

Does insurance enrolment increase healthcare utilisation among rural-dwelling older adults? Evidence from the National Health Insurance Scheme in Ghana

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ABSTRACT

Introduction This paper examines the relationship between national health insurance enrolment and the utilisation of inpatient and outpatient healthcare for older adults in rural areas in Ghana. The Ghanaian National Health Insurance Scheme (NHIS) aims to improve affordability and increase the utilisation of healthcare. However, the system has been criticised for not being responsive to the needs of older adults. The majority of older adults in Ghana live in rural areas with poor accessibility to healthcare. With an ageing population, a specific assessment of whether the scheme has benefitted older adults, and also if the benefit is equitable, is needed.

Methods Using the Ghanaian Living Standards Survey from 2012 to 2013, this paper uses propensity score matching to estimate the effect of enrolment within the NHIS on the utilisation of inpatient and outpatient care among older people aged 50 and over.

Results The raw results show higher utilisation of healthcare among NHIS members, which persists after matching. NHIS members were 6% and 9% more likely to use inpatient and outpatient care, respectively, than non-members. When these increases were disaggregated for outpatient care, the non-poor and females were seen to benefit more than their poor and male counterparts. For inpatient care, the benefits of enrolment were equal by poverty status and sex. However, overall, poor older adults use health services much less than the non-poor older adults even when enrolled.

Conclusion The results indicate that NHIS coverage does increase healthcare utilisation among rural older adults but that inequalities remain. The poor are still at a great disadvantage in their use of health services overall and benefit less from enrolment for outpatient care. The receipt of healthcare is significantly influenced by a set of auxiliary barriers to access to healthcare even where insurance should remove the financial burden of ad hoc out of pocket payments.

INTRODUCTION

The third United Nations' Sustainable Development Goal relating to health has created momentum in the drive towards Universal

Key questions

What is already known about this topic?

- ▶ The Ghana National Health Insurance Scheme (NHIS), put into operation in 2005, has an aim to increase the utilisation of healthcare and improve health at all ages.
- ▶ Previous studies that have analysed the effects of the Ghanaian NHIS have mainly focused on maternal healthcare and have found that those enrolled in the NHIS were more likely to seek formal healthcare and that women were more likely to deliver at a hospital.
- ▶ Little is known about the effect of NHIS enrolment on healthcare utilisation among the rapidly growing older age population, with their greater complexity of treatment, accessibility issues and longer period of treatment.

What are the new findings?

- ▶ NHIS coverage increases healthcare utilisation among rural older adults for both inpatient and outpatient care.
- ▶ The overall increases observed are not equitable across the population. The poorest have the lowest utilisation and the least benefit of enrolment. For outpatient care, wealth inequity is exacerbated by NHIS enrolment.

Recommendations for policy

- ▶ There is a greater benefit of NHIS enrolment for older aged females with regard to outpatient care.
- ▶ National insurance schemes should include older aged individuals, as there is a marked effect of enrolment on utilisation.
- ▶ A focus on ensuring equity is needed during implementation to ensure that all individuals benefit, rather than just the privileged.
- ▶ A simple policy of lowering financial barriers for payments for healthcare, such as for insurance, does not necessarily improve equity and hence alternative methods for obtaining universal coverage should be sought alongside.

Health Coverage (UHC), defined as when ‘all individuals and communities receive the health services they need without suffering financial hardship’.¹ Over the last decade, countries have been making progress towards this goal using a variety of policies aimed at increasing health utilisation and improving outcomes among the general population. Many of these policies have a focus on targeting vulnerable populations, such as the poor, mothers and children, older adults and those living in rural and remote areas.² National insurance schemes are playing a key role to help achieve UHC in many countries.² However, limited evidence is available about the success of these schemes in improving access to healthcare for older adults within low-income and middle-income countries. This paper examines this issue in a rural setting, using the National Health Insurance Scheme (NHIS) in Ghana as a case study. It assesses whether enrolment in the NHIS is associated with an improvement in healthcare utilisation among older adults living in rural areas using propensity score matching (PSM). It also examines if any improvements observed are equitable, exploring the dimensions of wealth (and its absence, ie, poverty) and gender.

Older adults are known often to suffer from high levels of poverty in low-income and middle-income countries, as many do not have a regular income; in Ghana, 80% of people aged 60 plus are in this category.³ A higher proportion of this group live in rural areas than those of working ages,⁴ areas which are served poorly by the health system, and leads to issues of access to and quality of care.⁵ Furthermore, ageing is associated with increasing occurrence of mental health conditions, dementia and non-communicable diseases,⁶ with a rising complexity of healthcare needs due to comorbidities and increasing demand for institutional care services.⁷ This means that older adults living in rural areas may be further disadvantaged. National insurance schemes, however financed and administered, need to cope with these complex health requirements in order to ensure equity and provide comprehensive care.

Pooled funding through health insurance can be seen to redistribute income, equalising the ability of the poorest groups to access care and pay for services.⁸ Evaluating whether the introduction of the NHIS influences outcomes such as healthcare utilisation will help in understanding whether health insurance is an effective tool for the task of improving equal access to healthcare. Furthermore, such an analysis will aid in understanding whether current strategies to achieve UHC are applicable to older adults. This knowledge is essential for advocates of subsequent policy reform in Ghana, but can act as guidance for developing countries implementing similar insurance schemes that aim to increase access to health services for all in the context of rapid population ageing.

THE GHANAIAN NATIONAL HEALTH INSURANCE SCHEME

Data from the 2012–2013 Ghanaian Living Standards Survey (GLSS) showed that 48% of adults aged 18–49

were enrolled in the NHIS, which increases to 58% for older adults aged 50 plus. The NHIS was initiated by the 2003 National Health Insurance Act and was put into operation in 2005.

The NHIS is funded through a range of independent sources, including the National Health Insurance Levy, which is a 2.5% value added tax; returns on National Health Insurance Fund investments; premium fees and contributions to the Social Security and National Insurance Trust (SSNIT; 2.5 percentage points per month). There is also further government funding to complement the scheme.⁹

The country’s previous ‘cash and carry system’ was seen as a barrier to access to healthcare services for many Ghanaians unable to afford unplanned cash payments when seeking care.¹⁰ The NHIS operates under the vision of being ‘a model of a sustainable, progressive and equitable social health insurance scheme in Africa and beyond’.¹¹

Although it is mandatory to be part of an insurance scheme in Ghana, the literature often argues that in practice enrolment is voluntary. No penalties apply for not being a member of any insurance scheme and citizens are not enrolled by default.¹² In order to become a member of the NHIS, individuals need to register at the local district office and pay a registration fee and a premium. The health insurance membership ID card, which provides evidence of enrolment, will then be provided for participants after a waiting period. Immediate biometric registration at selected district offices has been launched only recently to optimise the enrolment process.⁹ NHIS membership expires after 1 year and thus requires renewal to remain eligible.

On reaching 70 years of age, individuals are exempt from the NHIS premium payment if they can provide a proof of age, although they still have to pay the registration fee. Other groups that are exempt from paying the premium include the ‘core poor’, defined as those who cannot show a source of income and have no fixed residence.⁹ A number of smaller groups, such as those who contribute to the SSNIT or receive a pension from the SSNIT, are also exempt from the premium.

The scheme operates a negative list for the benefit package, with a comprehensive benefit package available apart from specific exclusions. Officially, the NHIS covers 95% of the common disease burden in its insurance package.⁹ The NHIS package includes outpatient services, inpatient services, oral health, eye care, maternity care and emergency care.⁹

Cancer treatment, with the exception of cervical and breast cancer treatment, is not covered even though the proportion of deaths due to cancer is increasing.¹³ The NHIS does not include psychiatric services in its benefit package, but mental disorder treatment is freely available in government psychiatric hospitals as well as through community psychiatric nurses. If, however, these services are not accessible, then alternatives have to be purchased out of pocket.¹⁴ Homecare, hearing aids

and dentures are excluded from the benefit package as well.¹⁵

There are known to be issues with the NHIS with regard to long queues and waiting times.¹⁶ This has a disproportionate effect on older adults, who are often physically not able to queue for a long time while waiting for care.¹⁷ In addition, large distances to healthcare facilities can be a barrier for less mobile older adults to actually use the care. The requirement to first enrol in the scheme, even if there is an exemption from the premium, discriminates against older adults, as travel to the local district scheme office may be problematic for some due to mobility or transport issues.

Moreover, rural dwellers are poorly served by the health system in Ghana in comparison to their urban counterparts. Sulemana and Dinye⁵ found that due to lack of healthcare facilities, long travel distances and poor transport systems, rural residents are considerably disadvantaged in terms of accessibility to healthcare services. Alhassan and Nketiah-Amponsah¹⁸ reported that in rural NHIS accredited facilities drug and resource availability was inferior to that in urban facilities. Overall, only 30% of qualified doctors and nurses in the country work in rural areas,¹⁸ even though 54% of adults age 60 and over live in the same area.⁴

Previous studies that have analysed the effects of the Ghanaian NHIS have mainly focused on maternal healthcare or the probability of women seeking inpatient and outpatient care.^{12 15} These have found that people enrolled in the NHIS were more likely to seek formal healthcare and that women were more likely to deliver at a hospital. However, it is uncertain whether these findings can be extended to older adults due to the great complexity of treatment, issues with access as well as the care often being required over a longer time period than in maternity.

Increasing use of healthcare is an important step of improving health outcomes in the longer term.¹⁹ However, the magnitude of the link between utilisation and outcomes is affected by the quality of the services offered, the timeliness that care is sought and follow-up care, which is outside the scope of this paper.

DATA AND METHODS

The data for the analysis were taken from the nationally representative GLSS and its supplementary community survey. The first GLSS was conducted in 1987. Round six, the latest (2012/1013) GLSS, sampled 18 000 households within 1200 Enumeration Areas.²⁰ In round six, a response rate of over 93% led to 16 772 households being interviewed. The GLSS collected data on sociodemographic characteristics, health, employment, household expenditure, income and housing conditions.²⁰

The associated national rural community survey was carried out in 655 rural enumeration areas which had been selected during the 2012/2013 GLSS data collection process.²¹ The community survey provides information

on a household's environment, including a facility questionnaire including information on the availability and accessibility of local services like healthcare providers. Further information on the community survey can be found in the Community Facility Report.²¹

The analysis was restricted to individuals aged 50 and above. This group were classified as older adults as it is contended that the commonly used chronological definition of 65 is not appropriate when conducting research in an African context. In an African context, a chronological age of 50 or 55 serves as an appropriate cut-off point when defining an older adult. The average life expectancy in low-income countries for men is 60 years and for women 63 years,²² while in Ghana, the life expectancy at birth is 62 years and the healthy life expectancy at birth 54 years.²³ Therefore, to define people aged 50 plus as 'older adults' is more appropriate when looking at low-income and middle-income countries.²⁴

In order to understand the impact of the NHIS on healthcare utilisation, it is necessary to control for differences in personal characteristics between the insured and non-insured. As a randomised control trial was not feasible or ethical, statistical matching was one way to control for selection bias.²⁵ This method creates a control group that is as similar as possible to the group that received the intervention in its observable characteristics, allowing the determination of the effect of an intervention. This paper applied PSM to analyse the effect of NHIS enrolment on healthcare usage. Using different matching algorithms to estimate coefficients allowed a measure of robustness in the results. Therefore three matching techniques were compared here in order to ensure the robustness of the results: (1) nearest neighbourhood (NN) with replacement, (2) radius and (3) Gaussian kernel matching.

Radius matching, also referred to as NN matching within a defined calliper distance, is a good alternative to NN matching when failing to find neighbours with the same propensity score.²⁶ Radius matching refers to defining a maximum score distance, also known as 'calliper' to match on.²⁶ Specifically, this means that within the defined propensity range, the NN is used as a matching partner. In order to choose an appropriate radius, Rosenbaum and Rubin²⁷ propose that an appropriate calliper width is a quarter of the SD of the estimated propensity score.

Unlike the NN and radius matching approaches which only use selected observations of the control group, kernel matching uses all of the individuals in the comparison group to construct the counterfactual outcome.²⁶ Kernel matching is defined as 'non-parametric matching estimators that compare the outcome of each treated person to a weighted average of the outcomes of all the untreated persons, with the highest weight being placed on those with scores closest to the treated individual' (p. 27).²⁸ Due to the increased information used, this approach results in a lower variance, although it also has potentially poorer matches.²⁶

NHIS enrolment was defined as holding a valid NHIS insurance card (treatment group). The control group consisted of all other older adults. The health insurance membership ID card provides evidence of enrolment and entitles members to free use of care at accredited facilities. Overall, the effect of NHIS enrolment was measured using two outcome variables: (1) consultation with health practitioner during the last 2 weeks (outpatient care) and (2) hospitalisation in the last 12 months (inpatient care). Both outcome variables are dichotomous.

The propensity score for this analysis was estimated using a logit function. The predictor variables entered into the model were based on the considerations discussed in the literature, which identified correlates of NHIS enrolment and increased utilisation of care. The availability and accessibility of healthcare services influence the usage of healthcare and insurance enrolment.^{5 29} Therefore, travel time to the nearest healthcare facility and hospital (reported by the community chiefs) as well as place of residence, region and road access (existence of a motorable road that passes through the community) was included to estimate the propensity score. Sensitivity analysis used the availability of a healthcare facility in the community instead of travel time to the nearest healthcare clinic and hospital which confirmed that availability of a healthcare facility in the community has a positive effect on insurance enrolment.

Further, previous research found that sex, education, religion, ethnicity, marital status, living standard and age were found to determine uptake of the NHIS and significantly influence the utilisation of healthcare.^{12 29-31} These variables were therefore also included.

In order to fully understand the benefit of NHIS coverage, the difference in healthcare usage between poor and non-poor older adults was measured. In this paper, 'poor' corresponds to a household lying below the poverty line of 1314.00 Ghana cedis (around US\$300) per adult per year. This method used

equivalent household expenditure taking into account that the consumption requirements of children are less than those of adults.³²

The data were randomly sorted to remove potential bias in the matching caused by the sorting of the data. Bootstrapping was used to estimate SEs, with 1000 replications run for each matching approach. All analyses were conducted in Stata using the *psmatch2* command.

RESULTS

Healthcare utilisation, both inpatient and outpatient, is significantly higher for all older adults who are NHIS members compared with those without NHIS membership before accounting for differences in the characteristics of those who are enrolled from those who are not (table 1). Twenty per cent of members consulted a health practitioner compared with 10% of non-members, while the percentage of older adults reporting being hospitalised overnight was also higher among members (13%) in comparison to non-members (6%).

The results further highlight that poor older adults use less care compared with their non-poor counterparts. Twenty-five per cent of insured non-poor older adults reported the usage of outpatient care compared with 14% of the insured poor. Looking at inpatient care, again a higher percentage of older adults used inpatient care if non-poor (14%) compared with poor (11%).

With respect to gender, the difference in the usage of outpatient care between insured and uninsured older men and women is about 10%. For hospitalisation the corresponding difference between insured and non-insured is 8% for men and 6% for women.

Table 2 summarises the patterns of NHIS enrolment which shows that older adults who live closer to a hospital facility, have road access in the community, are non-poor, older, married, Christian and more educated are more likely to have enrolled in the NHIS.

Table 1 Outpatient care and inpatient care usage by NHIS status

			Covered		Not covered		Difference	P value
			Mean	N	Mean	N		
Outpatient care	Total		20.406	3303	10.190	2689	10.216	0.000
	Poor	No	24.519	1974	12.220	1473	12.299	0.000
		Yes	14.296	1329	7.730	1216	6.566	0.000
	Sex	Male	18.873	1420	9.301	1387	9.573	0.000
		Female	21.561	1883	11.137	1302	10.425	0.000
Inpatient care	Total		12.880	3292	5.907	2675	6.973	0.000
	Poor	No	14.235	1967	7.844	1466	6.390	0.000
		Yes	10.868	1325	3.557	1209	7.311	0.000
	Sex	Male	12.730	1414	5.149	1379	7.581	0.000
		Female	12.993	1878	6.713	1296	6.280	0.000

P values based on a simple two-sided t-test.
NHIS, National Health Insurance scheme.

Table 2 Logit model of NHIS enrolment among older adults for estimating the propensity score

	OR		95% CI	
Region				
Western	1.000			
Central	0.722	*	0.540	0.965
Greater Accra	1.024		0.580	1.806
Volta	1.572	*	1.108	2.228
Eastern	1.461	**	1.106	1.928
Ashanti	1.646	***	1.238	2.188
Brong Ahafo	3.118	***	2.289	4.245
Northern	1.680	**	1.189	2.373
Upper East	4.854	***	3.431	6.864
Upper West	5.213	***	3.647	7.450
Sex				
Male	1.000			
Female	1.509	***	1.321	1.723
Age				
50–59	1.000			
60–69	1.241	**	1.076	1.430
70plus	1.785	***	1.537	2.073
Marital status				
Married/Cohabiting	1.000			
Separated/Divorced	0.619	***	0.497	0.769
Widowed	0.824	*	0.704	0.964
Never married	0.466	*	0.248	0.874
Education				
None	1.000			
Primary	1.173	*	1.0090	1.362
Secondary and higher	3.255	***	2.2941	4.617
Religion				
No religion	1.000			
Christian	1.618	***	1.303	2.009
Muslim	1.215		0.961	1.534
Ethnicity				
Akan	1.000			
Ga-Dangme	0.745		0.539	1.029
Ewe	0.778		0.580	1.044
Guan	0.990		0.710	1.378
Gurma	0.547	***	0.397	0.751
Mole-Dagbani	0.502	***	0.379	0.664
Other	0.621	**	0.452	0.852
Poor				
Non-poor	1.000			
Poor	0.696	***	0.610	0.793
Minutes				

Continued

Table 2 Continued

	OR		95% CI	
Hospital	0.996	***	0.994	0.996
Clinic	0.998	*	0.996	0.999
Road access				
Yes	1.000			
No	0.620	***	0.525	0.731
N	5,476			

*P<0.05, **P<0.01, ***P<0.001.

NHIS, National Health Insurance scheme.

DOES INSURANCE ENROLMENT INCREASE HEALTHCARE UTILISATION?

Due to potential selection bias, it is open to question as to whether the differences described in tables 1 and 2 reflect the true effect of NHIS enrolment. Table 3 shows the results for the three different methods of PSM that were estimated. Generally, the findings support the hypothesis that NHIS membership increases the utilisation of healthcare, supporting the unconditional differences reported above. When conditioning on observable characteristics for all matching approaches, a positive effect of NHIS enrolment on the utilisation of care was found. In all instances, significant differences were found in inpatient and outpatient care between insured and non-insured. The difference in outpatient care use between NHIS members and non-members was around 9%, with NHIS members tending to also use more inpatient care compared with non-members. Thirteen per cent of older adults enrolled in the NHIS used inpatient care in the previous 12 months compared with only 7% who were not insured.

Additional investigations disaggregated the analysis into different age groups in order to see the effect of the premium exemption for older adults aged 70 plus. The results supported the above analysis and indicated that insured individuals aged 70 or over were more likely to use both inpatient and outpatient care.

HAS HEALTHCARE UTILISATION INCREASED EQUITABLY?

Conditional on all observable characteristics, a positive effect of NHIS coverage on the utilisation of healthcare among poor and non-poor older adults was found (see table 4). Keeping all observable factors constant, the elderly poor enrolled in the NHIS were around 5% more likely to use outpatient healthcare services compared with the unenrolled. The enrolled non-poor older adults, however, were up to 11% more likely to consult a health practitioner compared with their non-enrolled counterparts. Further, the percentage of the enrolled poor who used outpatient care was the similar to the percentage of uninsured non-poor.

The benefit of enrolment for inpatient care services over the last 12 months was similar for both poor and non-poor older adults, at around 7%. However, only

Table 3 Healthcare usage by insurance status—propensity score matching results

		Covered	Not covered	Difference	SE*	P value
		(%)	(%)			
Consulted a practitioner	NN	20.926	12.140	8.786	1.465	0.000
	Radius†	20.926	12.140	8.786	1.506	0.000
	Kernel	20.926	11.729	9.196	1.138	0.000
Hospitalised	NN	12.883	6.794	6.088	1.155	0.000
	Radius†	12.883	6.794	6.088	1.224	0.000
	Kernel	12.883	6.755	6.127	0.929	0.000

*Bootstrapped.

†Imposed calliper width: 0.044.

NN, nearest neighbourhood.

11% of insured poor older adults stayed in a hospital overnight compared with 15% of insured non-poor elderly.

Finally, the differences in impact of NHIS coverage between males and females were assessed (see table 5). Depending on the matching technique, enrolled males were between 6% and 9% more likely to use outpatient care services compared with their unenrolled counterparts and around 7% more likely to use inpatient care service. For women, the likelihood of using outpatient care services increased by over 10% when they were enrolled but by only around 5% when measuring whether they have stayed overnight at a hospital.

SENSITIVITY ANALYSIS

Sensitivity analysis was used to assess the above PSM analysis. The quality of the matching was assessed by evaluating whether it was possible to balance the distribution of observed characteristics across the treated and untreated, conducted by comparing the situation before and after the matching and looking for remaining differences.²⁶ A two-sample t-test showed that after the matching, no significant differences between the control and comparison group exist indicating successful matching.

The main limitation of PSM is that only observed confounders can be included when estimating the propensity score. Unobserved omitted variables bias

cannot be controlled for using this method. This study used Mantel-Haenszel test statistics to determine how much positive or negative hidden bias is necessary for an unobservable factor to affect the treatment effect significantly. The results illustrate that, even when an unmeasured variable increases or decreases the odds of NHIS enrolment by as much as 50%, the treatment effect on consulting a health practitioner or visiting an inpatient facility still is significant, validating the results shown above.

DISCUSSION

Older adults are often faced with the double burden of high levels of poverty and greater need for healthcare as illness and disability increase with age. Thus, it is important to examine the merits of social health insurance coverage as an approach to improve access to healthcare, specifically among this older adult group. Due to the rapid ageing in many low-income and middle-income countries, healthcare systems need to respond to the increasing needs. This is essential to ensure that older adults enjoy healthy longevity, free from unnecessary morbidity.

Ghana is currently undergoing a profound demographic transition, with large increases in the number of older adults. This study focuses on older adults and

Table 4 Healthcare utilisation by insurance status and poverty status

		Non-poor					Poor				
		Insured	Non-insured	Difference	SE*	P value	Insured	Non-insured	Difference	SE*	P value
Consulted a practitioner	NN	24.825	14.949	9.876	2.051	0.000	14.539	9.840	4.699	2.200	0.033
	Radius†	24.825	14.949	9.876	1.979	0.000	14.539	9.840	4.699	2.173	0.031
	Kernel	24.825	13.615	11.209	1.578	0.000	14.539	9.522	5.017	1.629	0.002
Hospitalised	NN	14.239	6.822	7.417	1.664	0.000	10.667	3.733	6.933	1.337	0.000
	Radius†	14.239	6.822	7.417	1.683	0.000	10.667	3.733	6.933	1.266	0.000
	Kernel	14.239	8.866	5.374	1.405	0.000	10.667	3.158	7.509	1.196	0.000

*Bootstrapped.

†Imposed calliper width: 0.044 for non-poor and 0.045 for poor.

NN, nearest neighbourhood.

Table 5 Healthcare utilisation by insurance status and sex

		Male					Female				
		Insured	Non-insured	Difference	SE*	P value	Insured	Non-insured	Difference	SE*	P value
Consulted a practitioner	NN	19.051	12.830	6.221	2.094	0.003	22.282	12.012	10.270	1.943	0.000
	Radius†	19.051	12.830	6.221	2.060	0.003	22.282	12.012	10.270	1.929	0.000
	Kernel	19.051	10.453	8.599	1.614	0.000	22.282	13.017	9.266	1.598	0.000
Hospitalised	NN	12.813	5.313	7.500	1.444	0.000	13.117	8.303	4.813	1.594	0.000
	Radius†	12.813	5.313	7.500	1.445	0.000	13.117	8.303	4.813	1.621	0.003
	Kernel	12.813	5.126	7.687	1.255	0.000	13.117	7.860	5.257	1.317	0.000

*Bootstrapped.

†Imposed calliper width: 0.045 for males and 0.041 for females.

NN, nearest neighbourhood.

assesses both access to healthcare services and equity among rural dwellers in Ghana. Previous studies have mainly focused on the effect of insurance enrolment on healthcare usage of young and middle-aged adults, but have neglected to consider the extent to which these results can be generalised to older adults. This study argues that it is important to consider older adults separately due to their differences in demographic and socio-economic characteristics as well as differences in health and disability status. The 2010 Ghanaian Census showed that over 9% of older adults (aged 50 plus) suffer from at least one disability as compared with less than 3% of adults aged 18–49 years. Moreover, the educational status among older adults in Ghana was found to be lower compared with younger and middle aged adults.⁴ The 2010 census further showed that over 52% of older adults aged 50 and over live in rural areas compared with only 44% of people aged between 18 and 49. These differences in user characteristics can influence NHIS enrolment and healthcare utilisation significantly.

This paper used PSM to understand the causal treatment effect of NHIS membership on healthcare usage among older adults aged 50 plus. The study showed that enrolment in the NHIS was linked to improving utilisation of care, with greater use of both outpatient and inpatient care. This highlights that social health insurance is indeed a tool to improve the access to healthcare among an ageing population.

However, improvements in equity by poverty status or sex were less obvious. The majority of older adults in Ghana do not benefit from a regular income showing the importance of social healthcare systems to protect older adults by improving their financial protection when seeking care. The study, however, has demonstrated that despite the aims of the NHIS policy, a greater gain in outpatient usage is witnessed among non-poor older adults as compared with poor older adults, while the use of inpatient care is still much less for poor older people irrespective of enrolment. The lack of improvement in equity is in line with the findings from other studies in Ghana which indicated that rich women benefit from

the NHIS premium exemption for maternity more than the poor³³ as well in Burkina Faso³⁴ where a higher usage of outpatient care was found among the rich. This indicates that being in receipt of health insurance alone is not enough to ensure equal access to healthcare and that barriers to admission to healthcare services go beyond simple conceptions of monetary affordability. Indirect economic healthcare costs, such as long waiting times, loss of earnings when seeking care or travel costs, can reduce the usage of healthcare even when it is free of charge.³⁵ This is an important message arising from the analysis as poverty status was also found to be a significant determinant of choosing to be enrolled in the NHIS. However, it should be stressed that the findings also show that insurance enrolment *among* the poor significantly improves the utilisation of both inpatient and outpatient care.

The analysis suggests that receipt of healthcare in rural Ghana is significantly influenced by a set of auxiliary barriers to access to healthcare even where insurance should remove the financial burden of ad hoc out of pocket payments for poor older adults. Often the costs of enrolment itself form an important obstacle to NHIS membership even where premium exemptions are available. More research is needed to determine the average registration fee in a region or district to understand whether registration costs form a significant hindrance to enrolment. Furthermore, there may be the expectation of informal payments during healthcare visits which can hinder poorer individuals from making use of services. Aryeetey *et al*³⁶ showed that NHIS enrolment reduces household's out-of-pocket expenditure but it is estimated that 40% of insured members still make informal payments.³⁷

The Millennium Development Goals helped to frame the discussion on public health in many low-income and middle-income countries around the reduction of maternal mortality, which has contributed to the marginalisation of other important groups, such as older adults.³⁸ However, NHIS enrolment can be seen as an instrument for improving health outcome of mothers¹⁵

and for improving older women's usage of healthcare and can act as a tool to narrow gender-related discrimination in access. Sossou and Yogtiba³⁹ point out that 'the average elderly woman in Ghana is likely to be a rural dweller, widowed, living in an extended family household and poor' (p. 423) and also that older women are often subject to abuse, neglect and violence. In Ghana, the decision-making power for allocating funds from the household budget for healthcare often lies with the male household head who tends to control access to and allocation of household resources.⁴⁰ The findings here show that older women tend to benefit from NHIS enrolment more than men when it comes to the usage of outpatient care. Once enrolled at district offices, outpatient care services become freely available at the more accessible community level which is particularly important for less mobile older adults. Enrolled older women were up to 10% more likely to use outpatient care services compared with non-enrolled. Enrolled older males were between 6% and 9% more likely to use outpatient services compared with their unenrolled counterparts. These findings tally with similar findings elsewhere in low-income and middle-income countries.^{41 42} The lack of large differences between enrolled and non-enrolled women with regard to inpatient care may indicate issues with travel, with these services only available at district level and not at community level. Women often depend on money to travel to a healthcare facility—money which, in many households, is controlled by men.⁴⁰

Although the results in this paper suggest that insurance coverage increases the usage of healthcare, it should be noted that a social health insurance system alone is not sufficient to move towards UHC. The WHO⁴³ argues that 'in populations with poor or suboptimal health infrastructure, the service utilisation rate is an indicator of access'. Based on the WHO⁴³ guidelines the target for outpatient service utilisation is 5 outpatient visits per capita per year and 10 hospital discharges per 100 population per year, with older adults expected to need higher levels than this. Kowal *et al*⁴⁴ used the World Health Survey to examine the utilisation of healthcare in different countries and reported that 'a far smaller proportion of respondents in low-income countries access healthcare services compared with those in high-income countries (15% vs 33% for inpatient care; 55% vs 69% for ambulatory care)'. Kowal *et al*⁴⁴ estimated that 'approximately one in three respondents used inpatient healthcare services in the last 5 years in high-income group versus 15% in the low-income group'. In Ghana, only 10% of non-insured older adults and 20% of NHIS members consulted a health practitioner in the 2 weeks prior to interview, and 6% of non-insured and 13% of insured older adults reported being hospitalised overnight. For the poor the utilisation of any healthcare was found to be particularly low even when insured. In other words, any gains in utilisation of care observed in Ghana start from a very low baseline.

Ghana has been criticised for the low priority it has given to improvements in health infrastructure. Between July 2009 and December 2010, a survey was undertaken by the National Health Insurance Authority to assess the nationwide performance of the NHIS accredited facilities.⁴⁵ It measured the performance of accredited facilities by facility type, ownership as well as region. Although 95% of facilities passed the performance test, the overall performance was found to be poor. This could lead to low usage of care even among the insured. Further qualitative research would provide a more detailed understanding of the reasons for low healthcare usage, particularly among older adults in Ghana. Mensah *et al*¹⁵ point out that in the long run, health insurance can only improve healthcare efficiently when a consistent infrastructure exists, including well-located facilities, the provision of well-organised healthcare providers as well as a well-functioning and efficient administration. Further research is needed also to examine the long-run effect of NHIS coverage on health outcomes in order to fully understand long-term gains of the system. The assumption is that with improving medical access, the health status of older adults will improve as well. Even though the NHIS improves access to an extent, that alone does not necessarily demonstrate the success of the NHIS.

CONCLUSION

The effectiveness of the NHIS has to be evaluated with great care. Variables like wealth, age, education or marital status were associated with NHIS enrolment. These predispositions create selection bias and can act as confounders of analyses of NHIS effectiveness. The statistical PSM approach was applied in order to understand the effect of NHIS coverage on the usage of healthcare. In the context of this study, PSM is an operative measure to balance two groups (enrolled and unenrolled) based on observed confounders. Matching the participants on a similar propensity score allowed adjustment for predisposition to join the NHIS, making the two groups comparable.

The findings of this study indicate that the NHIS does improve access to care but that inequalities in service usage still remain. This means that when implementing a national insurance scheme policy-makers should consider alternative methods for improving equal utilisation of healthcare beyond a simplistic lowering of financial barriers in payment for healthcare services though insurance. The provision of services needs to be improved and the allocation of limited resources must be prioritised in a way that favours improvement of coverage among the poorest. Further, the healthcare system in general needs to expand in line with the specific needs of older adults to ensure a satisfactory usage of healthcare and the concomitant improvements in health.

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REFERENCES

1. WHO. *Universal health coverage (UHC)*. Geneva: World Health Organization, 2016.
2. Cotlear D, Nagpal S, Smith O. *Going universal: how 24 countries are implementing universal health coverage reforms from the bottom up*. 2015. Washington, DC: World Bank, 2015.
3. Hutton D. *Older persons in emergencies: considerations for action and policy development*. Geneva: World Health Organization, 2008.
4. Ghana Statistical Service. *2010 population and housing census: the elderly in Ghana*. Accra: Ghana Statistical Service, 2013.
5. Sulemana A, Dinye RD. Access to healthcare in rural communities in Ghana: a study of some selected communities in the Pru district. *EJRSS* 2014;2:122–32.
6. WHO. *Global Health and Aging*. Geneva: World Health Organization, National Institute on Aging, National Institutes of Health, U.S. Department of Health and Human Services, 2011.
7. WHO. *World report on ageing and health: esocialsciences*. Geneva: World Health Organization, 2015.
8. WHO. *Protecting people from the financial consequences of health-care payments*. Geneva: World Health Organization, 2017.
9. NHIA. *National health insurance scheme*. National Health Insurance Authority, 2017. <http://www.nhis.gov.gh/> (accessed 11 Oct 2017).
10. Hsiao WC, Shaw PR. *Social health insurance for developing nations*. Washington, DC: The World Bank, 2006.
11. NHIA. *National health insurance scheme*. National Health Insurance Authority, 2017. <http://www.nhis.gov.gh/nhia.aspx> (accessed 11 Oct 2017).
12. Blanchet NJ, Fink G, Osei-Akoto I. The effect of Ghana's national health insurance scheme on health care utilisation. *Ghana Med J* 2012;46:76–84.
13. WHO. *Global status report on noncommunicable diseases 2010*. Geneva: World Health Organization, 2011.
14. Ofori-Atta A, Ohene S. *Changing trends in mental health care and research in Ghana*. Accra: Sub-Saharan Publishers, 2014.
15. Mensah J, Oppong J, Schmidt CM. Ghana's national health insurance scheme in the context of the health MDGs. *Ruhr Economic Papers* 2009;157:4–20.
16. Dalinjong PA, Laar AS. The national health insurance scheme: perceptions and experiences of health care providers and clients in two districts of Ghana. *Health Econ Rev* 2012;2:13.
17. HelpAge International. *Older people in Africa: a forgotten generation*. HelpAge International, 2008.
18. Alhassan RK, Nketiah-Amponsah E. Frontline staff motivation levels and health care quality in rural and urban primary health facilities: a baseline study in the greater Accra and western regions of Ghana. *Health Econ Rev* 2016;6.
19. Currie J, Gruber J. Health insurance eligibility, utilization of medical care, and child health. *Q J Econ* 1996;111:431–66.
20. Ghana Statistical Service. *Ghana living standards survey round 6 main report*. Accra: Ghana Statistical Service, 2014.
21. Ghana Statistical Service. *Community facility report*. Accra: Ghana Statistical Service, 2014.
22. WHO. *World health statistics 2014: large gains in life expectancy*. Geneva: World Health Organization, 2014.
23. WHO. *Country statistics and global health estimates by WHO and UN partner*. Geneva: World Health Organization, 2015.
24. McIntyre D. Health Policy and Older People in Africa. Lloyd-Sherlock P, ed. *Living longer: ageing, development and social protection London: United nations reseach instiute for social development*, 2004:160–204.
25. Peikes DN, Moreno L, Orzol SA. Propensity score matching: a note of caution for evaluators of social programs. *The American Statistician* 2008;62:222–31.
26. Caliendo M, Kopeinig S. *Some practical guidance for the implementation of propensity score matching*. Institute for the Study of Labor (IZA), 2005.
27. Rosenbaum PR, Rubin DB. Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. *The American Statistician* 1985;39:33–8.
28. Heinrich C, Maffioli A, Vázquez G. *A primer for applying propensity-score matching*. Inter-American Development Bank, Office of Strategic Planning and Development Effectiveness (SPD), 2010.
29. Osei-Akoto I, Adamba C. *Ethnic and religious diversity as determinants of health insurance uptake in Ghana. 4th european conference on African studies Uppsala*, 2011.
30. Mensah J, Oppong J R. *Maternity protections and health insurance in Africa: comparative overview of Ghana, Kenya, Rwanda, and Tanzania*. Geneva: An external collaboration report for the Social Security Department of the International Labour Office, 2007.
31. Dixon J, Tenkorang EY, Luginaah I. Ghana's national health insurance scheme: helping the poor or leaving them behind? *Environment and Planning C: Government and Policy* 2011;29:1102–15.
32. Ghana Statistical Service. *Poverty profile in Ghana 2005 - 2013*. Accra: Ghana Statistical Service, 2014.
33. Johnson FA, Frempong-Ainguah F, Padmadas SS. Two decades of maternity care fee exemption policies in Ghana: have they benefited the poor? *Health Policy and Planning* 2015;1–10.
34. Gnawali DP, Pokhrel S, Sié A, et al. The effect of community-based health insurance on the utilization of modern health care services: evidence from Burkina Faso. *Health Policy* 2009;90:214–22.
35. Besley T. The demand for health care and health insurance. *Oxford Review of Economic Policy* 1989;5:21–33.
36. Aryeetey GC, Westeneng J, Spaan E, et al. Can health insurance protect against out-of-pocket and catastrophic expenditures and also support poverty reduction? Evidence from Ghana's national health insurance scheme. *Int J Equity Health* 2016;15:116.
37. WHO. *Obstacles in the process of establishing a sustainable national health insurance scheme: insights from Ghana*. Accra: World Health Organization, 2010.
38. Lloyd-Sherlock P. *Population ageing and international development*. Bristol: The Policy Press, 2010.
39. Sossou MA, Yotitba JA. Abuse, neglect, and violence against elderly women in Ghana: implications for social justice and human rights. *J Elder Abuse Negl* 2015;27:422–7.
40. Tolhurst R, Amekudzi YP, Nyongator FK, et al. "He will ask why the child gets sick so often": the gendered dynamics of intra-household bargaining over healthcare for children with fever in the volta region of Ghana. *Soc Sci Med* 2008;66:1106–17.
41. Dou L, Liu X, Zhang T, et al. Health care utilization in older people with cardiovascular disease in China. *Int J Equity Health* 2015;14:59.
42. Peltzer K, Williams JS, Kowal P, et al. Universal health coverage in emerging economies: findings on health care utilization by older adults in China, Ghana, India, Mexico, the Russian Federation, and South Africa. *Glob Health Action* 2014;7:25314.
43. WHO. *Service Availability and Readiness Assessment (SARA): an annual monitoring system for service delivery*. Geneva: World Health Organization, 2015.
44. Kowal P, Naidoo N, Chatterji S. *WHO study on global ageing and adult health (SAGE): health status, chronic conditions and health care utilization in respondents aged 50 and older from 70 countries in the world health survey/SAGE wave 0. SAGE working paper no 1*. Geneva: World Health Organization, 2012.
45. NHIA. *National health insurance scheme 10th anniversary international conference report*. Authority NHI, ed. *National health insurance scheme 10th anniversary international conference*. Accra: International Conference Centre, 2013.