
Basis for effective community-based Health Insurance schemes: investigating inequities in catastrophic out-of-pocket health expenditures, affordability and altruism**Obinna Onwujekwe^{1,2}, Benjamin Uzochukwu^{1,2,3} and Joses Kirigia⁴**

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Abstract

Background: Community-based health insurance (CBHI) schemes should be designed so that they are affordable, provide financial risk protection against catastrophic costs and harness community solidarity in form of altruism so as to ensure high levels of enrollment and use of the services. This paper presents information about the socio-economic status (SES) and geographic differences in affordability, catastrophic costs and altruism within the context of instituting effective CBHI schemes.

Methods: The study took place in a rural, urban and semi-urban community in two states in Nigeria. A questionnaire was used to collect information from 3070 randomly selected householders. Contingent valuation method was used to elicit altruistic willingness to pay. Catastrophic health expenditures were examined at 40%, 10% and 5% thresholds based on household non-food expenditures. Affordability was measured as proportion of total household expenditure that will be consumed by the existing per capita monthly premium for CBHI, which is 500 Naira. Data was examined for links between affordability, catastrophic costs and altruistic WTP with SES and geographic area of residence.

Results: Households are currently spending between 1139.6 Naira (US\$ 9.5) and 3846.5 Naira (US\$ 32.1) monthly on healthcare, and this was mainly as out-of-pocket expenditure. At the 40% household non-food expenditure threshold, 28.7% of households incurred catastrophic healthcare costs. Incidence of catastrophic costs was least in the urban area and amongst the highest quartile. A monthly premium of 500 naira (US\$ 4.2) was found to be less than 3% of households' monthly expenditures. The mean altruistic WTP was 202.7 Naira (US\$1.7) per year.

Conclusion: There were high levels of catastrophic costs, but with appreciable levels of affordability and altruistic WTP for CBHI, coverage can be increased and financial risk protection assured for most people that need CBHI.

Key words: Community-based health insurance; acceptability; affordability; enrolment; catastrophic expenditures

INTRODUCTION

A component of comprehensive health care financing strategy in Nigeria is the implementation of the National Health Insurance Scheme (NHIS), which will minimize direct out-of-pocket payments (OOPs) for health care in the country. The Nigerian NHIS is a social health insurance scheme started in 2005 and presently covers only federal government employees. The NHIS currently does not cover informal sector employees, and thus, community financing is a veritable option for insuring the financial health risks of people currently excluded by the NHIS. However, from 2011 the government plans to extend coverage of the NHIS to informal sector employees, using community based health insurance (CBHI) schemes as the vehicle. This will reduce the high level of OOPs in the country and engender higher level of financial risk protection.

OOPs is the predominant mechanism for financing health care in Nigeria, where public expenditures account for less than 30% of total health expenditure [1]. Less than 5% of Nigerians are covered by the formal sector aspect of the NHIS. Hence, there is the need to develop feasible and sustainable mechanisms for financial protection of the general population, especially those in informal sector employment, from the financial consequences of illness [2]. OOPs imposes financial heavy burden on households and increases the risk of impoverishment [3]. OOPs severely impede access to health care particularly for those in greatest need – the poor.

The WHO Commission for Macroeconomics and Health recommends that out-of-pocket expenditures by poor communities should be channeled into community financing schemes to help cover the costs of community-based health delivery [4]. There is evidence that CBHI provides some financial risk protection by reducing direct out-of-pocket spending and could lead to improvement in quality of services [5]. While social and private health insurance schemes seem to provide alternative arrangement for pooling of risks and financing health, in many instances they are severely

limited in scope, covering mostly the non-poor, people in the formal sector and those who can afford high premiums associated with such arrangements. CBHI offers opportunity for coverage of many people outside the formal sector, and if well designed, may be inclusive of the poor.

To ensure that any CBHI scheme to be implemented is acceptable, affordable and can protect against the unexpected high costs of healthcare, there is need to examine the acceptability, affordability and presence of altruism for ensuring increased coverage of the scheme. This presupposes that for CBHI to have wide coverage, be effective and successful: it has to be affordable by providing financial risk protection so that beneficiaries will not incur catastrophic health expenditures; it has to be acceptable to the potential enrollees; and altruism has to be present in the community so that the economically better-off people can contribute extra money so that the economically worse-off people can enroll and benefit [6]. Most people should of course be willing to pay for CBHI for themselves and members of their households.

Affordability is concerned with people's ability to pay CBHI premium. It is important to ensure that the levels of premium to be fixed are affordable to the potential beneficiaries and households would not forgo other basic needs (e.g. education, food, shelter, potable water and improved sanitation) because they have to contribute regular CBHI premiums.

The risk of catastrophic health expenditures is exacerbated by lack of financial risk protection, especially where people pay primarily out-of-pocket for health care [7]. Available evidence shows that the heaviest burden of health care costs, particularly those that are considered catastrophic, falls on the poorest [8]. Although the costs of illness differ by disease type [9,10], regressive cost burdens were found among the poorest households in urban and rural Kenya for all categories of illnesses studied [11]. As described by Xu *et al* [8], as the volume of total health expenditure met by out-of-pocket payments increases, the range of catastrophic payments also increases [12]. Many household

surveys suggest that the average household's contribution to per capita health expenditure in most economies is about 3 –5% of its income [13]. Using a threshold of 15 to 20% of income, Feder *et al* [7] estimated that expenses of 10 or 20% of income are typically within the catastrophic range.

Altruistic contributions by richer people can be used to enroll the poorest SES in CBHI. The strong sense of social contract (love thy neighbour like thyself attitude) that exists within Nigerian communities is a strong motivational force for altruistic behavior [14]. The generic definition of altruism (or caring externality) is concern for the welfare or plight of others [15]. Altruism can be elicited using the contingent valuation method (CVM). The CVM is increasingly being used to better understand the method and to aid decision-making [16]. There are three components of value that the CVM measures [17]: (1) Use value, which is the valuation of respondents' willingness to pay for the good because s/he will directly consume it. (2) Non-use, existence or option value – referring to valuation of the respondent's willingness to pay for the good not that s/he will directly consume it at present, but wants to be reassured that it exists in case s/he will need to consume it in the future. (3) Altruism or caring externality – which is respondent's willingness to pay for others to consume or benefit from the good or service in question.

This study examined socio-economic and geographic differences in incidence of catastrophic out-of-pocket health expenditures, affordability of CBHI and level of altruistic WTP for CBHI. This is because, unlike many insurance schemes, CBHI schemes are typically based on the concepts of mutual aid and social solidarity and are typically designed by and for people in the informal and rural sectors who are unable to get adequate public, private, or employer-sponsored health insurance [18].

RESEARCH METHODS

STUDY AREA:

The study was conducted in three communities in Enugu and Anambra States of southeast Nigeria. In Anambra state, the communities were: Awka (urban); Amawbia (semi-urban); and Amansea (rural). In Enugu state, they were: Uwani (urban); Iji-Nike (semi-urban); and Amokwe (rural). The selection of the three different types of communities presented a broad picture about affordability and altruism within CBHI in different settings.

In Anambra state, there is an existing CBHI scheme that covers some few communities. The current premium that is contributed by beneficiaries is 500 Naira per person per month. The formal sector aspect of the National Health Insurance Scheme (NHIS) covers the federal public servants in the two states and the monthly capitation per enrollee is 500 Naira.

STUDY DESIGN AND STUDY TOOLS:

This was a cross-sectional study. It used both interviewer-administered questionnaire and focus group discussions. A pre-tested interviewer-administered questionnaire was used to collect information from randomly selected households. The questionnaire was administered by trained interviewers to either heads of households or the most senior member of the household using an adequate sample of 3070 randomly selected households from the six communities. The households (minimum of 500 from each community spread) were selected using simple random sampling technique from a sample frame of households numbering system prepared by the National Bureau of Statistics. Adequate sample size was determined, using a power of 95% confidence

level and utilization rate of health facilities of 20%. The interviewers were trained over a period of three weeks so as to ensure their mastery of the questionnaire, especially issues about health insurance.

Data was collected on the demographic and socio-economic characteristics of the people and on household health care expenditures using a one-month recall period. Data was also collected on household weekly, monthly and annual expenditures on a variety of non-food goods and services. All the household expenditures were converted to their monthly values. In addition, data was collected on household weekly food costs and ownership of a wide variety of assets. Altruistic willingness to pay (WTP) was determined using the contingent valuation method (CVM). Maximum altruistic WTP was elicited using a dichotomous with open-ended follow-up question format. Before eliciting altruistic WTP, the WTP of the respondents to pay for themselves and for their other household members was elicited. An explanation of what health insurance means and a scenario that depicts the CBHI scheme were presented to the respondents before eliciting their maximum WTP.

Eliciting Altruistic WTP: The scenario and WTP question format used

As you may know, there are some people who are too poor to pay any premium for private health insurance, but that really need to be enrolled in the scheme so that their health status would be improved, enhance their productivity and potentially decrease their poverty level.

1a. Are you willing to contribute 500 Naira per year so that some of the poorest people could be enrolled in the private health insurance scheme per year [] 1 = yes
0 = no (no matter the answer, go to 1b)

1b. What is the maximum amount of money that you are willing to contribute yearly so that some of the poorest people could be enrolled in the private health insurance scheme? [] Naira

DATA ANALYSIS:

Tabulations, bivariate and multivariate analyses were undertaken. The data was examined for correlation between socio-economic status (SES) and geographic location with affordability, incidence of catastrophic expenditures and altruistic WTP. For analyzing the SES equity implications of the data from the consumers, an asset-based SES index was created using principal components analysis [19,20]. Information on household ownership of radio set, bicycle, television set, motorcycle, fridge, as well as per capita weekly food value were the variables in the SES index. The first principal component was used to derive weights for the SES index. The SES index was used to divide the households into quartiles and chi-square analysis was used to determine the statistical significance of the differentiation of the dependent variables into SES quartiles. Chi-square analysis was also used to examine the differences in the key variables by geographic area of residence of the respondents (divided into urban, peri-urban and rural).

For the analysis of current levels of catastrophic health expenditures, three thresholds were used. These were 40% of household non-food expenditures, 10% of household non-food expenditures and 5% of household non-food expenditures. Affordability (ability to pay) was measured as the proportion of current monthly levels of CBHI premium and capitation by the NHIS in monthly household consumption. This was based on the assumption of a monthly premium of 500 Naira per person based on current levels of premium the CBHI scheme in Anambra state and monthly capitation rate of the NHIS. The theoretical validity of altruistic WTP was assessed using a logistic regression of yes or no responses and Log of Ordinary Least Squares (OLS) of elicited altruistic WTP amounts.

RESULTS

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

Most of the respondents from the six study communities were male heads of households (61.7%), in their forties, main income earners (83%) and main decision makers about household expenditures (84.7%). The average number of household residents was five people. Majority of the respondents had some formal education and the least numbers of years spent

were found in the rural areas. There were a total of 1014, 1055 and 1001 respondents in the urban, peri-urban and rural sites respectively. Table 1 provides a summary of household annual expenditures on various items, e.g. food, clothing, rent, health care, etc. Uwani urban area had the highest mean expenditure on food and other household items.

Variables	Awka (urban)	Amawbia (peri- urban)	Amansea (rural)	Uwani (urban)	Iji (peri- urban)	Amokwe (rural)
Mean weekly food cost	2403.05	2231.41	1768.73	2899.22	1775.78	1722.95
Mean annual food value	124958.6	116033.3	91974.0	150759.4	92340.6	89593.4
Annual household expenditures on:						
Clothing	22628.3	16930.2	9781.5	36465.9	13413.4	15224.5
Rent	35388.4	13602.6	2658.9	55732.8	28045.6	18666.5
Durable household goods	12453.3	755.0	323.3	29270.4	180.2	16492.5
Healthcare	12111.1	4683.0	1871.9	14725.4	5732.2	11583.4
Cooking fuel	17430.5	17814.8	7829.2	30640.3	18098.1	9874.1
Educational expenses	28387.3	19964.0	8861.5	99505.1	39187.8	19416.5
Other expenses (specify)	39747.3	5716.9	4682.8	12768.3	5864.7	4920.0
Total	168146.3	79466.4	36009	279108.2	110521.9	96177.5
Grand total (Food + other items)	293104.9	195499.7	127983.0	429867.7	202862.5	185770.9

Table 1: Household annual expenditures on various items

Health seeking, cost of illness and payment mechanisms for the respondent

The number of respondents who were ill one month before the date of the interview were: Amansea 191 (38.2%); Amawbia 213 (42.6%); Awka 162 (32.4%); Amokwe 214 (42.8%); Iji 203 (36.6%); and Uwani 159 (30.9%). Therefore, 321, 416 and 405 people were ill and sought treatment in the urban, peri-urban and rural areas one month to the date of the interview respectively. Malaria was the major illness in the communities. The major sources of treatment were patent medicine dealers, followed distantly by public and private hospitals/clinics.

The total cost of treatment was 2819.9 Naira, out of which drug costs alone contributed more than 90%. Out-of-pocket spending (OOPs) was the major payment mechanism and was used in more than 85% of cases in the communities. Health insurance was rarely used in the six communities and was only reported by one respondent in the urban area and three respondents in the rural area. People mostly coped with payment using their own money. Exemptions, deferrals and subsidies were rarely used (or available).

The residents of peri-urban areas spent more on treatment compared to the urbanites and rural dwellers (Table 2). There was no SES difference in both the number of minutes that it takes to travel to the different providers as well as the travel expenditures. However, there was SES differentiation in treatment expenditures, where the most-poor spent the least amount of money on treatment.

Table 2: Geographic and SES differences in average monthly treatment and transportation costs

	Transport cost (SD)	Drug cost (SD)	Mean treatment cost (SD)
Combined	85.5 (242.5)	2191.3 (9580.2)	2819.9 (10676.0)
By geographic area			
Urban	93.8 (291.5)	2316.2 (7852.0)	3255.9 (10054.0)
Peri-urban	72.9 (224.2)	3034.1 (14037.7)	3639.7 (14743.4)
Rural	93.1 (216.6)	1209.4 (1773.3)	1624.1 (3812.3)
Urban:Rural ratio			
X2 (p-value)	14.5 (p<0.05)	17.2 (p<0.05)	11.8 (9p<0.05)
By SES			
Q1: most poor	92.5 (277.0)	1530.2 (6840.8)	1821.7 (7097.0)
Q2: very poor	73.6 (243.5)	2892.5 (16953.3)	3559.1 (17371.4)
Q3: poor	74.8 (151.4)	2165.6 (4987.8)	2803.6 (6940.5)
Q4; least poor	101.3 (277.3)	2803.6 (6940.5)	3429.9 (8509.4)
Q1:Q4 ratio			
X2 (p-value)	0.7 (p>0.05)	27.5 (p<.05)	28.2 (p<.05)

Catastrophic costs:

The incidence of catastrophic expenditures was quite high and from the full sample, 28.7% of health expenditures were catastrophic at the 40% threshold, whilst 75.8% of health expenditures were catastrophic at the 5% threshold. Catastrophic expenditures were more in rural and peri-urban areas where people mostly employed in the informal sector live. On all the catastrophic thresholds, the most-poor had the highest incidence of catastrophic expenditures, which ranged from 26.9% at the 40% threshold to 83.2% at the 5% threshold.

Table 3: Incidence of catastrophic health expenditures for different population groups at different thresholds

	>40%	>10%	>5%
Combined data	321 (28.7%)	654 (58.5%)	847 (75.8%)
By geographic area			
Urban = 321	68 (21.2%)	139(43.3%)	196(61.1%)
Peri-urban = 416	133(32.0%)	243(58.4%)	303(72.8%)
Rural = 405	120(29.6%)	272(67.2%)	348(85.9%)
X2 (p-value)	9.7 (.008)	41.8 (.00001)	62.4 (.000001)
By SES			
Q1: most poor = 328	97(29.6%)	215(65.6%)	273(83.2%)
Q2: very poor = 267	79(29.6%)	145(54.3%)	196(73.4%)
Q3: poor = 278	78(28.0%)	151(54.3%)	186(66.9%)
Q4; least poor = 253	65(25.7%)	138(54.5%)	185(73.1%)
X2 (p-value)	1.8 (.61)	15.3 (.002)	27.1 (.000001)
Q1:Q2 ratio	1.5	1.6	1.5

Affordability of CBHI:

Analysis show that based on the existing CBHI premium /NHIS capitation of 500 Naira per

month per person, the monthly premium will not consume more than 2% of monthly household expenditure. This analysis is based on the annualized household expenditures.

Altruism: Altruistic Willingness to pay (WTP) for Community-based health insurance

It was found that less than 40% of the respondents were willing to pay for CBHI and the average that respondents were willing to pay as a monthly premium for themselves ranged from 250 Naira (US\$1.7) in a rural community to 343 Naira (US\$2.9) (Onwujekwe et al, 2010). Table 4 shows that the respondents were willing to contribute an average amount of 202.7 Naira per year so that the very poor and indigent members of their communities could benefit from the scheme (altruistic WTP). The average WTP amount per respondent was 261.6 Naira per month as premium for CBHI. The amount was slightly lower for other household members at 211.1 Naira per person per month. Each respondent was willing to enrol an average of three extra people per household.

Table 4: Altruistic WTP for community-based health insurance in the three types of communities and by SES

	Altruistic WTP Mean Naira (US\$)
By geographic area	
Urban	358.9 (\$3.0)
Peri-urban	182.0 (\$1.5)
Rural	61.5 (\$0.5)
X2 (p-value)	473.2 (p<.05)
By SES	
Q1: most poor	91.0 (\$0.8)
Q2: very poor	167.2 (\$1.4)
Q3: poor	225.4 (\$1.9)
Q4; least poor	316.2 (\$2.6)
Q1:Q4 ratio	0.3
X2 (p-value)	282.2 (p<.05)

In logistic regression using the pooled data from all the communities, altruistic WTP was positively and statistically significantly related to number of years that the respondent spent in

formal education, incidence of payment using OOPs and total household expenditures. Conversely, altruistic WTP was negatively and statistically significantly related to geographic area of residence and total number of people in respondents' household. The regression was statistically significant ($LR^2 = 205.4$ and $p < 0.00001$). The Pseudo R^2 was 0.21 and the regression predicted 78.7% of the observations.

The results of the reduced log OLS multiple regression model are presented in Table 5.

Altruistic WTP was positively and statistically significantly related to SES, total health expenditures, total household expenditure, payment for health care using OOPs and by instalments. Conversely, altruistic WTP was negatively and statistically significantly related to geographic area of residence. The regression model was statistically significant and adjusted R^2 was 0.40.

Table 5: Reduced log ordinary least squares models of altruistic WTP

Variables	Coefficient (std error)
Urban/Periurban/Rural residence	-0.74(0.05)***
State of residence	
Household status of respondent	0.05(0.04)
Whether respondent is the main decision maker	
Total number of people in household	
Age of respondent	
Sex of respondent	0.10(0.07)
Whether respondent went to school	
Number of years spent schooling	
Total expenditure to receive treatment	0.001(0.001)***
Paid out of pocket for health care	0.33(0.15)**
Paid by health insurance	1.70(0.31)**
Paid in installments	0.31(0.13)**
Paid with own money	
Borrowed money for payment	
Total household expenditure	0.14(0.04)**
Socioeconomic status	0.07(0.03)**
Number of observations	648
F statistics	49.40 (p<0.0001)
Adjusted R^2	0.40
Ov test: F(p value)	1.12(0.34)

*P<0.10; ** p<0.05; *** p<0.01

DISCUSSION

There was high incidence of catastrophic expenditures in the study area, reflecting the high level of OOPs and financial burden that households bear, especially amongst the most-poor and rural population groups. This is because the occurrence of catastrophic spending was inequitable as rural dwellers and very poor people had the highest incidences of catastrophic expenditures. These are the groups of people most likely to be employed in the informal sector, to whom CBHI will be most beneficial in providing financial risk protection against health expenditures. However, the most-poor may have to depend on altruistic contributions to be enrolled in CBHI as they may not afford the full premium.

However, with contributions for CBHI being far much less than what households currently spend on healthcare, the CBHI can be said to be potentially affordable and is also unlikely to lead households to make catastrophic payments which tip them over into poverty. This is potentially so since various aspects of scheme design will need to be well implemented for the overall cost to be affordable to households. Households will also need to be made to understand the level of health care expenditure they usually make and how the CBHI reduces such losses. Scheme design then has to be trustworthy and the payment and service use mechanisms fashioned to prevent underhand payments. The services listed in the benefit package should also be provided accordingly as payments for health services included in the benefit package but unavailable will lead to use of health providers not included in the scheme, extra expenditure on healthcare, and an eventual dissatisfaction with the scheme. In other words, the CBHI will be seen to be affordable only if the health care needs of the people which they usually would spend on are all catered for under the scheme.

It was seen that many people were willing to contribute for altruism and it is hoped that majority of people will actually pay when the

schemes are implemented. Previous studies in a similar study area found significant positive correlation between stated and altruistic WTP [14,21]. However, the mean maximum amount chosen by the people who were willing to contribute for the poor to be included in the scheme was also low signifying a reluctance to contribute to the benefit of others. These findings suggest that it may be necessary to ensure that everyone who is enrolled in the scheme pays premiums and the government may need to specifically pay for the poor, and other enrollees will need to know that payment has been made for such groups. Scheme design will therefore include the need for budgetary provisions/subsidies for the poor. Where this is not done, the scheme may witness loss of members and a decline in the size of financial pool. It may also bring about a decrease in the quality and extent of health care service provided for those who do not pay premiums and re-introduction of other strategies of payment for health care such as out of pocket payments.

The negative relationship between altruistic WTP and geographic area of residence in regression analysis implies that urbanites were willing to contribute less altruistic amounts of money compared to the peri-urban and urban dwellers. The inference is that altruism was more in the rural areas, which is not surprising given that rural Nigerian communities comprise people from the same tribe or clan, are closely knit and hence more willing to show solidarity and exhibit “love thy neighbor” tendencies. Richer people were more likely to state higher altruistic WTP amounts as inferred from the positive relationship between altruistic WTP and SES status because higher SES groups have more disposable income to contribute to others. Generally, philanthropy is positively related to wealth. A positive implication of the finding of the willingness of wealthier groups to pay more is that households may accept to make financial contributions according to their ability to pay [22,23].

The positive relationship of previous healthcare expenditures and payments by OOPs showed that people that incurred higher expenditures and paid by OOPs possibly better appreciated the pains of such payments and the need to protect the poor from such payments. Similarly, people that paid through installments and/or health insurance for healthcare most likely appreciated the benefits of such stress-free payment mechanisms, and hence, were more altruistic than people that did not use health insurance or that paid by installments.

Finally, it was found that people are paying for healthcare mostly through OOPs and there was low level of use of health insurance in the study areas. However, as was found in the study, CBHI is potentially affordable. However, there were issues of geographic and SES inequity in WTP and other factors that should be addressed before CBHI schemes are developed and implemented. Finally, one may query whether stated altruistic WTP will translate into actual altruistic WTP when people are asked to contribute the amounts of the money that they stated. This is an area that future studies can explore. It is believed that altruism will actually play a role in ensuring that the most-poor and enrolled in CBHI.

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