VALUING HEALTH INSURANCE FOR CHILDREN UNDER FIVE: A CASE STUDY OF RURAL FARMING COMMUNITIES

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Abstract
The death rate of children under-five from preventable and treatable diseases is disproportionately high in rural agrarian communities. Meanwhile, health insurance is not accessible to such rural population, increasing their out-of-pocket medical expenses. Surprisingly, the literature remains sparse on alternative ways for such communities to finance their health expenditure. This paper examines the rural households' willingness-to-pay (WTP) for health insurance programme for children under five years old in Gujba local government. Data were analysed using contingent valuation method and the result shows that 60% of the households spent less than ₦1,600 per month in medical expenditure on their children. Meanwhile, sizeable number of the farming households (45.2%) earned an annual farm income of ₦800,000 - ₦1,000,000. The analysis shows that the respondents are willing to pay ₦8,438 to ensure their children have access to health insurance programme. The study also found that insurance premium, income, service satisfaction and numbers of under-five children in the household have significant effect on WTP while marital status, gender, age and education had no statistically significant effect on WTP. The study concludes that having health insurance programme for under-five children in Gujba local government area of Yobe State is feasible since rural farming communities are willing to pay a premium if the service is made available.

Keywords: Under-five children insurance, VGSHIP, farming households, Gujba Local Area

1. Introduction

Historically, the first country to establish health insurance was Germany in 1883. The idea of National health insurance programme was first introduced to Nigeria in 1962 but it was not put into law because of inadequate health care service providers in the country. NHIS aims at protecting people from out-of-pocket (OOP) medical expenditure and decreasing cost of health services. Other reasons for NHIS include; attainment of universal health coverage (UHC), increasing living standard of its citizens and ensuring private sector involvement which will consequently lead to investment in the health sector (Adewole, Dairo & Bolarinwa 2016, Philip *et al.,* 2019). It is documented that OOP payments accounts for well over 65% of all health expenditures (Ogben & Ilesanmi 2018), which with no doubt would discourage members of poor farming community from seeking health service for under-five children, most especially during the rainy season when they might have invested all resources in farming, threatening the lives of this vulnerable group.

After several trials by different administration, NHIS was finally established in 2005 with the aim of ensuring all citizens have access to adequate, qualitative and affordable health services (Edeh & Udoikah 2015).

Health Insurance is a safety measure taken by individuals that guarantees the provision of needed health care services after a payment of certain (meagre) contribution at regular intervals. In other words, it involves transferring the financial burden of healthcare services to policy providers over time. This allows subscribers access to have health services anytime the need arises by making little or no payment when receiving the service depending on the policy purchased (Onyedibe et al., 2012). Going by this definition, health insurance may increase household welfare by mitigating the

financial losses due to illness and consequently saving income and reduce uncertainty that may occur at the time of sickness. Over the 16 years of its implementation, investigations showed that the NHIS has secured health insurance coverage to not more than 5% of Nigerians (Aregbeshola & Khan 2018). This implies that the NHIS has left much to be desired in reaching a greater share of the population especially the poor, vulnerable and informal sector.

For every country to achieve economic growth there should be an improvement in its health sector because poverty can expose a household to health risks leading to unplanned expenditure and consequently negatively affecting their socio-economic status through decreased productivity. Governments in many low-income countries like Nigeria were not able to provide citizens with quality health services, most especially, those leaving in the rural communities (Titus, Adebisola, & Adeniji, 2015 and Ogben & Ilesanmi, 2018).

Meanwhile, it is a global mandate for countries to do everything possible towards realization of UHC as parts of the targets for Sustainable Development Goals (SDGs) (Aregbeshola& Khan 2018). "But Nigeria cannot achieve UHC until the NHIS is made compulsory for all Nigerians", according to the executive secretary of the scheme (Sambo, 2019).

Since the return of people from the displaced areas of Gujba local government as a result of activities of Boko Haram insurgency, children, most especially under-five who are considered the most vulnerable have no adequate access to quality healthcare delivery (UNICEF, 2022). This is because the operations of most of health service centers are skeletal. Many health care service personnel who fled the areas in 2014 have sought redeployment to other communities in the cities of Damaturu and Potiskum and other places, which are considered relatively more secured. This have left many residents of the farming communities in Gujba LGA with poor quality health services.

Situation Analysis of Children particularly, Multidimensional Poverty Index (MPI) in Nigeria which encompasses health, nutrition, social protection, education and livelihoods of children, shows that Yobe state has the worst index, with direct implications for child deprivations (UNICEF, 2022). Thus, having an insurance policy accessible, particularly to children under-five in rural farming communities of Yobe State is worthwhile. This will enhance the living standard and even life expectancy of under-five children in the area.

NHIS encompasses a myriad of other health insurance policies including; Formal Sector Social Health Insurance Programme (FSSHIP), Community Based Social Health Insurance Programme (CBSHIP), Tertiary Institution Social Health Insurance Programme (TISHIP), Public Primary Pupils Social Health Insurance Programme (PPPSHIP), Mobile Health insurance scheme, Voluntary Contributors Social Health Insurance Programme (VCSHIP) and Vulnerable Group Social Health Insurance Programme (VGSHIP) with the sole aims of working toward UHC (Aregbeshola & Khan 2018).

In specific reference to VGSHIP, the 2012 Operational Guidelines of NHIS states that the Vulnerable Group Social Health Insurance Programmes are designed to purposefully make healthcare services accessible to persons who cannot engage in productive economic activities due to limitation, including age. These comprise the prison inmates, physically challenged, pregnant women, internally displaced persons, and children under-five, among others (Joseph & Sa'id, 2019). However, this policy is unknown to many people.

Yobe state was among the earliest states to join FSSHIP as early as 2005. However, the programme is only accessible to people in the formal sector with a very limited population. Moreover, having an insurance policy in rural community like Gujba local government will alleviate the poverty level in the area which stood at 71% more than any other local government in the state (Yobe State, 2017). General Hospital

BuniYadi is among the 14 government hospitals in the state that is the only NHIS approved service provider in Gujba Local Government Area. The hospital provides NHIS service to the staff of Federal Government College (FGC) BuniYadi, Nigerian Police Force and National Population Commission that reside in the area, excluding the largest but informal sector population of the area, most especially including the vulnerable under-five children.

Hence, considering the non-coverage of the majority of the vulnerable under-five children in the NHIS programme in the area, the originality of this study lies in estimating households' willingness-to-pay (WTP) for VGSHIP in Gujba Local Government Area of Yobe State. This analysis is necessary to ascertain the feasibility of introducing health insurance for under-five children in the area. While it is acknowledged that feasibility requires broader cost-benefit assessments (CBA), estimating WTP will provide policy-relevant information on VGSHIP policy pricing (Ogben & Ilesanmi 2018; Asgary et al., 2004).

In one of the earliest studies on the ascription of policy premium to health insurance, Asgary *et al.*, (2004), used contingent valuation method (CVM) based on iterative bidding game technique to estimate rural households' WTP for health insurance in Iran. Using bid vectors from 5,000 to 50,000 rials, the study estimated multiple regression based on ordinary least squares, using maximum WTP bid by each respondent. Finding revealed that households in rural communities of Iran are willing to pay an average of 22,044 rials (US$ 2.77) per month for health care insurance. Similarly, village characteristics, number of visits to hospital, socio-economic characteristics of respondents and the availability of health infrastructure in the village were found to significantly influence households' choice for subscribing health insurance.

Meanwhile, methodology-wise, despite Asgary et al (2004) adopted iterative bidding game in data collection, the estimate of the study's WTP is relatively simple based on the traditional open-ended amount revealed by respondents was used. But open-ended CVM is prone to strategic bias, leading to overestimation or underestimation of premiums. Thus a superior and more reliable procedure is to indirectly measure WTP with qualitative dependent variable models following the adoption of bidding game peculiar of dichotomous choice contingent valuation method (CVM) as suggested by Arrow et al (1993).

Subsequent studies in Nigeria have however, in compliance with Arrow et al (1993), adopted dichotomous choice CVM procedure. These include Onwujekwe, et. al., (2010) in Anambra and Enugu states, in Nigeria, Banwat, et. al., (2012) in rural communities of Plateau State, Nigeria, Babatunde *et al.*, (2016) in in Kwara state, Nigeria, Ijeoma *et. al.*, (2019) on urban and rural households in Lagos State, and Ogben and Ilesanmi (2018) in Federal Capital Territory Abuja, Nigeria. However, none of these studies focused on VGSHIP or health insurance for children under-five despite they are the most vulnerable.

2. Methodology

2.1. The Study Area

The study was carried out in five randomly selected wards of Gujba local government area. Gujba Local Government Areas is one of the 17 Local Government Areas in Yobe state with its capital at Buni Yadi. It lies in the southwestern part of the state at latitude 11°29′52″N and longitude 11°55′51″E, occupying an area of 3,239 Km^2 with 456 meters elevation above the sea level. It has a population of 184,200 as at 2016. Farming is the main economic activity undertaken in the area. The major crops grown in the area include rice, maize, sesame, millet; sorghum, groundnut, and beans.

2.2 Study Sample

Household heads served as respondents for the study and 384 household heads were selected for

the study. Meanwhile, 10% (41) of the total respondents were added to make a total of 425 respondents in order to accommodate the expected unusable responses arising from uncompleted and unreturned questionnaires as suggested by Mitchell and Carson (1989). Multistage sampling technique was used in the selection of the respondents for the research.

In the first stage, Gujba Local Government area of Yobe State, was selected, being among the dominant rural farming communities and also one of the terribly affected areas by Boko Haram insurgency in the state.

Likewise, it is the local government area with the highest rate of poverty (71%) in the state (Yobe, 2017). In the second stage, five out of the ten districts (wards) in the local government were randomly selected. The third stage entails the selection of 425 respondents from the five wards, computed using sample size determination suggested by Mitchell and Carson (1989), where n $= \left[\frac{ZV}{\Delta}\right]^2$ such that; n= the required sample size, Z= the selected critical value of desired confidence level =1.96, V= the coefficient of variation =2, Δ = acceptable difference between true WTP and estimated WTP =0.2.

Primary data was gathered from the responses of households' heads using structured administered questionnaire. Contingent Valuation Method was chosen as the economic valuation method to estimate households' WTP for under-five children health insurance programme in the area. (Yacob, Radam & Awang 2008).

2.3 Research Questionnaire

The questionnaire for the research was adapted from Adam (2014) and Owusu-Amankwah (2018) and modified to the context of the study. Three (3) field assistants were trained specifically to assist in administering the questionnaires. The study's questionnaire was divided into four (4) sections, starting with the introductory letter.

The second section contained a description of the VGSHIP scenario. Meanwhile, the third section sought information on respondents' socio-economic characteristics, including; gender, age, educational qualification, annual income, marital status, numbers of children per household and monthly medical expenditure. The last section contained questions on the factors determining WTP for VGSHIP to insure under-five children.

3. Results and Discussion

Descriptive statistics, logistic regression model and economic valuation equation were used to analyze the data for the research.

3.1 Socioeconomic Characteristics of the households

Table 1 presents socioeconomic characteristic of the respondents. It is evident that out of 425 total respondents used in the study, 38.6% which constitute the lager share (majority) of the respondents are aged between 38 to 47 years old. Most of the respondents 91.3% are married. Likewise, 92.2% of the responses are from male. Majority (53.2%) of the respondents declare having 2 to 3 under-five children. This makes the sampled households relevant to the research context.

Table 1: Socioeconomic Characteristic of the respondents

Variables	Frequency	Percent
Age bracket of respondents		
18-27	62	14.6
28-37	140	32.9
38-47	164	38.6
48-57	48	11.3
58 and above	11	2.6

Marital status		
Married	388	91.3
Widow	25	5.9
Divorce	10	2.4
Separated	2	0.5
Respondent's Gender		
Male	392	92.2
Female	33	7.8
Range of Children/household		
None to one Child	108	25.4
2 to 3 Children	226	53.2
4 to 5 Children	81	19.1
6 Children and above	10	2.4
Annual income		
₦200,000-₦400,000	60	14.1
₦500,000-₦700,000	137	32.2
₦800,000-₦1000,000	192	45.2
₦1,100,000 and above	36	8.5
Educational level		
Qurán	164	38.6
Primary	51	12.0
Secondary	86	20.2
Tertiary	79	18.6
No Education	45	10.6
Medical expenditure greater than ₦1500		
Medical expenditure less than ₦1,600	255	60.0
Medical expenditure equal to or more than ₦1,600	170	40.0

Source: Field Survey, 2021

It can be observed from the table that many farmers in the rural areas (50.8%) acquired formal education, while 38.5% acquired Qur'an education only, implying that most of the farmers are educated. The table also shows that 60% of the respondents spent less than ₦1,600 per month as medical expenditure on under-five children. The results in the table reveals that sizeable number of the farmers (45.2%) earned an annual income in the range of ₦800,000 - ₦1,000,000. This makes it feasible for them to subscribe health insurance policy.

3.2 Factors determining rural communities' willingness-to-pay for Under-Five VGSHIP

Table 2 shows the diagnostics test result for the model assessing factors determining farmers' willingness-to-pay for VGSHIP for under-five children. Pseudo-R^2, LR, P-value, restricted and unrestricted log likelihood functions were used to evaluate the model's goodness of fit. The unrestricted log likelihood value is closer to zero in relation to the restricted log likelihood, supported by a statistically significant LR Chi^2. This further validates that the model has a good fit. Meanwhile, the Pseudo R^2 revealed that the model explains as much as 46% variations in the dependent variable.

Table 2 Estimated Contingent Valuation Model on WTP for U5 children VGSHIP

Parameters	Coefficient	Std. erro	Z	P-value	95% conf. interval Upper	Lower
Bid1	0.0005**	0.0000	8.77	0.0000	0 .0004	0.0007
Income group						
High income	-5.3657**	0.6174	-8.69	0.0000	-6.5758	-4.1556
Marriage group						
Single	-0.3306	1.4333	-0.23	0.8180	-3.1399	2.4787
Satf_Health_care						
No	0.6609*	0.3345	1.98	0.0480	0.0052	1.3167
Sex						
Female	0.8089	1.5103	0.54	0.5920	-2.1513	3.7692
Education						
Formal & inform	-0.2623	0.4562	-0.57	0.565	-1.1565	0.6319
Numb_Children	-0.2578*	0.1105	-2.33	0.020	-0.4745	-0.0412
Age	-0.0179	0.0177	-1.01	0.313	-0.0528	0.0169
Cons	-4.9402**	1.0980	-4.50	0.0000	-7.0923	-2.7881
WTP	₦8438					
Log likelihood	-291.27423					
Log likelihood	-156.8071					
LR $Chi^2(8)$	268.93					
Prob > Chi^2	0.0000					
Pseudo r^2	0.4617					

**,* respectively denotes significance level at 1st and 5th % respectively
Source: Field Survey 2021

The result of the logistics regression model in Table 2 shows that the respondents are willing to pay ₦8,438 for VGSHIP to insure their under-five children. However, logistics regression estimated gives parameters in log-odds form which is difficult to interpret in conventional probability. As a result, marginal effect model in Table 3 was estimated using delta method as suggested by Greene (2012) and Dowd *et al.,* (2014) to ease interpretation.

Table 3 Marginal Effect Model of the Estimated Contingent Valuation Model

	Delta-method				95% conf. Interval	
Parameters	dy/dx	Std. Err.	Z	P-value	Lower	Upper
Initial Bid	7.03e-05	4.19e-06	16.76	0.000	0.0000	0.0000
Income Group						
High Income	-0.5697	0.0285	-19.93	0.0000	-0.6257	-0.5136
Marriage Group						
Single	-0.0390	0.1656	-0.24	0.8140	-0.3637	0.2857

Satisfaction						
No	0.0799	0.0399	2.00	0.0460	0.0015	0.1582
Gender						
Female	0.0990	0.1856	0.53	0.594	-0.2648	0.4629
Education Status						
Formal	-0.0317	0.0556	-0.57	0.568	-0.1408	0.0773
Children HH	-0.0309	0.0129	-2.40	0.016	-0.0562	-0.0056
Age	-0.0021	0.0021	-1.01	0.311	-0.0063	0.0020

Source: field Survey 2021

The outcomes of the logistic regression analysis shows that the offer bid is significantly related to willingness to pay for VGSHIP at 1% level. Since the estimated coefficient is positive, it implies that a rise in the offer bid will increased the likelihood of households' willingness to pay for VGSHIP by 0.007%.

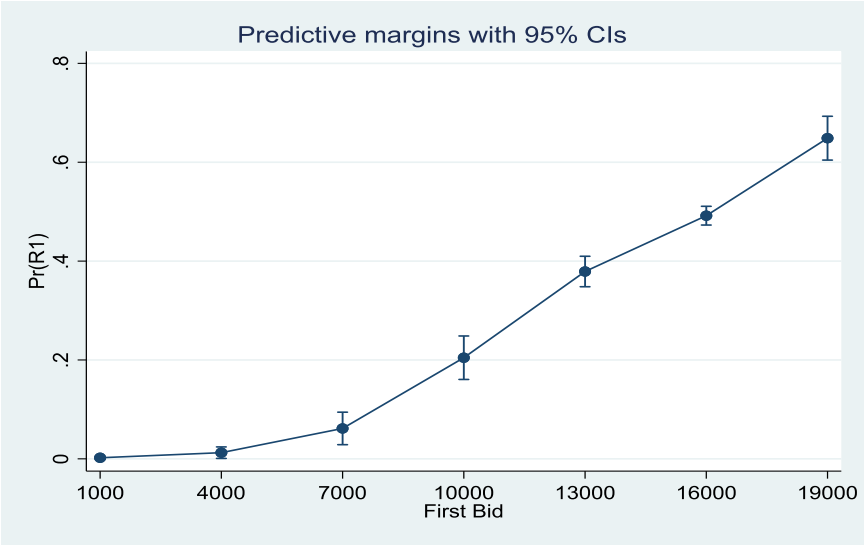

Figure 1: Relationship between insurance premium (first bid) and the probability of VGSHIP subscription.

To further examine this outcome, the connection between under-five VGSHIP and the insurance premium (first bid) was simulated in Figure 1. The figure shows more succinctly, the link between the two variables, indicating that as the premium (offer bid) increases, farmers' willingness to subscribe VGSHIP increases.

The result in Table 3 also shows that "High income" variable is significant and negatively related to farmers' probability of subscribing VGSHIP. This means that belonging to a household with high income decreases the probability of WTP for VGSHIP relative to low income faming households. This implies that VGSHIP is not perceived a normal good but an inferior service to making OOP health expenditure, hence, higher income earning households demand less of it relative to lower income farming households who might not be able to pay for the unplanned OOP health expenses.

The study's result shows a positive relationship between the farmers' measure of service

satisfaction with the current level of health care and their willingness to subscribe VGSHIP. Expectedly however, the group of farmers who declared no satisfaction with the status quo health care show higher probability to subscribe to VGSHIP. This indicates that the households that are more comfortable with the services rendered by the health service center might not be willing to pay for VGSHIP.

In addition, coefficient of numbers of children of the respondents was significant and negatively affecting the household willingness to subscribe VGSHIP. This means that the higher number of children a household has, the less the chances of households' willingness to subscribe for VGSHIP. This conforms to common expectations as higher cost of insurance policy and thus, higher cost of living is perceived by such households. This relationship is simulated in Figure 2.

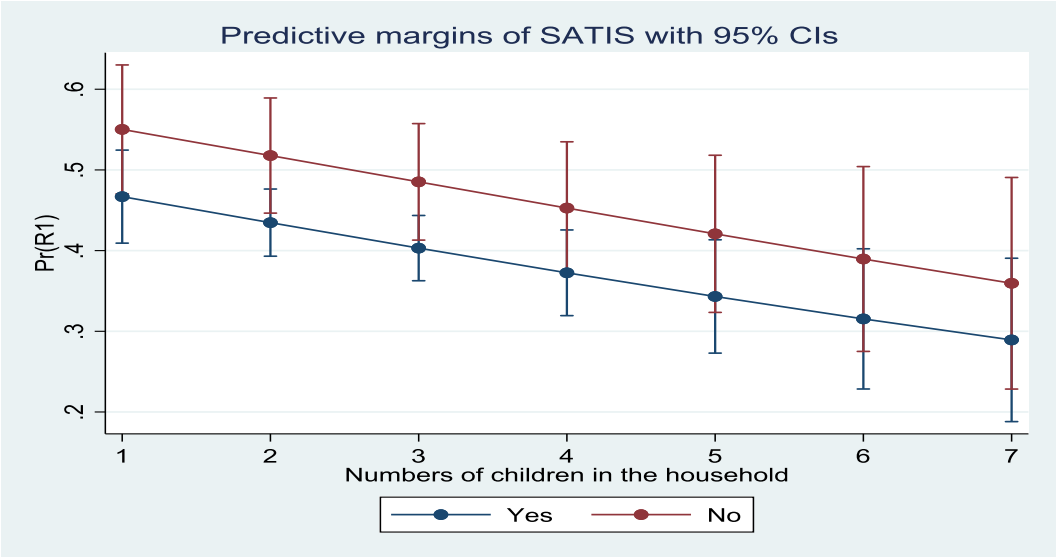

Figure 2: Relationship between numbers of children and probability of subscribing VGSHIP, moderated by service satisfaction.

The figure revealed that, as the numbers of children increases, farmers' willingness to subscribe VGSHIP for under-five children reduces. However expectedly, such reduction is higher for household who are satisfied with the services received from the health care service centers, characterized by unprecedented OOP expenditure.

4. Discussions

The outcome of the descriptive statistics revealed that 2.6% of the households which constitutes the minority are 58 years old and above. While the majority (38.6%) of the households are between 38 to 47 years old. The result shows that majority of the respondents are within the productive age, which is 38-47 years old as define by WHO (2002). Meanwhile, the result showed that 91.3% of the respondents in the rural communities are married, implying that most of the adult in rural areas are married. This is as a result of the fact that most of the adult in rural communities marry at relatively younger age compared to youth in urban areas, in conformity to the assertion of Egbe (2014).

The results revealed that 92.2% of the respondents are found to be male. This shows that most of the households in rural areas are headed by male. Culturally, females in such rural farming communities who are widows or divorced depend mostly on their male relatives. This agrees with the finding of Olawepo (2010) who had also reported the dominance of male headed family as against female. The results in Table 1 shows that majority

(53.2%) of the respondents have 2 to 3 children while those that have six (6) and above children constitute the minority (2.4%). The table highlighted that some rural households have many children due the multiple wives, which corroborates the findings of Etebong (2018). Moreover, the results showed that majority of people in the rural farming communities acquired formal and informal education. However, contrary to the findings by Ajemunigbohun *et al.,* (2017) on demand for health insurance among urban households in Lagos, where education appeared to have significant effect on determinant of insurance policy demand, this study could not find same for the rural farming communities in Gujba LGA.

As regards the income distribution of respondents, the results indicated that a sizeable proportion (45.2%) of the households earned an annual income of ₦800,000 - ₦1,000,000 while only 8.5% earned ₦1,100,000 and above per annum.

The results indicate that majority of the rural farming households are low income earners and this corroborate with the findings of Olawepo (2010). The outcome of the logistics regression analysis indicates that initial bid (offered insurance premium) is significantly related to willingness to pay for VGSHIP at 1% level. This implies that a rise in the offer bid will lead to rise in the probability of household willingness to subscribe for VGSHIP by 0.007%. This implies insurance is considered abnormal goods by rural farming communities in the study area. This policy-relevant finding is unique and does not conform to the result of Ahmed *et al.,* (2016) and that of Binnendijk *et al.,* (2013).

Whereas, the results indicates that high income is statistically significant and negatively related to households' willingness to subscribe VGSHIP in the rural areas. This implies that being a household with high income decreased the likelihood of WTP for VGSHIP relative to low income households. Therefore, low income households are more willing to subscribe VGSHIP than the households with high income in the study area. This is opposing the work of Fonta *et. al.,* (2010) in their findings where they reported that the high income households are willing to pay more than low income households.

Health care satisfaction was measured as either "yes" or "no" but the "no" category was specified in the model, while the "yes" category was used as reference and found statistically significant and positively affecting the willingness to subscribe under-five children health insurance.

This means that households that are not satisfied with the quality of services in the health centers are willing to subscribe VGSHIP than the respondents that are satisfied with service currently rendered to them by the service centers. This is similar to the findings of Eyong *et. al.,* (2016) which found majority of respondents declared not satisfied with the services rendered to them at health care center nearest to them.

Similarly, the study revealed that the number of children per household is negatively significant in relation to households' willingness to subscribe VGSHIP. This means that, as the numbers of children increases the price of VGSHIP also increases, implying that an increase in the household size reduces the probability of respondents' willingness to subscribe VGSHIP. This might be as a result of cost implication incurred in accessing the service because of the limited number of persons allowed to be enrolled in the scheme. This is against the study of Minyihun, *et al.* (2019) where households with many children
declared willingness to pay higher amount than households with smaller family size.

4.1 Implication of the Findings

Majority of households in Gujba Local Government Area of Yobe are informal farmers and as such not enrolled in the health insurance scheme (NHIS), which majorly cater for workers in the formal sector. Meanwhile, the community presently faces the challenge of accessing quality health services since many health practitioners have been displaced due to the activities of

insurgents. The analysis of data collected on the feasibility of the informal farming communities subscribing VGSHIP for under-five children shows attractive results. Albeit differences between the relatively poor and richer farmers' sensitivity to the insurance policy, farmers generally declared positive WTP premium for the proposed insurance scheme for the under-five children to reduce exposure to OOP expenditure. This means the implementation of VGSHIP is feasible in the communities. However, to reduce the relative unattractiveness of the policy to relatively richer households, further research will be required.

5. Conclusion

This study predominantly examined rural farming communities' willingness-to-pay for vulnerable group social health insurance programme (VGSHIP) for under five years old children in Gujba LGA of Yobe State. VGSHIP is one among the myriad of health insurance policies introduced by NHIS with the aim achieving universal health care coverage in Nigeria. Nonetheless, papers attempting to value the premiums policy holders are likely to ascribe to insurance policies such as the CBSHIP, FSSHIP and TISHIP Programme have appeared in the literature, while none has attempted addressing the policy established for the vulnerable group of health service seekers in Nigeria (VGSHIP).

This study assesses the economic value farmers ascribe to VGSHIP for under-five children, who according to UNICEF are the most vulnerable to mortality. Yobe State, where Gujba LGA is located is documented to have the worst Multidimensional Poverty Index (MPI) in Nigeria. Hence, the importance of realizing access to health care service for its teaming farming communities who have poor access to health facilities.

The economic valuation conducted based on the CVM model estimated in the study shows that community members have positive WTP for under-five health care insurance. The study thus concludes that the establishment of VGSHIP is feasible in the study area. This is because, although depending on the variability of socio-economic characteristics of farming households, community members are willing to pay for under-five health insurance if made available.

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