



A cross-sectional study determining the predictors of enrollment in Ghana's national health insurance scheme

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Abstract

Health care financing is a major development challenge and health policy concern to policy makers and health care consumers. Millions of households in developing countries have no financial access to health care. Ghana's National Health Insurance Scheme (NHIS) was established in 2003 to provide access to health care for all residents of Ghana. Though the NHIS has somewhat increased financial access to health care, barely a third of the population have health insurance and enrollment rates are low and undulating, and inequalities in coverage are pervasive. The study aimed to estimate the predictors of NHIS enrollment to ascertain the most significant factors for policy implementation to increase coverage. We conducted an empirical analysis of data extracted from Ghana Living Standards Survey (GLSS) Round 6, 2012-2013, (n = 65,663). A logistic regression model was employed for the multivariate analysis. The results show that that age, higher income, being female, higher education, prior medical seeking, place of residence, significantly predicted NHIS enrollment positively. Rural residence, poverty, unemployment, and being male were inversely associated with enrollment. Adopting measures that will encourage family and group enrollment, and targeting men, youth, the poor and rural residents, and replicating global best practices could increase enrollment in NHIS.

Keywords: Ghana; National Health Insurance Scheme; Predictors of Enrollment; Health Care Financing; Financial Risk Protection

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1. Introduction

Health care financing is a major development challenge and health policy concern to policy makers and health care consumers in Ghana. While out-of-pocket expenditure engenders catastrophic health spending and impoverishes households, evidence suggests that health insurance provides financial risk protection against catastrophic episode of health care (World Health Organization, 2010). The purpose of this study aimed to estimate the predictors of enrollment of Ghana's National Health Insurance Scheme, using logistic regression model to understand the most important determinants of enrollments in the NHIS to contribute to policy implementation for scaling up membership in the scheme.

Data for this study was extracted from the nationally representative Ghana Living Standard Survey (GLSS) round 6, 2012-2013 (Ghana Statistical Service, 2012). We have explained the details of the data sampling, collection, in the methods section of the paper. The data had a household sample size of 18,000 households, each with seven members on average within 1,200 enumeration areas, with a response rate of 93.2%. Data for this research is a bit old and therefore pose a slight limitation in terms of current policy implications of the findings of the study and should be used with caution. Nonetheless, the results of the study are beneficial as they can be compared with analysis of current GLSS data to show trends, similarities and or differences or otherwise for policy reforms".

1.1. Overview of Ghana's National Health Insurance Scheme (NHIS)

Ghana's National Health Insurance law, Act 650 was passed in 2003 to ensure the implementation of fair and equitable and universal access to affordable quality and acceptable essential health care for all residents of Ghana (Republic of Ghana, 2003). The full implementation of the social health protection scheme, however, started in 2004 (Ministry of Health, 2004). The Social Health Protection Scheme was aimed, among other factors, to totally abolish the severe out-of-pocket user fee health financing policy, dubbed "cash and carry," and replacing it with a health insurance scheme of equitable and affordable access to health care for the residents of Ghana. But after a decade and a half of its establishment, barely a third (41%) of residents had enrolled in the NHIS in 2016, and a large majority (59%) had no health insurance coverage of any kind and therefore pay out of -pocket for health care at the point of need (Minsitry of Health, 2016).

Goal three of the Un Sustainable Development Goal demands that every person, everywhere at all ages have access to health care and healthy lives. By this objective member countries are to strife to promote universal health coverage for all through financial risk protection, access to affordable quality health care including access to essential medicines and vaccines, equity in health care coverage (both the vulnerable, the haves and the have -nots all have adequate health insurance coverage) without anyone suffering catastrophic episode of health care (United Nations General Assembly, 2015). Though Ghana's National Health Insurance Scheme has made some gains in enrollment coverage over the 16 years period (2004-2020), equity in enrollment coverage and financial sustainability remains a daunting challenge and achievement of Universal Health coverage remains a mirage (Anarwat, 2018; Dake, 2018).

Trends in enrollment since the establishment of the NHIS shows steady increase but with inequities in favour of urban regions and the upper wealth quintiles indicating that the NHIS enrollment was pro-rich (Anarwat, 2018). From 2005, a year after the experimentation of the NHIS, enrollment increased by about 1.4 million (6%) of the total population in 2005 to 10.6 million (40%) in 2014, and increased to 11 million, representing 41% of the total population of Ghana in 2016 (National Health Insurance Authority, 2016a).

For the 8-year period, enrollment in the NHIS increased steadily from 33% (8.2 million) to about 41% (11.3 million) between 2010 and 2015 and plummeted to 35% (10.3 million) in 2017. The same period saw both increase and decline in NHIS membership renewal from 44% to 75% between 2010 and 2013 and declined to 64% in 2015 and further increased to 73% in 2017.

The year 2013 recorded the most significant membership growth rate of 13.2% while the year 2017 recorded a growth rate negative 7.1% in 2017 (Nsiah-Boateng and Aikins, 2018) which could have been attributed to slow transition of government policies due to the change of government in 2016 for a new government in 2017. Specifically, NHIA enrollment figures increased from 8.2 m (33%) in 2011 to 11.3 m (41%) in 2015 and declined to 10.3 m (35%) in 2017. But Informal sector enrollment rate was barely 29.8%, a 5 -points lower than the National figure of 35% in 2017 (Adei et al., 2019). The NHIS is currently facing financial sustainability challenges as a result of its costs far exceeding its revenue accumulation (Minsitry of Health, 2016; National Health Insurance Authority, 2016b). The scheme is financed through 2.5% Value Added Tax (VAT) (National Health Insurance Levy) on goods and services, a 2.5% deduction from workers' social security contributions, the contribution of informal sector population in the form of premium payment, development partners grants, and investment funds. The evidence, however, suggests that the informal sector contribution constitutes only about 5% of the total revenue generated, while the VAT (NHIS levy) constitutes the most significant (70%) funding to the NHIS. The other sources only constitute 25%. Benefit package of the scheme includes 95% of all disease conditions and Ghana and minor surgeries but does cover routine annual medical examination and cosmetic surgeries and dental care (Minsitry of Health, 2016).

2. Review of previous studies

Recent evidence indicates a declining trend in enrollment in the NHIS with a significant difference among regions, member groups and income quintiles. Enrollment in urban regions seems to be doing well in enrollment in the NHIS than rural regions and children have significantly higher enrollment figures than the other age groups probably due to the enrollment exempt policy for children. The informal sector member enrollment in the NHIS is particularly plummeting, as compared to the formal sector over the years (Nsiah-Boateng and Aikins, 2018; Dake, 2018). It is imperative for the government of Ghana through the National Health Insurance Authority (NHIA) to activate and enforce the mandatory enrolment clause under the NHIS Act 650 2003 and Act 856, 2012 governing the scheme and adopt innovative modern technology for enrollment, and the application of behavior change theories and approaches to nudge people to enroll and renew their membership in the NHIS if Universal health coverage is to be achieved.

A body of literature suggests that the key challenges hindering the growth of enrollment in Ghana's NHIS is the policy design of the NHIS which permits voluntary enrollment and, partial tax-funding of the scheme (Kipo-Sunyehzi et al., 2020). Though the NHIS Act 650 2003 and Act 856, 2012 mandate every resident of Ghana to enroll in the NHIS, its enforcement has been a daunting problem. Residents of Ghana enroll in the scheme by their own volition (Republic of Ghana, 2003; Republic of Ghana, 2012). Unlike the advanced countries health insurance schemes in the Scandinavian countries such as Norway, Finland and Sweden, and in Europe such as France, Britain, Germany, among others, which are generally funded through taxes, Ghana's NHIS is funded partly through the NHIS Levy (2.5% Value-Added Tax (VAT) tax imposed of goods and services), and voluntary payment of premiums and annual renewal by members. The voluntary enrollment and annual renewal of subscription, especially, in the informal sector partly accounts for low enrollment in the NHIS. Also, poor quality of health care services provided to clients, in adequate funding, corruption and abuses of the NHIS at the Scheme Level and at the health care providers level, and well as politization of the scheme regarding appointments of key personnel of the scheme and disbursement of funds and incessant government interference of the governance of the scheme inhibits its growth towards achieving UHC, which needs to be addressed (Kipo-Sunyehzi et al., 2020). Many factors determine individuals or household's' decision to enroll in a health insurance scheme. Knowing the most significant predictors of enrollment can facilitate the health financing policy reform and effective implementation process to scale-up enrollment in the NHIS for financial risk protection. There is ample evidence on health insurance enrollment in Ghana. For instance, Owusu-Sekyere & Bagah (Owusu-Sekyere and Bagah, 2014), found that sex, marital status, cost of curative health care, individuals' income level, higher levels of education, and ill-health significantly influenced people's decision to enroll in the NHIS. While this Owusu Sekyere and Baga's study provided very useful insights on the determinants of enrollment in the NHIS, it had limitations on external validity, because the data used was not nationally representative, it was conducted in only selected communities of one metro-area in Ghana.

Education, economic status, employment status, and prior professional health care consultation care found to influence enrollment in of insurance schemes. In addition, age, area of residence (urban/rural) and geographic region (10 regions in Ghana) positively correlates with individual's decision to subscribe to a health insurance scheme (Ayitey et al., 2013).

Evidence in four countries in West Africa supports the evidence that health care consumers with health insurance coverage are more likely to demand health insurance and use professional health care services than their counterparts who do not have any health insurance coverage (Robyn et al., 2012). Empirical studies also indicate that demographic and socio-economic status, such as age, household size, marital status, employment, gender, education, and income significantly influence the demand for health insurance (Jehu-Appiah et al., 2010; Sarpong et al., 2010) and geographical area of residence and the distance to the nearest available health care provider positively influence health care consumers' behavior to demand for health insurance and increase their health care utilization. Health care consumers who reside reasonably close to health care providers, especially urban dwellers, may be more likely to demand health insurance than their counterparts in the rural areas, who do not have such easy access and choice of health care providers, and may, therefore, not see the need to demand health insurance (Nketiah-Amponsah, 2009; Sarpong et al., 2010). Similarly,

wealth is strongly associated with NHIS enrollment. Health care consumers within the highest wealth quintile are more likely to enroll in the NHIS than individuals in the lowest wealth quintiles (Chankova et al., 2009).

Dzakpasu et al. (2012) found a significant increase in delivery by health professionals among the poor who had health insurance, and a reduction in socio-economic inequality in health professional delivery and health insurance coverage (Dzakpasu et al., 2012). The literature also suggests that the decision to enroll in a health insurance scheme is positively associated with the likelihood of health provider antenatal care and assisted delivery by professional health personnel. Expectant mothers are more likely to enroll in a health insurance scheme than non-pregnant women (Brugiavini and Pace, 2016).

Similarly, evidence suggest that female, higher educational level, large household size, urban residence, employment status, income, and lower health insurance premiums are associated with higher enrollment rates in a health insurance scheme (Amo, 2014). However, contra-results show that the determinants of enrollment in the NHIS in the Upper West region of Ghana. Contrary to emphasis that wealth is the predominant factor influencing enrollment in the NHIS, other determinants such as education, and desire to enroll in the NHIS for anticipation of unforeseen sickness or injury, were more significant covariates, but differed significantly by gender (Dixon, 2014).

3. Methods

3.1. Data sources

Data for this study was extracted from the nationally representative Ghana Living Standard Survey (GLSS) round 6, 2012-2013 (Ghana Statistical Service, 2012). It had a household sample size of 18,000 households, each with seven members on average within 1,200 enumeration areas, with a response rate of 93.2%. After adjusting for missing values and other data errors, a final sample of 16,772 households was retained. The GLSS round 6 employed a two-stage stratified sampling method to select a nationally representative sample. The raw data were explored and cleaned for missing values and inconsistencies, some recoded and renamed for the analysis, using STATA 14 Software.

3.2. Sampling methods

The GLSS round 6 uses a two-stage stratified sampling methodology to select the representative sample for the survey as has always been done in the previous surveys. At the first stage for the sampling method, each of the 10 regions used the already established enumeration areas based on the 2010 population and housing survey to select the Population Sampling Units (PSUs). A total of 1,200 enumeration areas (EAs) were selected to constitute the PSUs. Each of the 10 regions were assigned PSUs based on Probability Proportional to Size of the population (PPS) statistical technique for a balance regional distribution. The EAs were further distributed into Rural and Urban areas. Households were then listed and selected from determined units to form the Secondary Sampling Units (SSUs).

At the Second stage, a systematic sampling method was used to draw 15 households each from the 1,200 PSUs to arrive at a total of 18,000 households for the national survey. After adjustment for errors and omissions, a total clean final sample of 16,772 household were employed for the survey.

3.3. Variable selection and definition

The decision to subscribe for or enroll in a health insurance scheme is a function of several variables, but only those variables that contributed significantly to the model were used. These variables were derived from the demand for health insurance theory (Grossman, 1972; Folland et al., 2016), Andersen's health seeking behavior model, and empirical studies (Andersen and Newman, 1973; Andersen, 1995).

3.3.1. Dependent variable

The dependent variable in this study is National Health Insurance enrollment status. This variable is dichotomous, zero and one (0, 1), assuming the value, one (1) when the individual has NHIS status, and the value, zero (0) if the individual has no health insurance, as coded in the Ghana Living Standard Survey Round 6 (Ghana Statistical Service, 2012). This variable is a combination of those who paid registration only to enroll or paid both registration and premium, as was indicated in the survey.

3.3.2. Explanatory variables

The choice of covariates for the model was based on Anderson's behavior model for health care utilization and the demand for health insurance (Andersen and Newman, 1973; Folland et al., 2016) in addition to previous studies. These variables were age, age square, sex (male, female); educational of the individual, which was collapsed into categorical educational dummies (no education, primary education, secondary education and tertiary education), income and employment. In addition, the location variable (rural-urban), and regional dummies of the ten regions of Ghana the Greater Accra region, as the reference point (Brinda et al., 2012; Ayitey et al., 2013; Owusu-Sekyere and Bagah, 2014).

The variable income is a continuous variable defined as the total household earnings per year. Those household whose incomes fall within the lower income-quintile (lower 20%) are considered to have lower income, and those household with income level within the upper income quintile (upper 20% of the quintile) were considered to have higher income -level. This variable was however dropped as it has collinearity with other variables (therefore not found in Table 1-the definition of variables). The variable employment is defined as a dummy variable, "1" being employed and 0 being unemployed, as constructed by ILO as "engaged in any economic activity for income or not, in the past 12 months preceding the interview". Reference point is employed (See Table 1).

Table 1. Definition of Variables

Variables	Definition
<i>Dependent variable</i>	
National Health Insurance Status	A dichotomous variable defined as whether an individual has registered or was covered under the NHIS in the past 12 months and has a valid health insurance card. Thus, insured or not insured assuming the value 1 for insured, and 0 for not insured.
<i>Independent variables</i>	
Age	Age is a continuous variable defined as the age of the respondent at the time of interview. Age is associated with an individual's health status and the necessity of health care.
Age squared	This variable corrects for the non-linear effect of age on health care utilization.
Sex (Male, Female)	Defined as male or female (0, 1), reference point female (1). Male and female have different characteristics and health needs. Females tend to use more health services than males.
Marital Status (Married, not married)	A set of dummy variables: married/living together, never married, divorce, widowed.
Household size	The number of persons in a household as defined by the GLSS 6, 2013.
Education	Education is a continuous variable defined as the highest level of education the respondent attained.
Employment status	Dummy variable employed or not employed (0, 1), constructed as engaged in any economic activity for income or not in the past 12 months preceding the interview. Reference point is employed.
Total Health Expenditure	Total household expenditure on health care. A continuous variable.
Poor	Defines poverty status (0, not poor, 1 poor). Reference point is not poor)
Illness	Whether the individual experienced any form of illness or injury in the last 12 months. Illness is positively related to health care use and demand for health insurance. Dummy variable (0, 1), 1 not ill (healthy) reference point.
Sought Medical Attention	Dichotomous independent variable (1, 0) defined as whether an individual sought formal health care (health facility) in the past 12 months.
Residence: Rural-Urban	Whether the individual resides in a rural area or an urban area (0,1) Reference Point Rural
Geographical Location – Regional Dummies	This variable explains the 10 regional dummies. Western, Central, Greater Accra Region being the reference point, Volta, Eastern, Ashanti, Brong-Ahafo, Northern, Upper East, and Upper West.
Rural X Poor	An interaction variable explaining being poor and living in a rural area.

Source: Authors' construction

3.3.3. Empirical logistic model specification

We used the logistic regression model to estimate the predictors of NHIS enrollment. The logistic regression model has been widely used by many studies to estimate the demand for health insurance. Giving that the dependent variable (NHIS enrollment) is dichotomous (insured =1 and uninsured =0) we use the logistic regression (Long, 1997; Ayitey et al., 2013; Nketiah-Amponsah, 2009) to estimate the conditional probability of an event happening and analyzing the results with the log odds ratios. We used the Logistic regression model because it is used in data analysis when the dependent or outcome variable is binary or dichotomous (0/1, yes/no, true/false) in nature. Our dependent variable “Membership of a health insurance scheme” as explained in the methods section, is a binary variable, taking the form “1” for “enrolled in the insurance scheme” and “0” for “not enrolled in the health insurance scheme”. Though probit model could also be used for the estimation, logistic regression is easier and efficient to implement and interpret results, it is easier to predict the magnitude of the coefficients and direction of associations -either positive or negative of the predictors. However, non-linear problems cannot be dealt with appropriately by logistic regression. Its main limitation is its assumption of linearity between the dependent and independent variables (GeeksforGeeks, 2021). The correspondent logistic regression model is estimated as a logit given as:

$$\ln \frac{E(X_i)}{1 - E(X_i)} = (\ln \Pr(Z_i = 1 | X_i)) / 1 - \Pr(Z_i = 1) = \alpha + \beta X_i, \text{ where } E(X_i) = \Pr(Z_i = 1 | X_i) \text{ and } 1 - E(X_i) = 1 - \Pr(Z_i = 1)$$

$$E(X_i) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_i X_i,$$

where, β_0 = intercept β_i = parameter estimates; X_i = observed values of variables; $Z_i = 1$ intervention (Have Insurance) (Long, 1997; Nketia-Amponsah, 2009; Ayitey et al., 2013)

Mathematically, representing the dependent variables (Y), then Y =1 represents “have NHIS coverage” Y= 0 represents “Have no NHIS coverage”, also let X_i = the independent variables $X_1, X_2, X_3 \dots X_n$ and ε = the error term, then;

$$Y^* = \beta_1 X_i + \varepsilon$$

let Y=1 if $y^* > 0$; Y =0 if $y^* \leq 0$

we estimate the demand for health insurance as (Health Insurance Status) as

$$\Pr(Y) = \beta_0 + \beta_i X_i$$

$$\Pr(Y = 1) \text{ is given by } \ln \left(\frac{P}{1 - P} \right) = Z\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} \dots + \beta_n X_{ni}$$

where P = the probability of the i^{th} person enrolling in the NHIS and X_i = a vector of independent socio-demographic *predisposing variables* such as age, age squared, sex, marital status, education and *enabling variables* such as employment (unemployment), income (poverty status) and *need-based variables* such as health status (illness), Sought medical care and other covariates such as location (Rural-Urban), a set of dummy variables of geographical location (10 regional dummy variables), and an interaction variable- Rural X poor.

β = parameter estimates and ε_i = Stochastic error term.

4. Results

In this section, we present the empirical analysis of the results, first by characteristics of individual respondents as presented in Table 2, the bi-variate analysis-the association between the dependent variable and independent variables with its diagnostic chi -square test (Tables 3a and 3b).

Table 2. Characteristics of individual respondents by Dependent and Explanatory Variables

Variable	Frequency (N)	Percentage (%)
Dependent Variable (N=71,363)		
Insured	49,380	69.2
Not Insured	21,983	30.8
Explanatory Variables		
Male	55,582	77.89
Female	15,781	22.11
Married (including common law marriages)	57,121	80.14
Not married (includes divorced, widowed, single)	14,239	19.96
Healthy	61,015	85.50
Ill/Injury	10,348	14.50
Educational Level (N=71, 310)		
No formal Education	23,652	33.17
Basic Education (Primary 1 through Junior High School)	14,671	20.57
Secondary Education	23,883	33.49
Tertiary Education	6,039	8.47
Non-formal/Adult Education	3,065	4.30
Urban residence	27,145	38.04
Rural residence	44,218	61.96
Employment Status (ILO Definition -Unemployed) (N= 65, 716)		
Unemployed (NO) = employed	65,192	99.20
Unemployed (Yes)	524	0.80
Sought Medical Attention (N=71, 355)		
No	63,589	89.12
Yes	7,766	10.88
Poverty Status (N=71,363)		
Poor	24,110	33.79
Not Poor	47,253	66.21

Analysis by Authors from the GLSS 6 (2013)

We have also presented the results of the logistic regression analysis in Table 3a and 3b. It can be clearly noted from Table 2 that the majority of the individual household members (49,380, 69.2%) had National Health Insurance membership and 21,983 individual household members, representing 30.8% did not have health insurance membership. Also, there were more male respondents than female respondents, and more married couples than unmarried couples, and as much as 89.12% of respondents had not sought medical attention at the time of the survey.

4.1. Bivariate analysis between insured and uninsured

The results of the bivariate analysis are presented in Table 3a and Table 3b. The LR- Chi- Square diagnostic test was performed on the variables to determine whether there were significant differences in the independent categorical variables with respect to the insured and the uninsured. The results (Tables 3a and 3b) show that there was a significant difference between all the categorical independent variables with regards to the insured and uninsured except the unemployment status. The Pearson Chi-Square test results showed that educational level, marital status, sex, area of residence (rural/urban), health status, sought medical attention in the 14 days prior to the survey, poverty status and geographical region of residence were all significant at 0.1% level (Pearson chi-square $p=0.000$) while the variable "sex" was also significant at the 0.1% level (Pearson chi-square $p=0.001$).

Table 3a. Bi-variate Statistics: Registered/Enrolled in NHIS

	No Insurance		With Insurance		Total		Pearson Chi-Square Test (F statistics)
	Freq	%	Freq	%	Freq	%	
<i>Educational level</i>							<i>1080.80***</i>
No education (0)	8,420	38.30	15,232	30.90	23652	33.25	
Basic education (1)	5,004	22.80	9,667	19.60	14671	20.60	
Secondary education (2)	6,740	30.70	17,143	34.70	239	33.50	
Tertiary education (3)	936	4.30	5,103	10.30	6039	8.50	
Non-formal/ Adult education (4)	856	3.90	2,209	4.50	3065	4.30	
<i>Marital status</i>							<i>57.81***</i>
Not married	4,761	21.70	9,478	19.20	14239	20.00	
Married	17,221	78.30	39,900	80.80	5721	80.00	
<i>Sex</i>							<i>10.68**</i>
Female	4,694	21.40	11,087	22.50	15781	22.10	
Male	17,289	78.60	38,293	77.50	5582	77.90	
<i>Unemployed ILO</i>							
No	20,305	99.10	44,887	99.20	65192	99.20	
Yes	175	0.90	349	0.80	524	0.80	

Source: Authors' analysis with data from Ghana Living Standards Survey Round 6 (GSS, 2013)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$;

Notes: Freq denotes frequency; ILO denotes International Labour Organization

Table 3b. Bivariate statistics: Registered/ Enrolled in NHIS continued

	No Insurance		With Insurance		Total		Pearson Chi-Square Test (F statistics)
	Freq	%	Freq	%	Freq	%	
<i>Area of residence</i>							364.96***
Urban	7,218	32.80	19,927		27145	38.00	
Rural	14,765	67.20	29,453		44,218	62.00	
<i>Health status</i>							32.78***
Healthy	19,044	86.60	41,971	85.00	61015	85.50	
Ill	2,939	13.40	7,409				
<i>Sought medical attention</i>				40.40			200.92***
No	20,134	91.60	43,455	59.60	63589	89.10	
Yes	1,848	8.40	5,918	12.00	7766.00%	10.90	
<i>Poverty status</i>							385.97***
Not poor (0)	13,410	61.00	33,843	68.50	47253	66.20	
Poor (1)	8,573	39.00	15,537	31.50			
<i>Geographical region (residence)</i>							3415.59***
Western (1)	2,231	10.10	4,589	9.30	6820	9.60	
Central (2)	3,103	14.10	2,957	6.00	60,60	8.50	
Greater Accra (3)	2,915	13.30	3,664	7.40	6579	9.20	
Volta (4)	2,210	10.10	4,429	9.00	6639	9.30	
Eastern (5)	2,119	9.60	4,802	9.70	6921	9.70	
Ashanti (6)	1,914	8.70	5,471	11.10	7385	10.30	
Brong Ahafo (7)	1,313	6.00	5,603	11.30	6916	9.70	
Northern (8)	3,424	15.60	6,089	12.30	9513	13.30	
Upper East (9)	1,416	6.40	5,320	10.80	6736	9.40	
Upper West (10)	1,338	6.10	6,456	13.10	7794	10.90	

Source: Authors' analysis with data from Ghana Living Standards Survey Round 6 (GSS, 2013)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$;

Notes: Freq denotes frequency; ILO denotes International Labour Organization

4.2. Logistic regression model

The estimated models were robust and highly significant as can be seen from the likelihood ratio (LR chi-square test $p=0.000$), with total observations ($N=65, 663$ for the main mode, Tables 4a and 4b). The results showed that the variable Age in complete years with an adjusted odd ratio (aOR= 1.04, 95%CI:1.03-1.05) was highly significant at the 0.1% level ($p=0.000$). Thus, the odds of NHIS up-take decision are positively associated with an increase in age which is consistent with theory. The results showed that a unit increase in education is associated with increased odds of health care consumers' decision to enroll in the NHIS. Respondents with a higher level of education increased the odds of enrollment in the NHIS, which also points to the fact that higher

level of education could be associated with understanding the operations and benefits of health insurance, hence the positive decision to enroll.

Similarly, being married was positively associated with enrollment in the NHIS as compared to unmarried respondents (aOR= 1.44, 95% CI: 1.35-1.52). This was also reported to be highly statistically significant at the 1% level ($p < 0.01$) This could be explained by the fact that married couples may have more responsibilities and a total household expenditure including that of health and are therefore risk averse, hence their decision to demand NHIS.

Poor health status incapacitates families to be able to afford to pay for health care. The result of the estimated logistic model showed that being poor decreases the odds of enrolling in the NHIS (aOR =0.64, 95% CI: 0.62, 0.67) as compared to the rich. This finding is consistent with conventional rational economic theory.

Gender (sex) plays an important role in households and individuals' decision to demand health insurance as an enabling socio-demographic factor. On sex, the study found that being male decreased the odds of the demand for NHIS (aOR= 0.65, 95% CI: 0.61, 0.69, $p < 0.01$) as compared to female.

Also, respondents who sought medical attention before the survey predict a higher likelihood to enroll in the NHIS. This variable was statistically significant at 1% level of significance and increased the odds of NHIS uptake by 35%.

The results indicate that all nine regional location dummies (Western, Central, Volta, Eastern, Ashanti Brong-Ahafo, Northern, Upper East and Upper West) compared to the Greater Accra region, increase the odds of the demand for NHIS. We compared the other regional dummies to the Greater Accra region because it is the region with the national capital city with the highest population, highest income levels, and social amenities and health care facilities than any other region in Ghana. That explains why all the other regions are compared to the Greater Accra region.

The most interesting findings were that the three poorest regions (Northern, Upper East, and Upper West) had the highest odds of being enrolled in the NHIS. Health care consumers in the Upper West region, the poorest of all the regions, were 12 times more likely to be enrolled in the NHIS (aOR) as compared to those in the greater Accra region, indicating that the poor are more likely to enroll in this region than the rich contrary to the popular view that the NHIS is pro-rich. The Upper East, the second poorest region, followed suit, with 9 times higher odds (aOR=9.00, 95% CI: 8.19, 9.89) of being enrolled in the NHIS than the reference region. These findings could also be explained by the fact that the poor are exempted from paying a premium, and this could have facilitated their enrollment into the NHIS. A positive sign that the NHIS safety-net exemption policy is having a positive impact on enrollment. Another interesting revelation about the results was that, the Brong – Ahafo region which has many characteristics of the Northern regions also had greater odds of its residents' decision to demand the NHIS. However, in the Central region, the 4th poorest region in Ghana (GSS, 2012), respondents were least likely to enroll in the NHIS (aOR= 1.19, 95% CI: 1.10, 1.29) as compared to the Greater Accra region and the other regions.

Living in a rural area (aOR = 0.64, 95% CI: 0.62, 0.67) and being poor (aOR = 0.62, 95% CI: 0.60, 0.65)) were both significant barriers to enrollment in NIHS. Finally, the study interacted the variables “poor” and “rural area” to see their effects on the decision to demand the NHIS. The results showed that being poor and living in

the rural area rather increased the odds of being enrolled in the NHIS by 12% (aOR= 1.12, 95% CI: 1.01, 1.23) compared to the main effects alone. However, the combination was still a very substantial barrier. Compared to an urban, non-poor resident a rural, poor resident was less than half as likely to enroll in NHIS. The adjusted odds ratio was only 0.44 (calculated as 0.64 x 0.62 x 1.12).

Table 4a. Predictors of Ghana's NHIS Enrollment, Logistics Regression Model

Variables (N=65,663)	NHIS Adjusted Odds Ratio	95% Confidence Interval
Age in complete years	1.04***	1.03 - 1.05
AGESQ	1.00***	1.00 - 1.00
No education (Reference)	1	1
Basic education	1.49***	1.41 - 1.57
Secondary education	2.27***	2.16 - 2.39
Tertiary education	4.47***	4.09 - 4.89
Non-formal / adult education	1.42***	1.30 - 1.56
Marital status (Reference: Unmarried=0)		
Married	1.44***	1.35 - 1.52
Household size	1.01**	1.00 - 1.01
Sex: Female (Reference)		
Sex=1, Male	0.65***	0.61 - 0.69
Unemployed ILO (Reference: employed=0)	0.85*	0.70 - 1.03
Area of residence (rural/urban; Reference: urban=0)		
Area of residence - rural	0.64***	0.62 - 0.67
Health status - suffered from illness (Reference: healthy=0)		
Ill	1.02	0.97 - 1.08
Sought medical attention (Reference: did not seek medical attention=0)	1.35***	1.27 - 1.44

Source: Authors' analysis with data from Ghana Living Standards Survey Round 6 (GSS, 2013)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. GSS denotes Ghana Statistical Service

Table 4b. Predictors of Ghana's NHIS Enrollment, Logistics Regression Model Continued

Variables (N=65,663)	NHIS Adjusted Odds Ratio	95% Confidence Interval
Total expenditure on health	1.00***	1.00 - 1.00
Poverty status (Reference: not poor=0)		
Poor	0.62***	0.60 - 0.65
Geographic regional location (Reference: Greater Accra region=0)		
Western Region	2.60***	2.40 - 2.81
Central Region	1.19***	1.10 - 1.29
Volta Region	2.94***	2.71 - 3.19
Eastern Region	2.80***	2.58 - 3.03
Ashanti Region	3.09***	2.85 - 3.34
Brong Ahafo Region	6.51***	5.96 - 7.11
Northern Region	4.24***	3.91 - 4.61
Upper East Region	9.00***	8.19 - 9.89
Upper West Region	12.87***	11.69 - 14.16
Interaction term: rural X poor	1.12**	1.01 - 1.23

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, GSS denotes Ghana Statistical Service

Source: Authors' analysis with data from Ghana Living Standards Survey Round 6 (GSS, 2013)

5. Discussion

The study sought to estimate the predictors of enrollment in Ghana's National Health Insurance Scheme to ascertain the most significant variables for policy implementation to increase enrollment. The results of the study confirms both theory, and previous studies with slight deviations.

We found that the variable "age" in complete years significantly predicted NHIS enrollment when used as a continuous variable in the main logistic regression model. This finding is consistent with the theory of demand for health care, health care utilization and health investment. This could be explained by the fact that youthful age is associated with good health, all things being equal, but as individuals age, their health stock diminishes, and they tend to invest more in health including the demand for health insurance (Grossman, 1972; Andersen and Newman 1973; Folland et al., 2016). The findings on the age and age square variable, however, contrast that of Ayitey et al. (2013) which did not find these variables as significant determinants of enrollment in the NHIS.

For social policy, it is imperative to categorize potential enrollees in the NHIS into different age groups, for example, children (at least junior and senior high school), the economically active youth, the middle age adults, and the aged and engage them separately with different targeted messages to get their buy-in. Children, for instance, can be an excellent conduit for transmitting positive messages on health insurance to their parents if they understand the benefits well. The economically active youth and the middle age group, being healthy, may

be reluctant to enroll in the NHIS, therefore, they need moral suasion and persuasive strategies (nudging) to get them to enroll in the NHIS.

The study revealed that being poor decreases the odds of NHIS enrollment, but higher income levels of households, higher total expenditure on health and large household size were significantly associated with increased enrollment in the NHIS which is also consistent with a large body of evidence on the determinants of demand for health insurance (Wagstaff, 2007; Ayitey et al., 2013; Owusu-Sekyere and Bagah, 2014; Sarpong et al., 2010; Chankova et al., 2008). The study finds the large household size variable significantly associated with increased NHIS uptake intriguing. But on another lens, it is rational because larger households may tend to have greater probability of one falling ill, and with reduced income, it may be difficult to bear the health care cost out-of-pocket, hence, the decision to defy all odds to enroll. This finding is in consonance with Cameron and Trivedi (1991) which found that large family size increases the odds of buying health insurance. Consequently, a good health insurance policy aimed at increasing enrollment should target and provide a subsidy for the poor. Also, providing large households with incentives such as reduction in premiums will impact positively on health insurance enrollment.

The findings on poverty as a negative determinant of health insurance enrollment conforms to the popular views and findings that the NHIS is pro-rich and does not reach the poor very much (Ayitey et al., 2013; Apoya and Mariot, 2011). The current findings from this research, however, suggest that there has been a drastic improvement in enrollment of the poor in the NHIS in the last six years, a clear contrast to the Oxfam study. Now more poor people have enrolled in the NHIS and are benefiting from it as evidenced by significant enrollment decisions in the three Northern regions, especially, the Upper West, and Brong-Ahafo-regions. This finding also confirms the study which found that more poor people have enrolled in the NHIS in the Upper West region (Dixon, 2014) but counters Apoya and Mariot, 2011, which suggest that the National Health Insurance Scheme is pro-rich.

It is important for researchers and readers to interpret this finding with caution. It should not be misconstrued as poor people in these regions can afford health insurance better than those with higher incomes. Rather, they are more prone to illness, risk averse and are more likely to use health care. The NHIS premium exemption policy for the poor and the vulnerable could be yielding the desired impact.

We found that men were less likely to enroll in the NHIS than women, which confirms previous findings that females had higher odds of buying health insurance than men (Sindelar, 1982; Ayitey et al., 2013). This could also be explained that women are more vulnerable to ill-health especially during their reproductive age and tend to use more health services than men, which implies, being rational, they will demand health insurance as a financial risk protection against health than men.

6. Limitations

The study has few limitations in design and variable determination, but it does not significantly affect the findings. As a cross-sectional survey, respondent's behavior was not followed over time, hence, it was not possible to determine the relationship between exposure and outcome over time. Also, some essential

variables, according to theory and previous studies were dropped. For instance, premium, type of provider, morbidity and amount paid for drugs, distance to nearest health facility were dropped from the model because they had fewer or no observations and had probable cause of multi-co-linearity.

7. Conclusion and policy recommendations

Findings of the study confirm theory and literature on health care consumers' decision to enroll in a health insurance scheme. Intriguingly, our study found that fewer male and economically active persons (otherwise the strong and healthy population) were rarely enrolling in the National Health Insurance Scheme, which can engender adverse selection and increase utilization and costs of claims, and eventually collapse the scheme. To achieve universal health coverage through the NHIS, it is imperative to nudge the economically active youth and male to increase their enrollment in the scheme, and enforce the compulsory enrolment of all residents.

The study suggests that being female, higher incomes, and the aged significantly increase enrollment in the NHIS. We also found that the NHIS is pro-poor, at least, in the three northern regions of Ghana especially, Upper West, and the Brong-Ahafo region. Although higher levels of education significantly predicted higher enrollment, residence in the poor regions of the country were more likely to enroll in the NHIS than the higher income regions. This might suggest that the safety net premium exemption policy for the poor and vulnerable, and the stratified graduated premiums, where the poorer regions pay a little less than the higher income regions, could be yielding desired results. Consequently, we recommend providing incentives for family registration, and engaging men and the economically active youth with targeted messages on the benefits of health insurance to enroll more men into the NHIS. Also, more registration centers in the rural areas, out-reach programs to the rural areas to enroll more of the poor should be implemented. Finally, further research is needed to understand the dynamics of NHIS enrollment in the central and the other regions that reported lower enrollment, as well as men and the economically active youth population in Ghana. Also, there is the need for qualitative research to understand the role of quality healthcare on enrollment in NHIS and the achievement of UHC in Ghana.

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Ethical consideration

This research received ethical approval from the Brandeis University Institutional Review Board and written, and oral consent were received from participants in the study.

Conflict of interest

None of the authors declare any conflicts of interest.

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