards universal access to affordable and quality healthcare services" (Somanathan *et al.*, 2014).

Currently about 30 developing countries including Ghana are executing the programs intended to improve the evolution of UHC, whiles other low/mid-income nations are taking into account the move to implement similar programs.

Different countries have attained the UHC using diverse methodologies and varying health systems. Annear *et al.*, (2007), indicated that there are three basic characteristics that contributes to advancing towards the UHC. To start with, a political pledge must exist to establish systems which will help in intensifying access to healthcare, increasing equity and merging fiscal risks. Secondly, the expenditure on health needs should be increased to help expand the acquisition of more health services for all people. Finally, they indicated that, the proportion of health outlay must be upraised and merged to prevent reliance on households' out-of-pocket payments (Annear *et al.*, 2007).

Considering the thrust in support of the goals of the UHC, many countries on a global scale have embraced UHC as their national approach to which they have advanced toward the aim of affordable access to basic healthcare services.

2.1.1 Health Insurance Model in Ghana

Taken into account the intent of accomplishing the UHC by providing healthcare to all through the removal of cost which serves as a major impediment to healthcare, the government of Ghana, in August 2003 introduced the National Health Insurance Scheme (NHIS) by an Act of parliament (Act 650, Amended Act 852). This is one of the few attempts to introduce the Health Insurance model on a national scale in the sub-Saharan region (Kirigia et al, 2006). Before the introduction of the NHIS, user-fees were the core source of payment to access healthcare in Ghana – which was termed, the "cash-and-carry" system. Gwatkin, (2000) and Yazbeck, (2009) in their study found that, this system subjugates people of the low-income and

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prevents them from accessing healthcare services when needed (Gwatkin, 2000 and Yazbeck, 2009).

An all new-founded National Health Insurance Authority (NHIA) was however authorized "to secure the implementation of a national health insurance policy that ensures access to basic healthcare services to all citizens" (NHI Act, 2003). The NHIA was mandated to license and regulate what was called the District-level Mutual Health Insurance Schemes (DMHIS) permitted under the Act. Accreditation is provided by the NHIA to providers, and they also decide—with the help of DMHISs—premium levels, and usually supervises all NHIS functions (NHIS Act, 2003).

The mode of the NHIS do not in any way endeavor to treat all ailments experienced by the indemnified. The scheme provides a distinct benefit package established by Legislative Instrument 1809 which the NHIA determines to cover 95 percent of diseases which 'commonly' affect the Ghanaian population (Witter and Garshong, 2009).

Some of the common diseases covered by the scheme are malaria, diarrhea, upper respiratory tract infections, emergency care like road accidents etc. It also covers outpatient services like diagnosis testing, oral healthcare, all maternity care services – which includes caesarean deliveries, as well as drugs enlisted by NHIA. However, the package excludes diseases like cancer (but includes breast and cervical cancer), transplanting of organs, cosmetic surgery, dialysis and other forms of extensive surgeries are not covered under the scheme (NHIA, 2018).

All Ghanaians, by Act 650 Section 31, are necessitated to sign up onto the NHIS or any private health insurance plan. Nevertheless, in effect enrollment is voluntary because a person is not penalized by law for not enrolling. Which also implies that the enrollment onto the scheme is not automatically done. All prospective enrollees are obligated to visit their local

NHIS office in person, complete a digital registration form and make a small token of payment as registration fees—in addition to the premium —for the process to be completed.

According to the NHI Regulations, (2004) about 60 percent of subscribers on the scheme pay only a registration fee but not premiums. This set of people according to (NHI Regulations, 2004) include;

- The "marginalized poor" or indigents - considered to be a person who is without work and no noticeable source of income, no secured place of accommodation, and not living with an employed person with a permanent home

- Children under 18 years whose parent or guardian is enrolled;

- Adults over age 70;

- Categories of differently-abled persons; and

- All pregnant women (National Health Insurance Regulations, 2004).

People who do not fall under the exemption criteria are require to contribute an annual premium together with the basic registration fee. The NHIA guidelines sets the fee for the premium payment. This was meant to be charged with reference to income level, which ranges from Gh¢7.2 (Ghana cedis)—equivalent to US$1.44—for the 'very poor', to Gh¢48 (Ghana cedis) —equivalent to US$9.63—for the 'very rich' (all values calculated in 2018 exchange rate of United States Dollars). However, considering that the measure and data for accurate income in Ghana is not generally available, the scheme has moved to charging constant premium ranging from Gh¢10 to Gh¢24—equivalent to USD$2.01 and USD$4.81 respectively— on all non-exempted subscribers (National Health Insurance Regulations, 2004).

Data from the NHIS registration provided by the NHIA depicts an increase in enrollment since the insurance scheme was fully operationalized in 2005. The total number of active enrollees was 2.4 million as at 2006 and increased to 11.1 million during 2009. With reference to the national population during the same year, this suggest about 50 percent of the

population were insured. The method of computing operating members in the scheme was recently changed and the projections made in the NHIS 2010 annual report indicates that 34 percent of the population were active subscribers before the year end 2010 (NHIA, 2010).

2.1.2 Health Insurance Membership in Ghana as at 2008

The Figure 1 below displays the categorization of registered members of the NHIS as at the end of 2008 from all the 10 regions in Ghana. The largest category constitutes children under 18 years, representing 51 percent of the total registered membership. The 49 percent left constitutes both adult men and women from all other categories as described in the chart below. Reports based on the official statistics from the NHIS enrollment provided by the NHIA indicates that there has been a rise in enrollment since full operations of the NHIS began in late 2005. Children under 18 years constitutes greater part of the registered members basically because a registered adult in a household is allowed to freely and automatically enroll all children under 18 years in the household without a premium. To avoid duplication of counts, the scheme explains that the description of indigents in this chart supersedes all other level of categorization, the criteria for indigents is considered before any other categorization.

Figure 1:Distribution of Cumulated Registered Members by Category
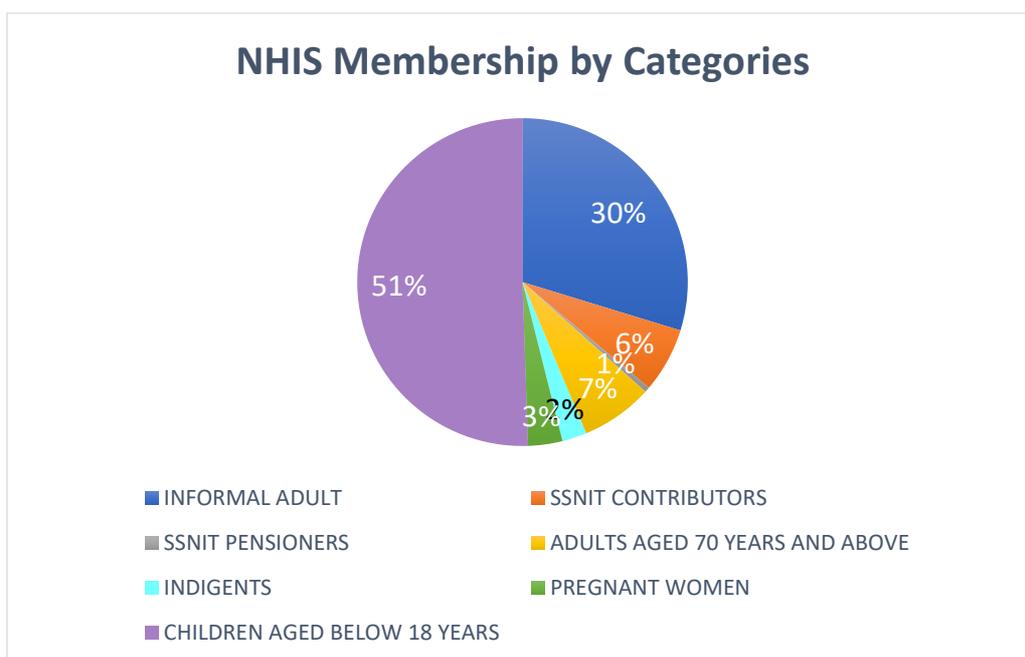
Source: Reproduced from NHIS Annual Report 2009

2.2 Overview of The Health System and NHIS Financing in Ghana

The Ghanaian health sector is predominantly funded via traditional sources: The Government of Ghana (GoG) finances the scheme by the use of public tax, revenues from private establishments and households on out-of-pocket expenditures, and donor support from overseas partners. The NHIA under the Ministry of Health (MOH) is tasked by law to manage the National Health Insurance Fund (NHIF). Below are the major sources of funding to the health sector put together by Yankah, (2009);

a.   Tax-based funding. This comes via National Health Insurance Levy (NHIL). There is a 2.5 percent value added tax (VAT) imposed on designated goods and services. The GoG supports the fund through yearly fiscal allocations suggested and sanctioned by parliament.

b.   Social health insurance levy. Employees and employers are taxed a compulsory premium of 2.5 percent through the Social Security and National Insurance Trust (SSNIT) depending on the employees' income. Members of the society with income below the poverty line as well as children are insured by the use of the "government's subsidy for specific subjects".

c.   Accumulations from investing extra funds kept in the NHIF by the National Health Insurance Council (NHIC) are also handed to support the health sector

d.   Premiums/contributions paid by NHIS subscribers

e.   Private health insurance. This scheme mostly integrates an element of costs for profits which is typically different from the NHIS. Premiums are usually based on a person's health risk, for instance, older citizens and individuals with persistent diseases are mostly charged extra premiums on the average.

f.	There are also the out-of-pocket expenses, made by individuals to the health service providers when they patronize healthcare without any form insurance (either private or public insurance).

g.	External funding sources like foreign aid and loans are also sources of financing benefited by the health sector.

Below is Figure 2 which further illustrates the flow of health financing in Ghana.

Figure 2: Current Overview of Health Financing in Ghana
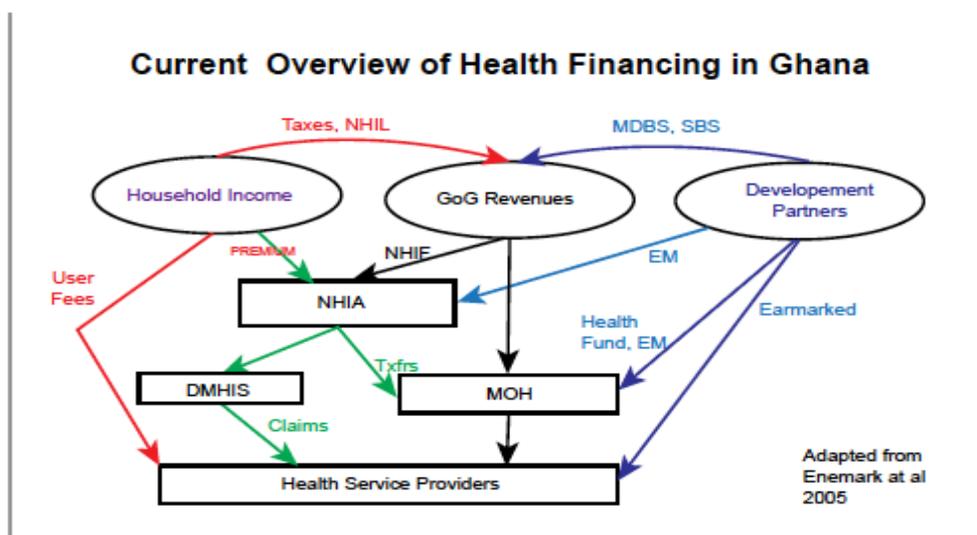
Source: (Ghana Health Financing Strategy, MOH 2015)

2.3 Factors Related to Health Insurance Coverage

Several studies from literature have recognized various socio-economic and demographic features like age, income, family composition, educational level and employment to be elements correlated to the variation in health insurance coverage in a country.

Using a sample from the American population, Abdel-Ghany and Wang, (2001) explored the factors associated to the different aspects of health insurance. The National Health Interview Survey of 1996 which observed a sample of 31,527 offered detailed data on demographic characteristics such as health status, age, education, work status, type of occupation and whether or not they used some insurance. Among the sample, there were

22,970 insured with health insurance, 4,597 were partly insured whereas 3,960 were without insurance. The study found significant correlations amongst demographic dynamics and health insurance. There was positive correlation between educational level and full coverage of insurance. It further explained that households with members who attained a minimum educational level of high school were 1.6 times more probable to be totally protected with insurance and 1.24 times more likely to be partly insured than families who had none obtaining at least high school education. Households with individuals attaining higher education like college were 1.88 times more likely to obtain a full insurance package than their counterpart who had just high school education (Abdel-Ghany and Wang, 2001).

Similar findings, as expressed by Abdel-Ghany and Wang, (2001), were found by Diane (1998) amid educational attainment and health insurance sign-up. These results were found from the America National Medical Expenditure Survey of 1987 (Diane, 1998). Results from Paulin and Dietz (1995) using the Consumer Expenditure Survey was similar, here, uninsured families generally had lesser educational background as compared to the insured (Paulin and Dietz, 1995). Chankova et al (2008) supported the argument with their findings from a survey made in Ghana, Senegal and Mali on the impact of mutual health organizations (Chankova *et al.*, 2008).

The number of children in a family was found to be a factor which correlates health insurance coverage by Abdel-Ghany and Wang (2001). Households who have children with ages between 6 and 18 as well as households with children below age 6 were more likely to obtain full insurance coverage with 1.2 and 1.44 times respectively more than those without children.

Further, Abdel-Ghany and Wang (2001) found no statistically significant correlation amid individuals who evaluated their health status as very good to those who evaluated their health status as bad (Abdel-Ghany and Wang, 2001). However, this opposed the findings of

Chankova *et al.* (2008) who found in Senegal that the households who reported that they had an outstanding health status were less plausible to acquire a health insurance than those who indicated their health status was below standard (Chankova *et al.*, 2008).

From the 1996 America National Health Interview Survey, Abdel-Ghany and Wang, (2001) again discovered about 70 percent of families had an individual who is self-employed and enrolled under a health insurance. Meanwhile 86 percent of households with a member who is a government worker, were likely to be insured under a full insurance (Abdel-Ghany and Wang, 2001). The differences observed between the income level and the level of confidence placed on the two types of employment are the possible explanations to this situation. This is further explained by Chernew *et al.*, (2005) that a person who is self-employed may have an insecure flow of income and therefore may have difficulty in committing the little earning to an insurance package (Chernew *et al.*, 2005).

Another factor that correlates health insurance coverage is age. Abdel-Ghany and Wang (2001) reported that households with an individual between the ages of 25 to 44, 45 to 64 years as well as above 65 years were more likely to have full insurance coverage (this is an approximation of 1.7, 2.9 and 14.4 times respectively), a bit more than households with individuals below 25 years. Chankova *et al.*, (2008) found a similar result in Ghana and Senegal. This acknowledges the discernment that the aged has a high probability of getting sick than the youthful and therefore people from especially low-income families require health insurance to protect them against financial peril, creating a positive association between age and health (Chankova *et al.*, 2008).

Lavarreda, *et al.*, (2008) used the 2003 California Health Interview Survey to examine the factors correlated with discontinuous health insurance coverage. They found that kids from higher income families and between the ages of 0 and 5 had discontinuous insurance. Adults who had discontinuous insurance were also more probable to be part of higher income

households, working in full-time jobs, or be a female within the age range of 25 and 44 years. The adults and children who are not insured under this category were more probable to have good health status than the entire populace (Lavarreda *et al.*, 2008).

A few country specific studies have been carried out in Ghana. A study by Dzakpasu *et al.*, (2012) conducted on the impact of the NHIS deduced an improved facility delivery by pregnant women in the Brong Ahafo Region mainly amongst the low-income households (Dzakpasu *et al.*, 2012). Pursuance to Mensah *et al.*, (2010) people insured under the national health insurance in the Upper East and Brong Ahafo Regions of Ghana were more likely to utilize Ante Natal Care (ANC) as well as have a delivery in health facility. Furthermore, the analysis also acknowledged enhanced birth outcomes with a reduction in child mortality amongst the insured as compared to the uninsured. A previous evaluation of the NHIS on maternal delivery care exemption from 2004–2006 by Mills *et al.*, (2008) in the Northern part of Ghana discovered that women who had knowledge that there was no financial cost for delivery care had a higher probability to use a health facility for delivery as against those who had no knowledge (Mills *et al.*, 2008).

The findings from the studies discussed earlier explored associations that exist between health insurance sign-up as well as social and demographic factors like the educational level, employment and age. The holistic view of these factors is moderately stable other than the premiums paid on health insurance. In Ghana, factors such as individual perception of risk and attitudes towards health insurance which are reported in some international literature have not been observed and analyzed in the Ghanaian context. The use of data from secondary sources like those extracted from the Demographic Health Survey (DHS) could be a possible reason, because the data source included just individuals and household level social and demographic characteristics. However, an exclusion to this was a study carried out by Singh *et al.*, (2015) using a baseline quantitative and qualitative analysis of Maternal and Newborns Evaluation

from the North and Central Regions of Ghana. This data was used to describe the experiences of insured women under the NHIS and the relations amongst insurance and skilled facility delivery, ANC and timely healthcare seeking for ill children (Singh *et al.*, 2015). The study however discovered some reasons for the enrollment onto the health insurance as:

(a) Health insurance creates some fortification against financial risk at the time the individual is found sick.

(b) Some people consider health insurance as a one-way ticket to good healthcare

2.3 Health Insurance Coverage and Health Service Utilization

Individuals who are officially insured under the health insurance do not always make use of the insurance service to enjoy its benefits of accessing healthcare. Some studies have identified reasons why this could be the case.

In a study modelled on the Vietnam Household Living Standard Survey 2006, by Sepehri *et al.*, (2009), factors affecting the use of health insurance benefits were assessed on individuals and households. It was found that factors like age, gender, place of residence and the number of individuals who were sick in a household were not significantly correlated with obtaining healthcare. Nevertheless, single or unmarried individuals were twice less likely to access the benefits of insurance as compared to married people. Uneducated people were 9.5 times more plausible to utilize insurance packages when accessing in-patient healthcare than people with just basic education. The outcome might reveal an opinion possessed by the educated that they may be served with less quality healthcare service on the basis of having health insurance (Sepehri *et al.*, 2009).

Sepehri *et al.*, (2009) again identified that access and use of insurance packages also varied among diverse health facilities. People were 1.7 times more likely to visit district hospitals with health insurance when accessing outpatient and inpatient care and 1.6 times when using provincial and central hospitals. However, the probability of utilizing insurance

packages for outpatient and inpatient services improved with patients who experienced severe ailment fairly than injury and or preventive care services. Membership duration was also a factor that influenced a rise in the use of insurance benefits (Sepehri *et al.*, 2009).

Another significant association found by Sepehri *et al.*, (2008) was between households' characteristics and adult health seeking behavior in Vietnam. People classified under the compulsory insurance were twice likely to obtain healthcare with the insurance than the uninsured. Other factors related to healthcare seeking behavior were gender, age and education. Females were 20 percent higher in seeking healthcare than males. But the gender difference decreases as the age increases. In addition, educational level correlated with the utilization of health insurance for people who had primary, secondary and post-secondary education becoming 1.3 times, 1.5 time and 1.7 times, respectively, more likely to pursue healthcare as compared to individuals with zero educational background. Household characteristics were also factors that influenced the use of healthcare services. High income households had a higher likelihood to utilize health services as compared to the low-income category. People residing in rural areas showed 20 percent less likelihood of visiting a health facility for healthcare than people living in the urban areas (Sepehri *et al.*, 2008).

Considering the Ghanaian context, healthcare utilization has been discovered to be very perceptive to the quality of healthcare, so much that the demand for health services is low for households when the quality of healthcare is presumed poor (Alderman, 1996 and Lavy, 1994). This makes people bypass facilities with low quality services to others with high quality services without taking distance into account (Klemick *et al.*, 2009 and Andaleeb, 2001).

There has not been a definite or general definition of health quality. But some literatures have defined it according to specific settings with its intent. Other literatures describe quality as "excellent performance", while some define it based on "client satisfaction" or probably "meeting clients' needs" (Bakan *et al.*, 2014 Thanh, 2013). However, there appears diverse

means to describe and measure the quality of healthcare (Ward *et al.*, 2005). It was further explained by Ward *et al.*, (2005) that, '*measures*' mainly denotes two features of '*care*', which are technical and functional. Where 'technical quality of care' is the degree to which the care meets some laid down principles and professional guidelines. 'Functional quality of healthcare' also denotes the experience with healthcare as observed by users/patients (Ward *et al.*, 2005).

The generally acknowledged clarification that opinion about high-quality healthcare affects healthcare utilization including insurance subscription assents that, perceptions are not dependent on insurance status. That is, as soon as one is insured, they may consider the quality of their healthcare as below standard conditional considering the processes at which health service delivery was experienced. This could be as a result of limited satisfaction they have with the service delivery processes to the insured. (Fenenga *et al.*, 2014 and Bruce *et al.*, 2008).

In Ghana, some researches have been carried on patient satisfaction of healthcare quality. One study conducted by Duku *et al.*, (2018) established that health insurance status is necessary considering the view of the non-technical quality of healthcare in the country. Results of the study showed that the viewpoint held by people about the quality of healthcare could be molded by their real acquaintances at the health facilities, with these experiences varying based on whether or not they have insurance. People who have insurance but witness longer waiting time and are given ordinary drugs consider the quality of the service to be below standard, whereas people who are not insured but paid cash for prerequisite drugs they need and also spend lesser waiting time at the facility assess the quality of the care they experience to be comparatively high (Duku *et al.*, 2018).

This implies that the levels of enrollment in the NHIS are low due to the fact that the quality of service is considered to be low for the individuals with insurance as comparative to the uninsured who make direct cash payments before experiencing healthcare service. The less satisfied insured individuals may drop out of the scheme because they consider themselves

better off without the health insurance and making direct cash payments. Meanwhile people may renew with the trust that the benefit of being protected against financial shock of making direct cash payments on healthcare supersedes the less quality of care (Duku *et al.*, 2018). It is therefore eminent that policy-makers deem it necessary to redesign and re-organize the NHIS especially mechanism provider-payment, in order to guarantee the delivery of quality healthcare for all users.

Considering child health insurance and benefits utilization, some few researches were conducted on the impact of free health insurance on children under 18 years in Ghana. Most researches were specifically on infants below age 6 years and maternal health. According to Singh *et al.*, 2015 there was a proof of an increase in timely request for healthcare for sick children based on the reports from caregivers on obtaining health services for their sick children. They further explained that though there seem to be positive correlation between Ante Natal Care visits and health insurance variables for the mothers, the results were not statistically significance. Major findings from Singh *et al.*, 2015 showed that amid the insured, there is an increased use of competent birth delivery and early care-seeking for sick children when significant household characteristics, with individual as well as community level factors are controlled for (Singh *et al.*, 2015).

2.4 Households Direct Out-of-Pocket Expenditure

Different studies have used direct cash payments on health service to measure the effect of health insurance on lower income households. A research by Akazili *et al.*, (2017) showed that, while the catastrophic payments have been recognized internationally, there is a limited results on the magnitude and impacts of direct cash payments on healthcare in Ghana. They used a data collated from 2005/2006 just at the beginning of the NHIS model of health financing in Ghana (Akazili *et al.*, 2017). Due to this, the outcomes of their study represent a dependable reference indicator for following the tendency of effects of out-of-pocket expenses as the Ghana's NHIS took off and evolves.

Direct out-of-pocket outlays include households' payouts directly made to obtain medications. Households cash expense on healthcare is considered catastrophic when the direct out-of-pocket payment is greater than the ability of the household to afford based on a standard threshold in a given year. The World Health Organization describes a catastrophic healthcare expense as health spending which accounts for at least 40 percent or more of the total non-food domestic expenditure of a hosuehold (Akazili *et al.*, 2017).

Using 5 percent of household total income as a threshold, the results from Akazili *et al.*, (2017) showed that 11 percent of households used additional 5 percent of their total revenue on healthcare services. This represents a high rate in comparison to other developing countries like Malaysia and Philippines. For instance, during 1998-1999, there were barely 7 percent of households in Malaysia spending an extra 5 percent of their household revenue on out-of-pocket expenditure on healthcare. Considering the same year less than one-tenth of households in Philippine expended more than 5 percent of their total household earnings on health service (Wagstaff and van Doorslaer, 2003) and (van Doorslaer, 2007). On the other hand, Ichoku and Fonta, (2009) carried out a study on the catastrophic healthcare financing in Nigeria and the results showed that 39 percent of households showed an out-of-pocket healthcare expense being an extra of 5 percent of their total household earnings (Ichoku and Fonta, 2009).

Based on the above results, without health insurance it is showed that the out-of-pocket expenditure for a person can exponentially escalate to about 75 percent of the household's monthly non-food spending. Undoubtedly, improving equity of access to healthcare will necessitate an increased in government' health expenditure by increasing the coverage of health insurance to enable a reduction in direct out-of-pocket expenses for households and individuals (Thanh *et al.*, 2010).

Lagomarsino *et al.*, (2012) who did a study in some developing countries on health insurance reforms further stated that health insurance contributes to about 1 to 6 percent

decrease in out-of-pocket expenditures, where it is 2 percent in Kenya, India and Indonesia, 6 percent in Vietnam, 3 percent in Mali and Nigeria (Lagomarsino *et al.*, 2012).

A research by Okoroh *et al.*, (2018) also displayed results that showed that even though individuals who are insured pay considerably less compared to those without insurance with regards to out-of-pocket expense, they are sometimes faced with the probability of catastrophic expenses at the point of healthcare. Examining their study, they acknowledged that 6 to 18 percent of the insured made catastrophic expense, which appears to be an issue worthy of noting as majority of the findings were reported on low economic areas in Ghana (Okoroh *et al.*, 2018).

2.5 Modeling the Factors Impacting Health Insurance Uptake and Utilization by Households with Children

The factors associated to the implementation of health insurance to subsidize health expenses by the majority as well as the utilization of its benefits is multifaceted. Nonetheless, they can be summarized based on the above literature into the model displayed by Figure 3 below. This model portrays four major groups of dominant factors as indicated below;

(a) Households' characteristics

(b) Characteristics of children in low-income households

(c) The low-income households' knowledge and attitude about health insurance

(d) The perception of the poor about the functional quality of healthcare provided under health insurance in comparison to direct cash payment for children.

Figure 3: The Factors Associated to the Impact of Health Insurance on Children
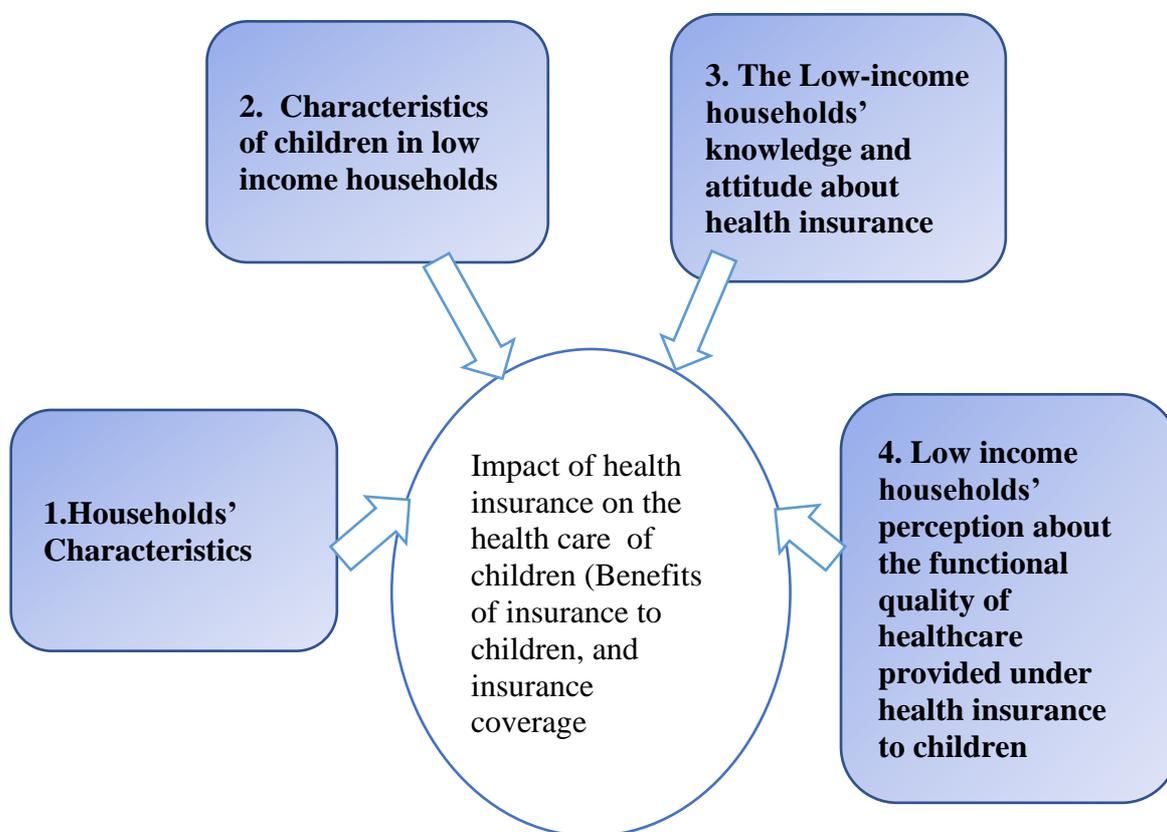
There have been a few econometric publications that have used different statistical models and designs to ascertain the effect of health insurance on healthcare access and use for children. However, most of the variables identified to affect the enrollment and use of health insurance have a higher correlation – for instance, education and household income. Therefore, it is essential to consider the approaches used by different researchers to tackle the issue.

A fixed-effect model was used on panel data by Wagstaff and Lindelo (2008) to assess whether health insurance schemes have the propensity to escalate the financial risk of Chinese households (Wagstaff and Lindelo, 2008). A similar tool was used by Sepehri *et al.*, (2006) to evaluate whether the Vietnamese public health insurance could help reduce risk to household's finance (Sepehri *et al.*, 2006). Ordinary Least Square (OLS) method has been applied on cross-

sectional data by Jowett *et al.*, (2003) to examine the effect of public health insurance on private health payments in Vietnam (Jowett *et al.*, 2003).

More so, Dubay and Kenney (2009) used the difference-in-difference (DID) approach with an Instrumental Variable (IV) to evaluate the effect of health insurance scheme on children' insurance coverage among America households by exploiting a panel data (Dubay and Kenney, 2009). However, these models are all not applicable in all context due to inadequate resources and absence of baseline data. Chapter three of this study therefore explains the model use to evaluate the effect of health insurance on children healthcare utilization by applying the Propensity Score Matching (PSM) approach.

CHAPTER THREE

RESEARCH METHOD

3.0 Introduction

The theoretical context for evaluating the effect of the NHIS program on children's healthcare utilization builds on a model of zero-cost of health insurance for children below 18 years with a registered parent or guardian. This assertion is based on the premise that parents take into consideration the various factors in relation to diverse health insurance opportunities open to them before undertaking an insurance to benefit their children. Beside the free nature of the insurance to children in Ghana, some of the factors and variations that affect parents' choice and consequently their utilization actions are the cost value of health insurance, income available to households and household preferences, each of these are hypothesized to affect the insurance enrollment. This chapter however, covers the method used for assessing the elements that influence healthcare choice and service utilization for children.

3.1 Data and Method

Considering the bias of self-selection into the health insurance program, the statistical model chosen to assess the impact of insurance on children' health utilization is the propensity score matching method.

3.1.1 Description of Data

This study relies on the Demographic and Health Surveys of Ghana (DHS) conducted in 2008. This data was collected by the Ghana Statistical Service (GSS) with the Ghana Health Service (GHS) providing technical assistance. The sampling frame for the 2008 survey was according to the GSS, 12,831 households. This sample frame was informed by the sample adopted from the 2000 Population and Housing Censuses (PHC) of Ghana. Seasonal and institutional populations, for instance, persons living in hotels, security barracks, as well as prisons were omitted from the sampling frame. The sample was structured in such a manner

that will enable the estimation of fundamental indicators for all the 10 regions in Ghana, whiles allowing for urban and rural estimates respectively.

The DHS data for 2008 contains consistent information on demographic characteristics of households, employment, education, income, expenditure, housing, households' involvement in poverty alleviation programs, and data on health indicators, child health indicators as well as health insurance coverage. Respondents' out-of-pocket expenses on health treatments, healthcare utilization, as well as the number of healthcare access during the 'past 12 months' before the day of interview for all households in the sample were gathered.

The DHS data used in this study followed a two-stage sample frame and was strategized to enable estimations of relevant indicators at the national, regional as well as district levels. The initial phase was the selection of the sample points termed as clusters, which comprise of enumeration areas (EAs) defined under the 2008 PHC. Systematic sampling of households was then carried out at the second stage, where there was listing of households in all the chosen EAs and households were randomly selected to be surveyed. Each cluster was made to consist of 30 households. Women who were between the ages of 15-49 and men who were between the ages of 15-59 and were all permanent occupants of the selected households were eligible for the interview.

The dataset is publicly available and was acquired via the Demographic Health Survey program online platform. The anonymity of the data was kept, with no information that can be used to identify survey participants.

3.2 Description of Variables

3.2.1 Dependent Variables

The key variable of interest in this paper is the health service utilization of children under 18 years of age. Exceptionally, the status of insurance of household heads during the period of the survey period considered. As part of the survey, respondents were required to provide information on the coverage status of all household members at the time of the

interview. This is mainly due to the fact that children below the age of 18 are covered under the adult' (parent or guardian) national health insurance registration/enrollment.

Children's healthcare utilization is the main outcome of interest. Healthcare use is computed by the number of yearly access to healthcare by an individual– this specifically includes, general health examination, hospital or clinic visit, spent a night at the health facility, and or taking prescription. However, the main hindrance in evaluating the effect insurance on children' healthcare is the endogeneity factor associated with enrollment. Because it is possible for parents who prioritize their kid's healthcare to be more likely to acquire insurance to secure their children against any catastrophic incident and also take their wards to the medical center as often as possible for check-up or healthcare when they are sick.

3.2.2 Independent Variable

Health insurance coverage is classified as the key independent variable in this study. As part of the data collected by the DHS, respondents were asked whether or not they were covered by insurance (which is expected to automatically cover the children under age 18 in the household) and the type of insurance under which they were insured. There exist a range of health insurance systems in the country that may differ according to the variety of services they offer with diverse effect on the utilization of healthcare. Due to data limitation, it is almost impossible to distinguish between the various kinds of health insurance. Nonetheless, the results presented here are grounded solely on the National Health Insurance scheme in the country as described in Chapter Two.

3.2.3 Covariates

A number of characteristics of children and their households that has the possibility of causing a confounding effect on a child's healthcare seeking were controlled. Based on theory and with reference to Borghi *et al.*, (2006), factors such as finance, education and geographical settings contribute to shaping child health utilization (Borghi *et al.*, 2006). The selection of covariates in this study was restricted to the variables captured by the DHS 2008.

The variables which were controlled for include, educational level of household head, household head marital status, household income, employment status and geographical location of the household. Due to the basic fact that location or place of residence can have effect on both healthcare services and access to health insurance, regional dummies and an account of whether or not the household lives in an urban or rural area was created.

The educational status of household head was a self-reported account which reflects the highest educational attainment during the survey period. The analysis here makes use of the educational status of the household head classified into four groups, which are; no education, primary education, secondary education and higher education. For marital status of parents during the survey period, the coding was expressed as; formerly married, presently married and never married. However, the coding for the employment status was a dummy including all paid and in-kind work on family farms and all forms of family businesses.

All these variables were chosen because they are unrelated to accessing health insurance – the exposure to treatment – but are fairly related to healthcare utilization (the outcome). The inclusion of these variables can therefore boost the accuracy of the estimated treatment effect without escalating bias. On one hand, integrating variables that are associated to health insurance – the treatment – but not related to healthcare utilization will reduce the accuracy of the estimated treatment effect but minimizing bias.

3.3 Statistical Method

For this analysis, the propensity score matching (PSM) approach is applied to assess the impact of health insurance coverage on children's use of healthcare services.

As defined by Rosenbaum and Rubin (1983), PSM creates groups that can be statistically compared, centered on a model of likelihood of being a part of the treatment group through the use of observed characteristics. The treatment and control are therefore matched according to the derived score (Rosenbaum and Rubin 1983).

There is a high likelihood that the tendency to acquire health services is correlated with the factors that influence enrollment into health insurance. This, therefore introduces bias because of the observed and unobserved heterogeneity. In matching a set of participants to non-participants that are similar in, especially, their likelihood to participate in the program or intervention, propensity score approach addresses selection bias because of the observed heterogeneity. Whereby the pool of observable characteristics named, X, are not dependent on allocation to treatment.

The PSM approach established by Rosenbum and Rubin (1983), has been widely applied in diverse evaluation studies. Since the observations which have comparable propensity score are expected to share similar distributions of covariates, the PSM method matches the tendency to be part of treatment based on the score, which is quite unlike other methods that match the covariate X (Mocan and Tekin, 2006). In other words, it is used to mimic the idea of randomization when it is almost impossible to randomize the treatment.

The mean difference in results amongst the control and treatment groups depending on the propensity scores is therefore the Average Treatment Effect (WB, 2010). This is expressed below as:

$$\tau_{ATE} = E\,(\tau) = E\,[Y_{(1)} - Y_{(0)}]$$

Nevertheless, the most adored metric used is the Treatment effect on the Treated (TOT), because this estimates the differences in outcomes based on receiving the program/treatment compared to not receiving the treatment/program for a subject *i* which is selected at random from the treatment sample. Typically, the TOT is given by:

$$\tau_{TOT} = E\,(\tau \mid D_i{=}1) = E\,[Y_{i(1)} \mid D{=}1] - E\,[Y_{i(0)} \mid D{=}1]$$

$$\tau_{TOT} = E[Y_{i(1)} - Y_{i(0)} \mid D_i = 1]$$

The TOT therefore expresses the average differences between the expected outcome values of a subject *i* participating and subject *i* not participating.

According to Rosenbum and Rubin (1983), the validity of PSM is conditioned on two assumptions which are the; (a) conditional independence – this ascribes that participation is unaffected by the unobserved factors or characteristics – meaning, assuming a group of observable covariates X that are unaffected by treatment, prospective outcomes *Y*, are independent of the assignment to treatment D_i. and; (b) sizable common support or overlap in propensity scores across the treated and non-treated groups (Rosenbum and Rubin, 1983).

For this study, the insured are regarded as the treated group and those otherwise is the control. The control group is created based on the use of observable characteristics within a pool observation.

3.3.1 The Propensity Score Estimation

The initial phase of applying the PSM is by estimating the propensity score, and in this case the logit regression model was adopted, due to the outcome being binary (indicating whether or not a person is insured). Defining the covariates to be used in calculating the propensity score was also done at this stage. The strategy for the matching stems on the conditional independence assumption which necessitates that the outcome variable should not depend on the treatment, conditional on the propensity score. Based on the work of Rosenbaum and Rubin, (1983) the conditional independence assumption states that $(Y_{iT}, Y_{iC}) \perp D_i | P(X_i)$ (Rosenbum and Rubin, 1983). Since the counterfactuals ($Y_{i(1)}$ for $D_i = 0$ and $Y_{i(0)}$ for $D_i = 1$) used to calculate the TOT cannot be observed directly, it was assumed conditional on the observed characteristics X_i, that the choice to enroll onto the insurance does not depend on seeking healthcare.

Heckman, *et al.*, (1997) argued that excluding significant variables stands the chance of increasing bias in the final estimates (Heckman, *et al.*, 1997). Therefore, variables that concurrently stand the chance of correlating the decision to participate and the outcome

variable are considered. Also variables that are not affected by the participation – for example, variables that are observed before the treatment or are fixed overtime – will be added to the model (Caliendo and Kopeinig, 2005). Adding variables that are unrelated to the outcome variable will contribute to violating the common support assumption.

The variable selection here is guided by the literature of Caliendo and Kopeinig, (2005) from the theory of implementing the PSM. This theoretical approach is adopted considering the DHS data at hand. Dropping a variable was based on the variable not correlating with the outcome variable as well as the treatment variable. Therefore, the propensity score estimate was based on children who visited any health facility for healthcare or sort for professional health service (including general health examination, clinic/hospital visit, spending a night at the hospital and or using some medical prescription) in the previous 12 months before the survey.

3.3.2 Balancing Test

According to Becker and Ichino, (2002), fulfilling the balancing property determines the recoding of covariates, this implies that the mean propensity score of treatment and control should not be very different per group (Becker and Ichino, 2002). Nevertheless, in the quest to fulfill the balancing property, a number of the propensity score estimation was repeated where the variables were recoded.

Additionally, the common support condition was implemented to better improve the quality of the matching. Executing the condition of the common support, ensured that each observation in the treated group (i.e. an insured household) is tallied to a matching control observation (i.e. uninsured household). This approach on the other hand can lead to forfeiting some of the sample as according to Lechner (2001), due specifically to excluding cases where the propensity score is larger than the maximum score or very less than the minimum score in the comparable group (Aggarwal, 2010). A situation like this has the chance of causing

misleading results (Caliendo and Kopeinig 2008). However, a smaller caliper radius was applied to minimize this situation.

3.3.3 System for Matching and Estimating the Impact of Health Insurance

There are several matching devices that can be used in creating the comparison group to be used in constructing the counterfactual outcomes of treatment effects. None of the methods has been classified as superior over the other but each method has different tradeoffs in terms of quantity and quality of results due to the different ways they are applied (Caliendo and Kopeinig, 2008).

However, three fundamental matching methods were employed here. Initially, the simple propensity-score matching was used. Here, the matches were constructed based on estimated conditional likelihood that given covariates **X,** observations are considered part of the treatment group. In order to report the estimated treatment parameters, the standard errors were adjusted and the caliper limit was set to 0.11, as also considered by Abadie and Imbens, (2012). Furthermore, the nearest neighbor matching was adopted. Matches here were made based on control units that highly resembles the treatment considering the covariates **X** and the use of a weighted function (Abadie and Imbens, 2006). The standard errors calculated and used by Abadie and Imbens, (2011 and 2012) were applied, because the traditional bootstrap method is presumed not to yield valid estimates. Lastly, the nonparametric kernel matching estimator was estimated (Heckman, Ichimura, and Todd, 1997).

The STATA commands *teffects* and *psmatch2* were applied to estimate the Average Treatment Effect by using different algorithms which lead to the selection of the one that yields the preferred match. The matching systems below were put to test, that is; the nearest neighbor with and without replacement with the radius matching within different calipers. The STATA command *teffects* and *psmatch2* accounted for additional variance when estimating the propensity score.

3.3.4 The Quality of the Score Matching

As discussed earlier, in order to determine the quality of the matching to confirm that the allocation of the covariates between the control and the treated groups are similar, different measures were deployed. The command *ptest* in STATA 14 summarized and balanced the covariates between the treatment and the control group pre and post matching. The standardized pseudo-R^2 was also produced, with the likelihood ratio test for joint insignificance and the results of the t-test, indicating the quality of the match. Caliendo and Kopeinig, (2008) indicates that a standardized bias is considered satisfactory if it ranges between 3 to 5 percent after the matching. They, (Caliendo and Kopeinig, 2008), further explained that Pseudo-R^2 depicts the degree to which the covariates explain the likelihood of getting treated, where a lower R^2 shows a sufficiently good match. Under the logit model, in order to show a quality matching, the likelihood ratio test of joint insignificance does not needs to be significant at the post-matching (Caliendo and Kopeinig, 2008).

In this study, the matching technique which formed the dominant quality matching was adopted, and reports were structured based on the results and the standardized bias, pseudo-R^2, the likelihood ratio test for the joint insignificance as well as the sample t-test. Chapter four therefore describes the results obtained.

CHAPTER FOUR

RESULTS

4.0 Introduction

The levels of health insurance coverage of all the regions in Ghana are presented in this section. The section continues to examine the rates of some specific health insurance enrollments and the differences in coverage and usage based on the characteristics of respondents.

4.1 Types of Health Insurance

According to the survey protocol, respondents were allowed to account for more than just one type of health insurance they have enrolled. Different health insurance schemes were observed in all the regions across the country. Based on the 2008 sample, Figure 4 below shows the percentages of women and men enrolled in variety of health insurance in all 10 regions.

Figure 4:Percentage of Men and Women Covered by Different Types of Health Insurance
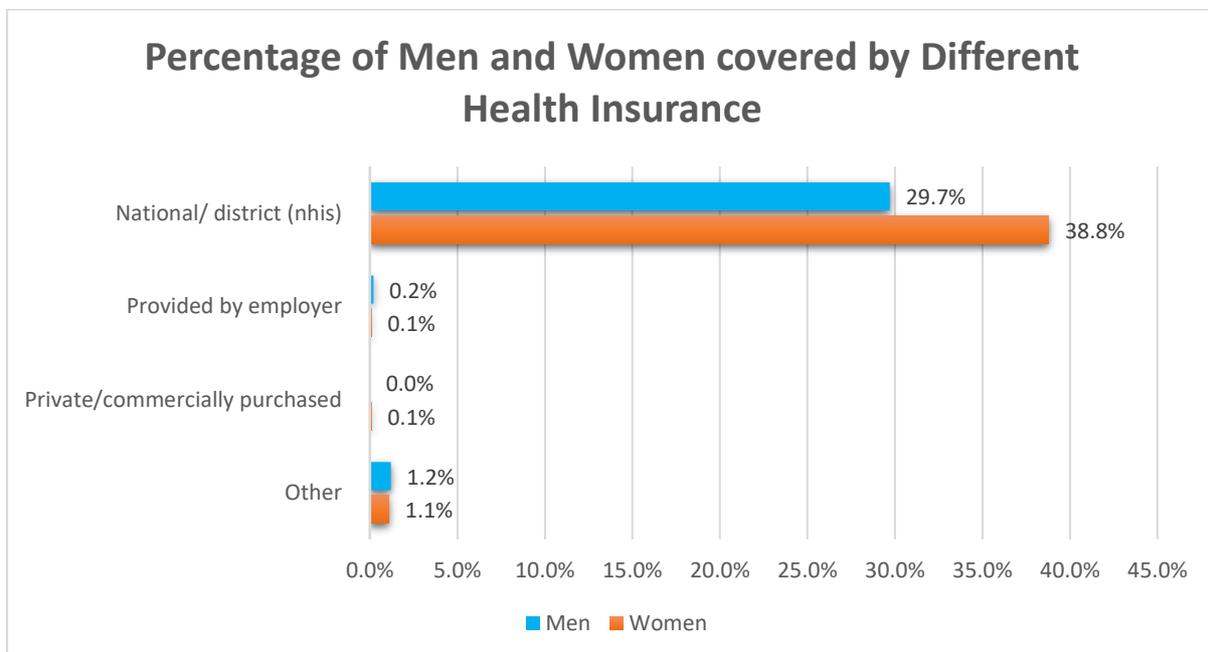
Source: Author's Construct, 2018
Note: Since the respondents were allowed to state multiple insurance schemes they were enrolled on, the sum of the percentages in figure 4 exceeds the total prevalence.

According to the data, the NHIS was the main type of coverage for both adult men and women in the country, where 29.7 percent of men and 38.8 percent of women were enrolled. Almost all registered insurance subscribers were enrolled onto the NHIS as likened to all other types of insurance. Private and employer-based insurance were rarely reported, which was less than 1 percent out of the prevalence rate in 2008. This made privately purchased insurance very scarce in the sample.

4.1.1 Descriptive Statistics

The 2008 DHS data has a total sample of 11,778 observations. However, in order to deduce the effect of health insurance, the data was reduced to households who had children below the age of 18 and were enrolled during period of the survey. Given the primary objective of the study focusing on children under age 18, the sample was first reduced to only households who had children below the age of 18. The segregation brought the sample to a total of 7,991. Which implies that, out of the 11,778 total observation only 7,991 had at least a child under the age of 18. This therefore serves as the working sample. Secondly, the sample was then divided into two with one group insured as at the time of the survey and the other group not insured – serving as the control group. Among the 7991 sample, there were 4,564 (representing 57.39 percent) who were insured – this implies a household with at least a child under 18 who had insurance. On the other hand, there were 3,389 (42.61 percent) households who had at least a child below the age of 18 but didn't have insurance. It was also found out that 0.47 percent of the sample did not respond to the health insurance question.

Among the 42.61 percent (3,389) who were uninsured, the results show that about 45.1 percent (1,528) reported that they were not insured because the premium was not affordable to them. It was followed by 32 percent (1,084) who credited their lack of insurance to the assertion that the individuals in their household barely get sick and that they do not need to insure their health. Perceived poor quality of healthcare service and distance to health facilities were some

of the reasons stated by 22.9 percent (776) of those who were not insured as what prevented their households from buying the national health insurance.

As with figure 4 above, Table 1 below shows the parentage of the insured and uninsured as at the survey period categorized by their demographic characteristics which includes marital status of the household head, age of head of household, education, employment status, household status on wealth, and place of abode – either rural or urban – as well as their region of residence.

In summary, Table 1 below shows that household heads within the age range of 36-55 were more in absolute terms enrolled onto the insurance scheme. However, in percentage terms, it is interesting to note that there is not much difference among household heads between the ages 36-55 in the two categories of enrollment.

With marital status, there is almost no disparity in percentage terms between those insured who are currently married and the uninsured who are currently married. Largely, among those insured and those who are not insured in the sample, health insurance coverage was positively correlated with educational level – for instance, the number of 'higher educational' attainment under the insured are significantly higher than that of the uninsured with 9.3 percent and 2.4 percent respectively. Surprisingly, secondary level education has the highest population for both insured and uninsured.

A contrasting situation occurs under the employment category, which is, even though the population who were currently unemployed were higher than those who were not currently employed but uninsured, the population who were currently employed but uninsured were more than their counterparts who were insured. Table 1 below shows the statistical disparities amongst the insured and uninsured using on socio-economic characteristics.

Table 1: Percentage of Insured and Uninsured According to Socio-economic and Demographic Characteristics

	Insured			Uninsured	
	N	**%**		**N**	**%**
Age					
15-35	1269	27.8		1148	33.9
36-55	2172	47.6		1609	47.5
56+	1123	24.6		628	18.6
Marital status					
Never married	145	3.2		129	3.9
Currently married	3522	78.2		2600	77.6
Formerly married	840	18.6		620	18.5
Education					
None	1402	30.7		1356	40.0
Primary	524	11.5		563	16.6
Secondary	2216	48.55		1390	41.0
Higher	422	9.3		80	2.4
Employment Status					
Not Currently employed	1374	30.1		586	17.3
currently employed	3190	69.9		2803	82.7
Wealth Quintile					
Very poor	850	18.6		1113	32.8
Poor	851	18.4		784	23.1
Moderate rich	922	20.2		611	18.1
Rich	970	21.3		508	15.0
Very rich	981	21.5		373	11.0
Residence					
Rural	2108	46.2		1082	31.9
Urban	2456	53.8		2307	68.1
Total	**4564**	**57.4**		**3389**	**42.6**

Overall, the correlation between health insurance and household wealth is positive. Households in the 'very rich' wealth quintile had the highest insurance as compared to the uninsured on the same income level. Nonetheless, among the uninsured, households in the lowest wealth quintile are greater than their insured counterparts. This depicts a clear negative correlation between households' income and the rate of insurance enrollment under the uninsured population.

Regarding the rural-urban comparison, the urban population for both insured and uninsured has the highest percentage of 53.8 for the insured and 68.1 for the uninsured.

Even though enrollment onto the NHIS scheme is considered compulsory, it is practically an individual's decision to make. Nevertheless, comparing the general use of healthcare service between the insured and the uninsured can give us an effect estimation which is biased because it is very possible that enrollment onto the NHIS scheme is motivated by other factors that equally have correlation with healthcare utilization. Propensity score matching is therefore used to identify the uninsured that have comparable characteristics as the insured based on observed characteristics (Rosenbaum and Rubin 1983).

4.2 Estimating the Propensity Score and the Quality of Matching

4.2.1 Estimating the Score

In order to come up with propensity scores as described in chapter three, three steps were taken. To begin with, a logit model was ran to measure the propensity scores because of the dichotomous outcome indicator which specifies whether or not a household head is enrolled. This can be described as the estimated likelihood of being insured based on a group of covariates. The covariates used for the matching are related to the demographic characteristics of all household heads as well as the education, occupation, socio-economic status, and region of residence.

The estimated propensity scores were then used to match the uninsured population that has similar propensity scores as those insured. Finally, the outcomes of the uninsured and the insured were matched to acquire the possible impact or effects of health insurance on the insured population. Table 2 below reports all the covariates applied in the propensity score estimates.

Table 2: Estimates of Propensity Score Model (logit)

	Full Sample	
	Coefficient	**S.E.**
Age		
15-35	Ref.	Ref.
36-55	0.53**	0.07
56+	0.2*	0.012
Marital status		
Never married	Ref.	Ref.
Currently married	0.44***	0.6
Formerly married	0.15**	0.24
Education		
None	Ref.	Ref.
Primary	0.36*	0.26
Secondary	0.65***	0.74
Higher	0.30**	0.07
Employment Status		
Not Currently employed	Ref.	Ref.
currently employed	0.43***	0.32
Wealth Quintile		
Very poor	Ref.	Ref.
Poor	0.68***	0.09
Moderate rich	0.89***	0.14
Rich	1.75***	0.27
Very rich	2.19***	0.32
Log Household size	1.68	1.55
Residence		
Rural	Ref.	Ref.
Urban	0.55***	0.04
Region		
Ashanti	0.15**	0.18
Brong-Ahafo	1.09***	0.14
Central	-0.97	0.05
Eastern	0.614***	0.2
Western	Ref.	Ref.
Greater Accra	-1.04*	0.23
Northern	0.52**	0.11
Upper East	0.23**	0.27
Upper West	1.01***	0.16
Volta	-0.04**	0.09
Log pseudolikelihood	-2.003	
N	7991	

Note: *$p<0.05$, **$p<0.01$, ***$p<0.001$

Ref. indicates the variable is a referenced variable.

It can be identified from Table 1 and 2 that the level of households' wealth has a positive correlation with enrollment onto the insurance scheme, which also appears to be significant. This could be that the premium set for the NHIS might be high for the low-income households and also other costs associated with the use of healthcare, like transportation cost, might be a barrier to the poorer population. This is a possible factor that can serve as a hindrance to healthcare utilization by children under 18 who belong to low income households.

Employment status of heads of households was also positively correlated with insurance enrollment and was statistically significant. There was a decrease in the rural-urban gap in enrollment after other covariates were controlled for. Even after some background characteristics were controlled for, difference in regional covariates stayed statistically significant.

4.2.2 Quality of Matching the Score

Next to estimating the propensity score, the common support was examined between the insured and the uninsured. This was done using a graph of histogram to assess the propensity score ranges for both the insured and the uninsured. Illustrating the propensity scores on the graph shows an adequate overlap between the treatment and the control. Below is the histogram showing the overlapping match estimates between the insured and the uninsured.

Figure 5: Graph of Common Support (Propensity Scores by Group)
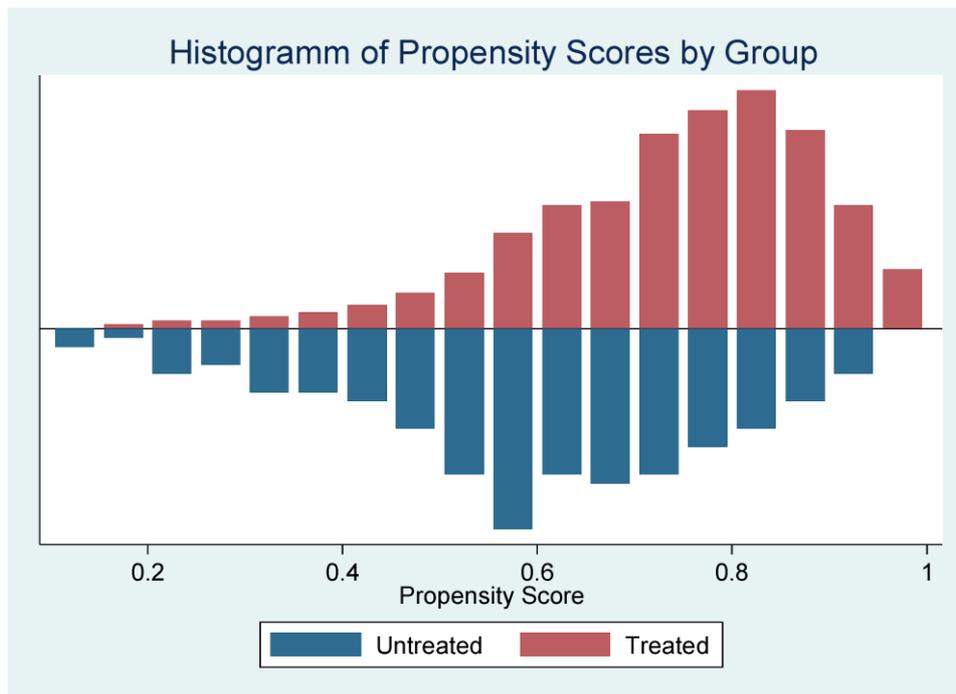
Source: Author's Computation from DHS data

The propensity score (PS) for the uninsured ranges between 0.1123536 and 0.929670, while that of the insured ranges from 0.1781026 to 0.979554. These results provide a feasible condition of common support or overlap for both the insured and uninsured for a successful matching. The feasible overlap range is between 0.1781026 and 0.929670.

A number of matching algorithms were tried and the final one was selected based on the quality of the matching. This was tested on a benchmark of some parameters comprising the median and the mean of covariates biases and the pseudo-R^2. Table 3 below shows the outcome of the best quality matching approach and the quality of measurement pre and post-matching.

Table 3: The PSM Performance: Results of the Mean, Median absolute biases, Pseudo-R^2 and Likelihood Ratio

Sample	Unmatched	Matched
Mean	18.3	2.1
Median	13.6	1.8
Std. dev.	11.1	1.3
Pseudo-R^2	0.164	0.003
LR X^2	504.74	1.12
P>X^2	0.00	1.00
Radius Matching (Caliper = 0.011)		

As indicated by Grilli and Rampichini, (2011), it is expected that the lesser the caliper radius, the more appropriate the quality of the matching but there is a risk of dropping some participants with no control match (Grilli and Rampichini, 2011). The radius caliper width of 0.011 was determined by the least number of unmatched cases and the quality of matching. This helped in enlarging the use of data in the treated. The Pseudo R^2 in Table 3 is reported based on regressing the propensity score on the selected covariates used in the matching. As described by Aggarwal (2010), the Pseudo R^2 should be very minimal if the covariates produced a good matching outcome after the matching. It can therefore be noticed in Table 3 that the Pseudo R^2 is moderately lower. The likelihood ratio test (LR X^2) was also insignificant after the matching. This shows there is a distribution of similar covariates after matching.

The comparison of the average individual covariates between the treated and control is shown in the Appendix. The mean bias between the treatment and control considering the observable covariates measured in the model reduced significantly. In absolute terms the mean bias was less than 2 percent which appears to show a quality matching as proposed by Rosenbaum and Rubin (1983), who stated that a quality match should be less than 5 percent (Rosenbaum and Rubin, 1983).

4.3 The Effects of Health Insurance Based on the Propensity Score Matching

4.3.1 Healthcare Utilization Variables

The health seeking behavior of households with children is reported here based on four basic variables. These variables are captured under preventive and general health seeking behavior of households. The variables captured under the preventive healthcare showed that, in the past 12 months before the survey, about 37 percent of the entire sample indicated they had at least a child who had a general health examination. Under the health seeking behavior, 58 percent of households indicated that their children visit a hospital or clinic. About 5 percent of households also indicated that they have children who spent a night in a hospital or clinic. Households who sort for prescriptions for their children were remarkably 65 percent on the average. Table 4 below shows the reported healthcare utilization variables.

Table 4: Healthcare Utilization Variables

Variable *(in the last 12 months)*	Number of cases	Mean	Std. dev	Min	Max
General health examination	1986	0.377	0.211	0	1
Clinic/Hospital visit	2901	0.58	0.272	0	1
Spent overnight in hospital	209	0.054	0.477	0	1
Prescriptions	3987	0.65	0.74	0	1

Note: This was based on 7991 respondents. The means and standard deviations denotes sampling weight with adjusted means. All the means captures only the proportion of respondents who reported that at least a child from their household experienced the said service.

4.3.2 Healthcare Utilization Differences and The Average Treatment Effect on the Treated (ATT)

Table 5 below depicts the matching means between the insured and the uninsured with respects to the four outcome variables. Considering the mean value of both the insured and the uninsured, the differences is significant in all the four outcome variables. The difference is higher with hospital/clinic visits. Which indicates that about 44.9 percent more of those who were insured visited a hospital or clinic than those who were not insured. However, about 12.1 percent more of the insured (than the uninsured) household reported that they had at least a child spending a night at a clinic or a hospital. Moreover, as 67.6 percent of the insured

household reported having a general health examination for a child, 34 percent of the uninsured household also reported having general examination for their wards.

The matching process used in Table 6 here controlled for all the socio-economic and demographic characteristics of covariates as shown in the previous Table 2 above. Given that the household in the higher wealth quintile were more insured, the increased use of health facilities and services for sick children under those insured could be determined by wealth and other socio-economic factors other than the mere insurance. Below is Table 6 showing the average treatment effect of health insurance on the insured. Using all the observable characteristics, children from the household who are insured are more likelihood to pursue prescribed healthcare than children in uninsured household, 'all things being equal'.

Table 5: The Average Treatment Effect on the Treated (ATT)

	Matching Means				Average Treatment Effect on the Treated		
Outcome	Insured	Uninsured	Difference	P-Value	Av TT	S.E	P-Value
General health exam	0.676	0.34	0.336	0.00	-0.024	0.004	0.001
Clinic/Hospital visit	0.789	0.34	0.449	0.00	0.262	0.021	0.005
Spent overnight in hospital	0.512	0.391	0.121	0.00	0.021	0.032	0.012
Prescriptions	0.897	0.739	0.148	0.00	0.210	0.021	0.033

Note: This was based on 7991 total respondents. All calculations controlled of the demographic characteristics of the household heads as reported in Table 1.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.0 Introduction

As indicated in Chapter One, this study seeks to examine the impact of health insurance on children's healthcare usage at the household level in Ghana. The household head was used as a reference point to determine the probability of having a child under 18 years enrolled in the health insurance scheme.

5.1 Health Insurance and Healthcare Utilization

After matching and controlling for household background characteristics that has the possibility of causing a bias estimate of the effects of health insurance on children healthcare, the results showed that health insurance has a positive impact on accessing healthcare. This encourages parents to at least access medical examination or seek prescription for their children when sick as Table 4 describes.

It was also demonstrated that health insurance enrollment is more popular among the high-income earners than the low-income households. It is also shown that the higher the income a household, the more probable it is to get insured as compared to the low-income households which showed the reverse. According to the data, the number of uninsured households is much larger at the low quintile (very poor) as compared to any of the income levels described in Table 1. This clearly shows the positive correlation between household income and health insurance after controlling for key factors at the household level. This, however, defeats the primary purpose of introducing the insurance system to reach the very poor or low-income population in the country. According to the insurance policy reviewed in literature, the extremely low-income individuals are encouraged to enroll unto the insurance without a premium, however the data indicates that a substantial number (about 32.8 percent) of the uninsured fall under the 'very poor' income category (or wealth quintile).

The inability of some members within the low-income group to access the national health insurance package was attributed to the price of the insurance and the individual perception associated with health insurance due primarily to inadequate and lack of comprehension of the insurance policy. The distance – in terms of transportation cost – covered to assess healthcare was also another factor affecting patronage, given that it costs extra more to the low-income household to cover longer distances in kilometers to access a health facility or even get access to an insurance facility to register. The implication of this, however, is that reduced premiums or the absence of premiums may not directly balance or increase access to health insurance. On one hand, some studies could argue that an increase in absolute number of health facilities as well as health service professionals, has the possibility to encourage easy access to health insurance. On the other hand, given that enrollment onto the NHIS is voluntary, households who enrolled may have different health needs or health seeking behaviors as compared to those who did not enroll.

Secondly, it was discovered that on the average, households that get insured under the NHIS showed a higher likelihood to have their children go for general health examination or 'check-up', and visit the hospital or seek formal healthcare for their children when they are sick than the uninsured. The insured households are also more likely to have their wards spent a night at a health facility, if possible, when sick and also seek prescription advice as appropriate. These differences occurring between the insured and uninsured households can be partially explained by the fact household heads belonging to the higher educational level and high-income category on the average are more likely to get their children insured and take them to the hospital when they are sick or seek formal healthcare when they are sick. Conclusively, when all the observed characteristics are controlled for, health insurance enrollment is positively correlated to the use of healthcare by children in the sample.

These findings are coherent to a few studies including Mensah *et al*, (2010) and Witter

and Garshong, (2009). In evaluating the impact of health insurance on healthcare utilization, there was an indication of positive significant effect of insurance for the insured, this is again invariable to the findings of Nguyen, (2016). Other studies such as Buchmueller et al, (2004) have also found unforeseen effects of the insurance status on healthcare utilization.

5.2 Potential Implication

In general, these findings imply that children with an insured primary caretaker stand a greater chance of accessing health service as compared to children of an uninsured primary caretaker or household head. For instance, children from lower income families with no insurance have lesser likelihood to benefit from professional healthcare services as compared to children from household with insurance. There is also a clear indication that providing free or low-cost health insurance to people is not the only means to assure its healthcare utilization.

5.3 Limitations of the Study

A few hurdles faced in this paper may have effect on the external and internal validity of the outcomes.

Even though the matching approach used in this study to some extend eliminates bias because of the selection based on observable factors, bias can still occur from omitted or unobserved variables. Regardless of how careful the PSM was done, the study outcomes are not bias-free.

Secondly, since this analysis is based on a secondary data, it is acknowledged that other important elements such as distance to health facility, information on the healthcare provider, trust in the management of the insurance scheme and other salient deterministic factors of health insurance enrollment and use of healthcare were excluded in the analysis. Admittedly, there could still be improvement on the estimates of the results if these factors are included in later studies.

Moreover, this analysis may be faced with the problem of endogeneity because there might be a number of unobservable disparities between households that enrolled for the health insurance package and households that did not. This might potentially lead to an exaggerated effect of insurance on healthcare utilization.

5.4 Conclusion

Other studies have discovered direct effect of insurance on the patronage of healthcare in developing countries across the world including Ghana. However, just a handful of studies have employed rigorous statistical tools like the propensity score matching or other non-experimental method to discover the effect of health insurance has on healthcare utilization for children in Ghana.

This study however is a continuous experiment as its being supported by other studies. The adjusted estimates found with the relationship that exists amongst health insurance and healthcare utilization showed a positive and statistically significant effects for a minimum of one use of healthcare service for children in insured households. The results of the study indicate an increase in healthcare utilization for children under 18 with health insurance as compared to the uninsured.

Despite the limitations, this study adds to the institutional knowledge for health policymakers by exhibiting the positive effect national health insurance has on the regular access to professional health service for children. It is also right to acknowledge the benefits of premium-free health insurance for children below the age of 18, because enrollment into health insurance based on premiums can create inequality in access to general healthcare for children, particularly from low-income families. With consideration to the fact that the low-income households in this study had limited access to insurance, which is primarily a reverse of the policy objective in Ghana, a further research will be needed to find out factors that prohibits low-income households from accessing the insurance package.

Before and After Matching (Mean Biases of Covariates)

Variable	Sample	Mean Insured	Mean Uninsured	Bias(%)	Bias Reduction(%)	t-stats	P-value
Age							
15-35	*Matched*	24.21	23.81	1.2	77.12	0.29	0.028
	Unmatched	23.1	22.13	8.9		0.98	0.125
36-55	*Matched*	32.5	31.12	1.5	75.2	0.92	0.032
	Unmatched	25	30.01	9.7		2.07	0.143
56+	*Matched*	18.32	10.12	1.6	65.1	0.23	0.072
	Unmatched	16.1	11.14	7.9		0.43	0.633
Marital status							
Never married	*Matched*	0.043	0.051	1.5	89.5	0.33	0.004
	Unmatched	0.032	0.048	-13.8		-3.19	0.623
Currently married	*Matched*	0.87	0.03	0.1	90.1	0.03	0.012
	Unmatched	0.85	0.045	11.9		2.31	0.443
Formerly married	*Matched*	0.048	0.016	-1.8	45.2	-0.43	0.027
	Unmatched	0.044	0.021	-3.1		-0.54	0.531
Education							
None	*Matched*	0.24	0.42	2.5	90.2	0.43	0.223
	Unmatched	0.22	0.218	-29.8		-5.43	0
Primary	*Matched*	0.16	0.31	1.7	80.5	0.32	0.532
	Unmatched	0.13	0.21	-21.1		-4.4	0
Secondary	*Matched*	0.48	0.42	-2.2	77.3	-0.12	0.582
	Unmatched	0.43	0.58	12.2		8.43	0
Higher	*Matched*	0.12	0.09	27.1	87.3	-0.32	0.212
	Unmatched	0.13	0.082	-3.2		4.34	0
Employment Status							
Not Currently employed	*Matched*	0.11	0.02	-2.8	-67.2	-0.54	0.401
	Unmatched	0.13	0.03	-1.7		-0.32	0.321
currently employed	*Matched*	0.78	0.31	2.7	-63.4	0.64	0.59
	Unmatched	0.71	0.29	1.7		0.73	0.735
Wealth Quintile							
Very poor	*Matched*	0.15	0.032	0.4	98	0.2	0.743
	Unmatched	0.12	0.043	-41		-9.32	0
Poor	*Matched*	0.21	0.064	-2.1	67.1	-0.76	0.656
	Unmatched	0.2	0.075	-6.2		-0.45	0.122
Moderate rich	*Matched*	0.34	0.2	0.5	-243.3	-1.21	0.821
	Unmatched	0.31	0.201	-2.2		0.23	0.453
Rich	*Matched*	0.36	0.111	3.7	84.5	0.62	0.543
	Unmatched	0.29	0.123	31.3		5.64	0.001
Very rich	*Matched*	0.42	0.101	0.4	98.5	0.22	0.921
	Unmatched	0.4	0.122	27.1		5.21	0

Residence

Rural	*Matched*	0.539	0.13	-2.1	81.2	-0.44	0
	Unmatched	0.501	0.11	-27.3		-7.32	0.546
Urban	*Matched*	0.61	0.21	2.4	82.3	0.41	0.462
	Unmatched	0.51	0.132	24.2		7.12	0.514
Region							
Ashanti	*Matched*	0.181	0.201	6.9	52.1	-0.69	0.345
	Unmatched	0.16	0.153	-1.9		1.71	0.002
Brong-Ahafo	*Matched*	0.141	0.134	24.3	97.1	-0.33	0.756
	Unmatched	0.12	0.076	-0.02		4.46	0.33
Central	*Matched*	0.032	0.106	-0.1	99.1	-0.1	0.12
	Unmatched	0.028	0.043	-22.5		-4.8	0.111
Eastern	*Matched*	0.123	0.127	-1.2	93.2	0.32	0.043
	Unmatched	0.121	0.7	14.6		0.29	0.654
Western	*Matched*	0.082	0.077	2.7	-71.1	0.53	0.764
	Unmatched	0.094	0.081	-1.3		-0.3	0.01
Greater Accra	*Matched*	0.066	0.064	0.4	92.1	-1.3	0.321
	Unmatched	0.066	0.121	-16.2		0.33	0.213
Northern	*Matched*	0.161	0.13	0.4	97.4	0.08	0.543
	Unmatched	0.131	0.176	-16.2		-3.24	0.12
Upper East	*Matched*	0.121	0.012	3.9	87.3	0.32	0.301
	Unmatched	0.11	0.016	11.1		0.47	0.102
Upper West	*Matched*	0.131	0.122	4	64.3	0.65	0.012
	Unmatched	0.154	0.11	10.4		2.64	0.004
Volta	*Matched*	0.078	0.03	-1.1	80.2	-0.12	0.106
	Unmatched	0.074	0.05	16.2		-0.31	0.071

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