



Effect of Community Based Health Insurance on the Livelihood of Rural Households in Kwara State, Nigeria

**Raphael Olanrewaju BABATUNDE¹ Oluwafemi OYEDEJİ¹ Esther OMONIWA¹
Adewale Henry ADENUGA^{1,2*}**

¹Department of Agricultural Economics and Farm Management,
University of Ilorin, Ilorin, Nigeria

²Gibson Institute for Land Food and Environment, School Of Biological Sciences, Queen's University Belfast, United Kingdom

*email: adenugahenry@gmail.com

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Abstract: Hygeia Community Based Health Insurance is an option of financing healthcare which gives opportunity to community members in Kwara state, Nigeria to have access to quality healthcare at an affordable price. Given the importance of such pre-payment scheme, this study was carried out to assess the impact of the Hygeia community based health insurance scheme on the livelihood of rural households in Kwara State. A three-stage sampling technique was used to proportionately draw 115 beneficiaries and 60 non-beneficiaries from Shonga, Lafiagi and Bacita districts of Edu local government area of the state. Descriptive statistics and the Propensity score matching econometric model were the major analytical tools employed for the study. The findings from this research showed that rural household benefitting from the Hygeia Community Based Health Insurance scheme had a higher per capita income and were more food secured compared to the non-beneficiaries of the scheme. The study recommended the establishment of community based health insurance schemes in the rural areas so as to help improve the per capita income and calorie intake of the rural farming households. The study concluded that the government should support the growth of community health insurance schemes in the rural communities by providing the enabling environment and making it more accessible to the rural populace.

Keywords: Health, hygeia, income, insurance, rural

1. Introduction

Given the high demand from people for good quality healthcare services and the extreme under-utilization of health services in several countries, it has become imperative to address the issue of health insurance especially among rural populace who lack access to quality health care delivery system. This is particularly important given that sustainable instruments for health financing are urgently needed to reduce high amount of out-of-pocket payments and the incidence of catastrophic health shocks in the developing world (WHO, 2006). Thus, the belief of direct public provision of health care services to aid its utilization by Nigerian citizen has been questioned in the recent past. There is now a growing realization that even

the poor can make small, periodic contributions that can go towards meeting their healthcare needs. As a result, health insurance is increasingly being recognized as a tool for financing healthcare provision and utilization in low-income countries (Jutting, 2004).

However, in developing countries few companies market health insurance to poor households (Pauly *et al*, 2006). Insurance companies do not target poor rural consumers for many reasons, ranging from their inconsistent incomes, which may lead to missed premium payments, to the relatively high transaction costs of servicing an inexpensive insurance policy. These problems are similar to those faced by the credit industry in developing countries, which led

to the creation of micro-finance. Micro-health insurance agencies have therefore followed the lead of micro-finance and have started to offer insurance to this previously un-served population. This has therefore given rise to the Hygeia Community based Health Insurance scheme. The scheme is a demand-driven, donor subsidized community health insurance scheme for low to medium income populations in Nigeria. It was launched in January 2007 and commenced operations in February 2007. The Hygeia Community based Health Insurance scheme is currently the local implementation partner of the Dutch Health Insurance Fund in Nigeria. The Fund has pledged funding for the co-premiums of 115,000 low income individuals over a period of 5 years. It is also working with the Dutch agency, the World Bank and some state governments to extend the coverage of the scheme to more low income people in the country.

Since its launch, the Hygeia Community based Health Insurance scheme has enrolled thousands of low income individuals, commencing with pilot schemes for Shonga Local Government Area and its environs in Kwara State, the Lady Mechanic Initiative and Market women in Lagos State. The benefit package provides coverage for the most common medical problems that are found among the target groups and consists of primary health care, limited secondary care, medication and hospitalization including HIV and AIDS treatment. Most of the beneficiaries of the scheme have reported and received treatment for malaria, maternal care, hypertension, upper respiratory tract infections, musculo-skeletal pains etc. Most of these conditions, they would hitherto have had to pay for on an out-of-pocket basis or patronize the unorthodox healthcare providers. In many instances without appropriate healthcare interventions these conditions would have led to significant morbidity and mortality. The scheme has also been involved in voluntary counseling and testing activities and identified HIV and AIDS positive enrollees who have been placed on antiretroviral (ARVs) drugs when required. Community outreach activities focused on topical public health conditions such as malaria, HIV and

AIDS, hypertension and diabetes mellitus have also served to raise awareness about these conditions and preventive modalities. The Hygeia Community based Health Insurance scheme has revitalized the health system of benefitting communities. It also continues to serve as a catalyst towards the attainment of the millennium development goals (Hygeia, 2013).

Unfortunately, empirical evidence on the impact of health insurance schemes such as this is scarce, and there are even fewer studies on the effects of insurance in developing countries. One reason for the lack of evidence is that it is difficult to find a valid group to compare with the insured. We cannot simply compare the outcomes of insured and uninsured households because health insurance status is typically strongly correlated with other household characteristics. For example, rich and well educated households typically have both better health (Asfaw, 2003) and better health insurance coverage (Jutting, 2004). Importantly, that correlation does not mean insurance improves health. At the same time, those in poor health may be more likely to purchase health insurance when it is offered (Cutler and Reber, 1998), but that correlation does not mean insurance worsens health. Worthy of note is the fact that a longitudinal study that assesses the impact of health insurance on livelihoods of rural households is not common in Nigeria as a whole and specifically in Kwara State. The study therefore seeks to assess the impact of the Hygeia Community based Health Insurance scheme on the livelihoods of rural households in Kwara State of Nigeria.

2.2. Methods

Descriptive statistics and the Propensity-Score-Matching model were used to analyze the data collected. The descriptive statistics was used to analyze the socioeconomic characteristics; the respondents' rating of the community based health insurance scheme, the per capita income, per capita calorie intake and food security status of both the beneficiaries of the scheme and the non-beneficiaries. Descriptive statistics used include measures of mean, standard deviation and

frequency distribution. This is essential to facilitate recognition of any difference as a real one or just by chance, when comparing the mean of variables or among groups of a variables. To evaluate differences in the mean between two variables paired t-tests method was employed.

Data and Sampling Techniques

The data for this study was collected using a well-structured questionnaire to solicit response on the socioeconomic characteristics of rural households in the study area. Also, information was collected on the sources of livelihood available to households, different types of insurance available to households, households' income level and food security status from both beneficiaries and non-beneficiaries of the he Hygeia community based Health insurance scheme in Kwara state, Nigeria. A three-stage

sampling technique was employed in selecting a total of 115 beneficiaries (Treatment group) and 60 non-beneficiaries (Control group) proportionately from Shonga, Lafiagi and Bacita districts of Edu local government area of the state. The first stage was the purposive selection of Edu Local government area because of the high number of the beneficiaries of the Hygeia Community based Health Insurance scheme in the areas. The second stage was a random selection of the Shonga, Lafiagi and Bacita districts while the third stage was a random selection of beneficiaries and non-beneficiaries of the programme from each of the districts. Table 1 gives the sample distribution of the beneficiaries and non-beneficiaries of the scheme across the three districts.

Table 1: Sample Distribution of Households across Shonga, Bacita and Lafiagi Districts

District	No of Beneficiaries	No of Non-Beneficiaries
Bacita	44	23
Shonga	28	14
Lafiagi	43	23
Total	115	60

Source: Field Survey, 2014

Propensity Score Matching (PSM)

To compare the welfare indices of beneficiaries and non-beneficiaries in the study area, propensity score matching (PSM) method was used. The propensity score was estimated using Logit regression model and nearest neighbour matching algorithm was adopted using the estimated propensity scores to match non-beneficiaries to beneficiaries of the scheme. The propensity score matching was then concluded with an estimation of the impact of the Hygeia Community based health insurance scheme intervention with the matched sample and calculation of standard errors. The propensity score matching (PSM) is a statistical matching technique that attempts to estimate the effect of a treatment, policy, or other intervention by accounting for the covariates that predict numbers. Unfortunately, for observational studies, the assignment of treatments to research subjects

receiving the treatment. PSM attempts to reduce the bias due to confounding variables that could be found in an estimate of the treatment effect obtained from simply comparing outcomes among units that received the treatment and those that did not. The technique was first published by Paul Rosenbaum and Donald Rubin in 1983, and implemented in the Rubin causal model for observational studies. The possibility of bias arises because the apparent difference between these two groups of units may depend on characteristics that affected whether or not a unit received a given treatment instead of due to the effect of the treatment per se. In randomized experiments, the randomization enables unbiased estimation of treatment effects; for each covariate, randomization implies that treatment-groups will be balanced on average, by the law of large is, by definition, not randomized. Matching attempts to mimic randomization by creating a

sample of units that received the treatment that is comparable on all observed covariates to a sample of units that did not receive the treatment. For example, one may be interested to know the consequences of participating in Hygeia insurance scheme. The people 'treated' are simply those participating in the insurance scheme. In this case, it is unfeasible (and perhaps unethical) to randomly assign people to the insurance scheme beneficiaries, so observational study is required. The treatment effect estimated by simply comparing a particular outcome between the beneficiaries and non-beneficiaries of Hygeia Community Based Health Insurance scheme would be biased by any factors that predict the insurance scheme intervention. PSM attempts to control for these differences to make the treated and non-treated groups more comparable.

The PSM is able to allow for causal inference and the minimisation of sample selection bias in non-experimental settings in which:

- Few units in the non-experimental comparison group are comparable to the treatment units; and
- Selecting a subset of comparison units similar to the treatment unit is difficult because units must be compared across a high-dimensional set of pre-treatment characteristics.

PSM employs a predicted probability of group membership e.g., treatment vs. control group based on observed predictors, usually obtained from logistic regression to create a counterfactual group. Also propensity scores may be used for matching or as covariates alone or with other matching variables or covariates. A propensity score is the probability of a unit (such as a person) being assigned to a particular treatment given a set of observed covariates. Propensity scores are used to reduce selection bias by equating groups based on these covariates.

Suppose that we have a binary treatment T , an outcome Y , and background variables X . The propensity score is defined as the conditional probability of treatment given background variables:

$$p(x) \stackrel{\text{def}}{=} \Pr(T = 1|X = x).$$

Let $Y(0)$ and $Y(1)$ denote the potential outcomes under control and treatment, respectively. Then treatment assignment is (conditionally) un-confounded if treatment is independent of potential outcomes conditional on X . This can be written compactly as

$$T \perp Y(0), Y(1) | X$$

Where \perp denotes statistical independence.

If un-confoundedness holds, then

$$T \perp Y(0), Y(1) | p(X).$$

4. Results and Discussions

Socioeconomic characteristics

Table 2 shows the summary statistics of the socioeconomic characteristics of the beneficiaries and non-beneficiaries of the Hygeia community based health insurance scheme in Kwara state, Nigeria. From the table, the mean values of the age, years of schooling, total household assets, farm size, farming experience adult equivalent of household size among others can be deduced. The results showed that the mean age of the beneficiaries and non-beneficiaries of the scheme was 43 years and 40 years respectively. This implies that majority of the household head are still active and in their active years of age. This result is similar to that obtained by Babatunde *et al* 2011 for a similar study in rural, Nigeria. The result further showed that most of the benefitting households have an adult equivalent household of about 5 persons while the non-beneficiary rural households have an average of 4 persons. With regards to education, the result showed that the mean years of schooling of the beneficiaries stood at about 7.5 years while for the non-beneficiary it was about 6.92 years. Most of the rural households practice farming at subsistence level, as the mean farm size was 2.73 hectares for the beneficiaries and 2.77 for the non-beneficiaries. For the rural farming households, the mean years of farming experience was 22 year for the scheme beneficiaries and 21 years for the non-beneficiaries. The average income per month was ₦4570.00 for the beneficiaries of the health insurance scheme and ₦4230.00 for the non-beneficiaries.

Table 2: Summary statistics of variables

Variables	Beneficiaries	Non-Beneficiaries	Pooled
	(N=115)	(N=60)	(N=175)
	Mean	Mean	Mean
Age (years)	42.97 (11.623)	40.40 (12.445)	42.09 (11.938)
Education (Years of Schooling)	7.50 (4.778)	6.92 (5.607)	7.30 (5.069)
Farm Size (Hectares)	2.73 (1.450)	2.77 (1.563)	2.74 (1.488)
Farming Experience (years)	22.15 (10.865)	20.73 (12.003)	21.66 (11.254)
Household Size (Adult Equivalent)	4.69 (1.788)	4.30 (1.816)	4.56 (1.802)
Total Asset (₦ '000)	410 (280.21)	382 (274.63)	401(277.84)
Dependency ratio	1.13 (0.833)	1.15 (0.768)	1.14(0.809)
Income (₦ '000)	4.570 (2.637)	4.23 (5.752)	4.45(3.975)
Health Expense (₦ '000)	0.63 (0.395)	0.77 (0.609)	0.68(0.482)
Calorie Intake (Kcal/AE/day)	3495 (1030.83)	2492.49 (411.57)	3151.46 (990.70)

Source: Data Analysis, 2014

Table 3 shows the rating of the community-based health insurance scheme by beneficiaries. The majority of the beneficiaries (about 47 per cent) rated the Community based insurance scheme in their area as very good while about 9

per cent said it was fair. On the other hand, 16.5 per cent said the scheme was excellent. This means that majority of the respondents derive some level of satisfaction from the services being provided through the scheme.

Table 3: Rating of the Community-based Health Insurance Scheme by Beneficiaries

Variables	Frequency	Percentage
Fair	10	8.7
Good	32	27.8
Very Good	54	47.0
Excellent	19	16.5
Total	115	100.0

Source: Field Survey, 2014

Per Capita Income

The per capita income was obtained by dividing the total household income by the adult equivalent of the household size. The result was used to group the respondents into terciles as shown in Table 4. The first tercile (low income group) had a per capita income range of between

₦302 - ₦2, 847 with an average per capita income of ₦2, 165.63. The second tercile (medium income group) ranges between ₦2, 879 - ₦4, 432 and an average of ₦3, 587.65. The third tercile (high income group) ranges between ₦4, 456 and ₦42, 334 with an average of ₦7, 643.79.

Table 4: Per Capita Income in Terciles

Income Terciles (₦)	Beneficiaries (N=115)		Non-Beneficiaries (N=60)	
	Frequency	Percentage	Frequency	Percentage
Low (302 – 2, 847)	34	29.6	25	41.7
Medium (2,879 – 4,432)	37	32.2	21	35.0
High (4, 456 – 42, 334)	44	38.2	14	23.3
Total	115	100.0	60	100.0

Source: Data Analysis, 2014

The modal income group for the beneficiaries is the high income group while that of the non-beneficiaries is the low income group. This result suggests that the beneficiaries of the scheme are better-off income wise than the non-beneficiaries. However, about 35 per cent of the non-beneficiaries fell in the medium income group. This implies that only a little effort is needed for them to move to the high income group and a health insurance scheme like this will give them the opportunity to stay healthy and therefore more active thereby serving as a platform to save more and increase the possibility of moving to the high income group.

Per Capita Calorie Intake

The per capita calorie intake of respondents was obtained by dividing the total household calorie intake per day by the adjusted adult equivalent (AE) household size. This was then used to group respondents into terciles as shown in table 5. The first tercile (low calorie intake

group) ranges from 1543.90 - 2714.50 kcal/AE/day with an average per capita calorie intake of 2, 318.90 kcal/AE/day. The second tercile (medium calorie intake group) ranges between 2720.25 – 3291.75 kcal/AE/day and an average of 3019.90 kcal/AE/day. The third tercile (high calorie intake group) ranges from 3296.50 and 8087.40 with an average of 4129.90 kcal/AE/day. About 72 per cent of the non-beneficiaries belong to the low calorie intake group while only about 14 per cent of the beneficiaries belong to the same group. On the other hand, 48.7 per cent of the beneficiaries fell in the high calorie intake group compared to only 3.3 per cent for the non-beneficiaries. This implies that beneficiary households consume more in terms of calorie intake than the non-beneficiary households. This result is similar to that obtained by Nguyen et al (2012) in their study of the impact of health insurance on health care treatment and cost in Vietnam.

Table 5: Per Capita Calorie Intake in Terciles

Calorie Terciles (Kcal/AE/ day)	Beneficiaries (N=115)		Non-Beneficiaries (N=60)	
	Frequency	Percentage	Frequency	Percentage
Low (1543.90 – 2714.50)	16	13.9	43	71.7
Medium (2720.25 – 3291.75)	43	37.4	15	25.0
High (3290.50 – 8087.40)	56	48.7	2	3.3
Total	115	100.0	60	100.0

Source: Data Analysis, 2014

Food Security Status

The food security status of the beneficiaries and non-beneficiaries of the programme is given in table 6. The results showed that 95.7 percent of the beneficiaries of the scheme were food secure while for the non-beneficiaries it was 43.3 percent. In like manner, only 4 percent of the

beneficiaries were food insecure while as much as 56.7 per cent of the non-beneficiaries were food insecure. This can be attributed to the fact that beneficiaries of the health insurance scheme pay less for health care and as such are able to save more. These savings are in-turn used in acquiring the needed food to stay food secured.

Table 6. Food Security Status

Food Security Status	Beneficiaries (N=115)		Non-Beneficiaries (N=60)	
	Frequency	Percentage	Frequency	Percentage
Food insecure	5	4.3	34	56.7
Food secure	110	95.7	26	43.3
Total	115	100.0	60	100.0

Source: Data Analysis, 2014

Impact of the Hygeia Community Based Health Insurance on Livelihood

The result of the logistic regression used to calculate the propensity scores for the analysis are shown in table 7 and the same independent variables were modeled for the two livelihood indicators. The estimation used bootstrapped standard errors to provide reliable standard errors and to account for the fact that the propensity score is estimated. The summary of the impact of the Hygeia community based health insurance on the calorie intake and the per capita income of the beneficiaries is given in table 8. ATT is Average Treatment Effects on the Treated (beneficiaries) and ATE is Average Treatment Effects on the population (beneficiaries and non-beneficiaries). As shown in the table, the result of the analysis showed that the scheme has a positive and significant effect on both per capita income and

calorie intake. This implies that beneficiaries have a higher per capita income and calorie intake of ₦1, 163.44 and 1036.30 kcal/AE/day respectively compared to the control group. Among the treated (beneficiaries) group however, the per capita calorie intake increased on the average by 1,017.67 kcal/AE/day, while the monthly per capita income increased by ₦1, 444.11. The average monthly per capita income for beneficiaries increased by ₦907. This implies that participating in the community based insurance will help the low income households in the state increase their per capita income by N907.00. This may be because these participating households will definitely have reduced out-of-pocket spending for healthcare services thereby increasing their disposable income. Their per capita income can also be increased if the savings they have because of reduced out-of-pocket spending is invested in high income yielding activities.

Table 7: Logistic Regression results for propensity score estimation

Variables	Calorie intake	Per capita income
Age of head (years)	0.0601* (1.84)	0.0601* (1.84)
Gender of head (male = 1)	1.5462 (1.32)	1.5462 (1.32)
Years of Schooling (years)	0.0426 (1.13)	0.0426 (1.13)
Farm Experience (years)	-0.0437 (-1.30)	-0.0437 (-1.30)
Access to Credit (yes = 1)	1.9723*** (2.82)	1.9723*** (2.82)
Household size (Adult Equivalent)	-0.0607 (-0.49)	-0.0607 (-0.49)
Farm size (Hectares)	0.2209* (1.65)	0.2209* (1.65)
Total Household Asset (Naira)	0.0000 (0.09)	0.0000 (0.09)
Constant	-2.6636 (-1.56)	-2.6636 (-1.56)
N	175	175

Source: Data Analysis, 2014; *, ***, indicate the coefficients are statistically significant at 10% and 1% level, respectively. Z-values are shown in parenthesis and are based on bootstrapped standard error

Table 8: Propensity Score Estimation of the Impact of Community-based Health Insurance on Calorie Intake and Per Capita Income

Variables	Calorie Intake	Per Capita income
Age (years)	20.387* (1.77)	-36.047 (-0.81)
Gender of household head (male=1)	587.033 (1.24)	-259.709 (-0.14)
Education (Years of Schooling)	-11.070 (-0.77)	0.199 (0.00)
Farming Experience (years)	-17.641 (-1.48)	39.752 (0.87)
Access to Credit (yes=1)	-332.748* (-1.65)	39.752 (0.87)
Household Size (Adult Equivalent)	-78.628* (-1.71)	-1002.448*** (-5.67)
Farm Size (Hectares)	98.459** (2.01)	1023.304* (1.65)
Total Asset (₦ '000)	0.001** (2.47)	0.004*** (3.50)
Health Insurance Beneficiary (Yes = 1)	1048.207*** (7.43)	907.35* (1.67)
Constant	1378.062** (2.12)	5173.42**

Source: Data Analysis, 2014; *, **, *** indicate the coefficients are statistically significant at 10%, 5% and 1% levels respectively. Z-values are shown in parenthesis and are based on bootstrapped standard error.

The result also showed that the calorie intake increased by 1048 kilocalories among the beneficiary households. This shows that the community based insurance can help rural poor households improve their food consumption significantly. One possible means by which this insurance scheme can bring about increased calorie consumption is by reducing the out-of-pocket expenses and increasing the purchasing power of these households such that they have access to increased access to good food. Alternatively, the scheme can help the problem of cash constraint and thus investment in agricultural

production to grow more food. This is consistent with the findings of Kai Liu (2013) and Aggarwal (2010) in a similar study.

4. Conclusion and Recommendations

The study revealed that there was no remarkable variation in the socioeconomic characteristics of the treated (beneficiaries) and the control (non-beneficiaries) groups. However, the beneficiaries were found to be better-off in terms of the per capita income and the calorie intake than the non-beneficiaries. This can be attributed to the fact that beneficiaries of the

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enjoyed reduction in out-of-pocket payments which increased their per capita income. This income can then be used in increasing their production capacities and as such their calorie intake. Also, the PSM estimation of the impact of scheme shows that the per capita calorie intake increased on the average by 1048 kcal/AE/day among beneficiary households while the monthly per capita income increased by ₦907.00. The study therefore showed that the Hygeia Community Based Health Insurance scheme has the potential to improve the livelihood of the rural farming households. The study recommended that the government should encourage the establishment of Community Based Health Insurance schemes in the rural areas of the country. Also, for effective and efficient functioning of Community Based Health Insurance in the country, health insurance providers should be encouraged to establish their own hospitals or clinics close to the rural areas as much as possible rather than partnering with other hospitals. In conclusion, the government should support the growth of community health insurance schemes in the rural communities by providing the enabling environment and making it more accessible to the rural populace.

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