

Dynamics of Observable Use of Family Planning Methods in Rural Nigeria: A Double Hurdle Model Approach.

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Abstract: The increased population growth in Nigeria calls for concern with regards to the pressure being exerted on available resources. Although family planning methods and techniques have been advocated over the years to control the population, increasing population growth rate is still observed. The study examined the observable use of family planning in rural Nigeria. Observable use of family planning combines the decision to adopt a family planning method and the extent of use of such method. Data from the 2008 Demographic and Health Survey (DHS) data for rural couples recode was used and analyzed through descriptive statistics and the independent double hurdle model. The results showed that there is very low level awareness of family planning and its methods among rural couples as well as low level adoption of modern family planning methods. Factors that significantly determine the adoption of family planning methods include awareness, number of children born, increasing wealth, increasing level of education and number of living children. The extent of use of modern family planning methods were determined by respondent's age, increasing wealth, access to health insurance, number of living children and number of marriage unions. Policies that target increasing awareness and literacy are expected to improve the use of modern family planning methods for effective population control.

Key Words: *Family planning, Observable use, Double hurdle, Rural Nigeria*

I. INTRODUCTION

Whereas the population of a country is seen as its most important resources, especially as it concerns growth rate, spatial distribution, and quality in terms of education, health and economic return, (Nwachukwu and Obasi, 2008), increasing population is seen as a risk to economic growth in many developing countries of the world. Malthusian law predicted that there would be a time when the available resources will not be sufficient to meet the rate of growth of world population. Specifically, Malthus assumed that population growth rate is geometric, while growth rate of the economy is arithmetic, indicating that population is growing faster than the economy, (Malthus, 1978). According to him, subsistence, which he meant by agricultural growth which was the main stay of the economy in his days could never meet up in growth as much as the population will grow. Thus, this leads to a state of high pressure on the existing resources, leading to hunger. The world population is seen to be growing at a very rapid rate and the highest concentration of this growth rate is located in sub Saharan Africa, (Beekle and McCabe, 2007). This has brought about different conflicts and environmental hazards within the sub Saharan zone. Nigeria, the largest country in the region is found to have an astronomical population growth rate, making it one of the most populous countries in the world. Estimates by the National Bureau of statistics (NBS), (NBS, 2012), give the population of Nigeria at 144 million, 149 million, 154 million, 159 million, 164 million between the years 2008 and 2012. Presently, the population is estimated at almost 178 million, such that at least 1 in every 43 persons on earth is a resident of Nigeria, (NBS, 2012, Trading Economics, 2015). Population growth in Nigeria is on the rise as a result of increased health care services which has had its effect in decreasing death rate and increasing successful birthrate, such that there is an imminent population explosion problem in the country, (Nwachukwu and Obasi, 2008). Moreover, cultural and religious inclination in the country supports population growth through family growth as a thing of pride and the work of God, (Undelikwo *et al*, 2013). However, the increasing population may not have been a problem if there are enough resources per person to support the population growth, and therein lies the problem of increasing population, (Oyedokun, 2007, Babatunde and Ajayi, 2011). Thus, even though there is an increasing economic growth rate, unemployment, poverty and non-inclusive growth is rife, (Trading Economics, 2015; Omotola, 2015). Responses to population explosion in many countries have involved migration, legislative edicts and most importantly, family planning. Family planning is a concerted effort by national policy to ensure that the population growth rate of any country is in concordance with the resource base and economic growth of the country. Family planning has taken root in South Asia and East Asia, with contraceptive prevalence rate of 53% and 77% respectively, (Sharan *et al*, 2010). However in sub-Saharan Africa, the average prevalence rate of contraceptive use is 22%, and that of Nigeria is put at just 9.1% and the unmet need for family planning in

Nigeria is estimated at 18.3% as at 2011, (United Nations Economic and Social Affairs, 2013). It has thus been asserted that there is no significant improvement as yet in the use of family planning methods as means of population control in Nigeria. Studies on the decision to adopt and use family planning have been largely based on classical discrete choice models. Descriptive statistics, logistic regression, probit regression and their variants have also been used to isolate the factors that determine the adoption of family planning in many parts of the world. However, decision models in other studies have begun to adopt the hurdle model, which is an extension of the count models that can also be construed as one of the discrete choice modeling tools, (Greene, 2008). Consumptions and expenditure studies have successfully used the hurdle model to determine the decision to consume and the extent of such consumption, Gao *et al.*, 1995; Akinbode and Dipeolu, 2013 and Eakins, 2013). The use of the double hurdle model in estimating the decision to use and the extent of use further justifies this present research, since it helps to determine the actual observable use of family planning in rural Nigeria.

The overall objective of this study is to examine the dynamics of choice of adoption and use choice of family planning methods among rural households in Nigeria. The study will thus identify household characteristics with respect to family planning choice and adoption and isolate the factors that affect the choice of adoption and use of family planning methods available to the household.

II. REVIEW OF LITERATURE

Family planning is the means of methodologically ensuring that there is proper child spacing and fertility moderation within the family with regards to the biological, medical, cultural and economic characteristics of the family, (Martinez, 1966). It is a means by which people anticipate and attain the desired number, timing and spacing of children that they desire, (WHO, 2013). The campaigns and programs for family planning have been ongoing in many developing countries over the years with varying results, (Nwachukwu and Obasi; 2008; Beekle and McCabe, 2007; and Duze and Mohammed, 2006). In the Phillipines, family planning has brought about a drastic reduction in the number of children born, with consequent increase in household standard of living, (Lambert *et al.*, 2000). Ethiopia has also witnessed an increase in the use of contraceptive both among married and unmarried women, (Beekle and McCabe, 2007). In Asia, family planning has greatly improved the ratio of people to available resources, (Sharan *et al.*, 2013). Studies on family planning have identified different dynamics in the use and adoption of the different family planning methods available. Family planning is more widely adopted in urban areas than in rural areas. The Demographic and health Survey (DHS) in different countries have shown that there is variation in the level and use of family planning methods and their impacts in the various countries, (Akintade *et al.*, 2011). The studies revealed that the increased adoption has led to a dramatic reduction in the population growth rate in many countries, except in Nigeria where the growth rate is still on the increase, especially in the rural areas. Although, there is a general increase in adoption of family planning in Nigeria, (Akintade *et al.*, 2011), it is skewed in favour of urban areas; whereas, the low adoption in rural areas implies a continued increase in the Nigerian population since over 54% of the Nigerian populace are rural residence, (Oyedokun, 2007). Literature has shown that adoption of family planning methods is a function of certain socioeconomic variables such as education, age, cultural inclination, regional differences as well as gender, (Oyedokun, 2000; Duze and Mohammed, 2006). Information about family planning methods have also been seen as important factor that determine adoption. Women particularly are more likely to adopt family planning methods when they are well educated and have some source of income generating activities, (Undelikwo *et al.* 2013). Male use and adoption of family planning methods also increased with education, information, and residence in urban areas (Duze and Mohammed, 2006; Undelikwo *et al.*, 2013). Barriers to the adoption of family planning include perceived health risks, culture, religion and unavailability of the providers of family planning methods, (Akintade *et al.*, 2011). Discrete choice modeling in literature has concerned itself mostly with the use of the classical probit and logit models. Decisions to adopt family planning have also followed the same pattern in using the classical discrete choice models to estimate the determinants of choice of family planning methods in the different study areas. However, a hurdle model can also be construed as a discrete choice model tool, (Greene, 2008). This has been supported by literature and empirical improvements of statistical models, (Burke, 2009). Even though, most arguably, it has been used to capture count variables, it is conceivably used as a model to capture decision making especially with regards to household consumption expenditure of food and non food items. The first part of the hurdle model is a decision model that follows the direction of the classical discrete choice model, for which a probit model is usually formulated. Double hurdle model has been extensively used in estimating household consumption expenditures of fish, (Akinbode and Dipeolu, 2013) with respect to adoption of optimum fertilizer use (Akpan *et al.*, 2012), and expenditure on household appliances (Wodajo, 2008).

III. Methodology

Data

The data for this study is the Nigerian National Demographic Health Survey data of 2008. The DHS surveys are designed to provide information on fertility, family planning, reproductive health, child health and HIV/AIDS. This study intends to use the data as a means of understanding the dynamics of family planning use in rural Nigeria. The methodology of the sample design for the DHS follows a 2 stage cluster sample design, using the 2006 population census as its sampling frame. In the first stage, 888 clusters consisting of 286 urban and 602 rural clusters were chosen. In the second stage, an average of 41 households was selected from each cluster in all, 36, 800 households were selected across the country. We used the Couples recode, which is a merge of the Men and Women recode data in the survey. However, in order to fully capture the dynamics of couples' use of contraceptive and family planning methods, we decided to use and keep only variables that relate to those who are currently married/living together as a couple. The sample size for couples in Rural Nigeria is 21,691 cutting across the geopolitical zones of the country. However, only sample of 15,544 couples were used in the present study after compensating for missing data and the use of only presently married couples. Questions relating to the dependent variables in the model of choice in this study will determine whether the couples are willing to adopt family planning methods and the extent of use of the methods. The question relating to the first hurdle asks if the couples are willing to use family planning methods. The second is concerned with the pattern of use of the family planning method chosen by the couple.

Study Area

The study used the Nigerian rural population as its sample in this research. The Federal Republic of Nigeria is on the southern coast of West Africa, bordered by Cameroon to the East, Chad to the North East, Niger to the North, Benin to the West and the Atlantic Ocean to the South. Nigeria has 250 tribal groups recognised, even though there are three main tribes that predominate-the Hausa, Igbo and the Yoruba tribes. Nigeria is said to be divided also along the lines of Urban and Rural areas. Whereas the urban areas characterized by higher levels of infrastructures than the rural areas, the rural areas have the most population in the country. In the rural areas, farming is the predominant occupation, with small holder farming being the rule. However, non-farm occupations are taken up during the non-planting seasons in order to supplement income. Rural population in Nigeria accounts for over 50% of the total population in the country. Studies have also shown that the rural areas are the site of increased population growth and low use of family planning methods.

IV. Methods of Data Analysis

Analyzing the DHS survey to meet the objectives of this study took the following forms:

Descriptive Analysis

The descriptive analysis was used to profile the socio economic characteristics of the households in the study sample. It also profiled family planning methods, awareness and use in the study area.

Double Hurdle Model Analysis:

The double hurdle model allows for separate stochastic processes for participation and consumption decisions, (Akinbode and Dipeolu, 2013; Eakins, 2013). The model was first proposed by Cragg in 1971 to allow for two independent processes within the analytical framework. Therefore, a positive observable use of family planning is dependent on both the decision of the household to use/adopt and the observed pattern of use. The first process is the decision to consume/participate, and which has a dichotomous variable as the dependent variable. The second process measures the extent of the participation/use, usually with a categorical variable that may or may not be dichotomous. While the first process is similar to a probit analysis is used to model the decision to participate, a truncated regression the model determines the extent of use of the good. The double hurdle model is seen as an improvement to both the tobit and the generalized tobit (Heckit models), (Cragg, 1971; Eakins, 2013).The Cragg model specifically allows the factors that determine the adoption and level of use to differ- an Independent Double hurdle model. The independent double hurdle model is specified as follows:

A. The Adoption Equation**

$$d_i^* = z_i' \alpha + \mu \dots\dots\dots 1$$

Where,

$$d_i = \begin{cases} 1, & \text{if } d^* > 0 \\ 0, & \text{otherwise} \end{cases} \dots\dots\dots 2$$

B. The Extent of Use

$$y_i^* = x_i' \beta + v_i \dots\dots\dots 3$$

C. The observed/positive use of Family planning

$$y = d_i y_i^* \dots\dots\dots 4$$

Where, d_i is the decision to adopt and y_i^* is the extent of use of the methods adopted; y is the observed family planning use which is a function of both the decision to adopt and the extent/pattern of use.

Also, μ_i is the error term associated with the adoption decision and v_i is the error term associated with the extent of use equation.

Thus a positive use of family planning methods is observed if the couple decides to adopt and also use the methods chosen.

Independence is achieved when the following is obtained with regards to the error terms of equations 1 and 3, when

$$\mu_i \sim N(0,1) \text{ and}$$

$$v_i \sim N(0, \sigma^2)$$

That is, there is no correlation between the two error terms.

The independent double hurdle model is estimated by maximum likelihood as follows:

$$\text{LogL} = \sum_0 \ln \left[1 - \varphi(z_i \alpha) \varphi \left(\frac{x_i' \beta}{\sigma} \right) \right] + \sum_+ \ln \left[\varphi(z_i \alpha) \frac{1}{\alpha} \varphi \left(\frac{y_i - x_i \beta}{\alpha} \right) \right] \dots\dots\dots 5$$

If $z_i \alpha = 1$, then there is no zero adoption and in fact we have a Tobit model, which just estimates the extent of use of the adoption. Where, z_i is the vector of socio economic characteristics and other factors that determine the choice of adoption of any family planning method among the respondents.

x_i is the vector of socioeconomic characteristics and other factors that determine the extent of use of the family planning methods adopted. α and β are parameters to be estimated. This study carried out its empirical analysis on the assumption that the decision to participate and the extent of use of family planning methods are independent of each other. This study assumes that participation decision is basically dependent on the household level variables of the couple. The second hurdle is dependent on the variables that refer to both the respondent and his/her partner as well as other household level characteristics. The dependent variable for the decision to adopt a family planning method was Current contraceptive use, which was coded 1 for use and 0 for non use. The dependent variable for the extent of use was determined from the pattern of use, with the formula below

$$x = \frac{C - c_i}{C - 1} \dots\dots\dots 6$$

Where, C is the number of categories for pattern of use (4); c_i is the i^{th} category. Thus, extent of use is coded 0 for non use, 0.33 for used before last birth; 0.67 for used since last birth and 1 for currently using. This will enable the CRAGGIT command to carry out the second tier analysis which is equivalent to the Tobit regression model. Estimating the double hurdle model on the STATA software is not straight forward with a single user command, (McDowell, 2003). However, according to Burke, (2009), the double hurdle model can be carried out using a probit model to estimate the first hurdle and a truncated regression for the second hurdle. In both cases, zero observations are included which serve as the basis for the superiority of the double hurdle model over both the tobit and the heckit models. A better and more inclusive is the use of the ‘craggit’ command’. The craggit model can be estimated on STATA to give parameters of both the decision variables and the extents of use variables in two tiers. The first tier represents the decision to adopt or not to adopt, while the second tier represents the result of the extent of participation. The craggit model specified in this study assumes independence of the two tiers of decision making for the use of family planning methods in the study area. This study used STATA 12 to estimate the independent double hurdle for observed family planning use in rural Nigeria.

V. Results

Summary Statistics of Individual Respondents and Household Characteristics

The summary of socioeconomic characteristics presented in Table 1 reveals that on the average, respondents were 29 years old, and their partners 37.8 years old. The average household size is 6.2, while the total number of children born and the number of living are 4.7 and 3.8 respectively. The range of number of

children born is between 1 and 18. The average age of respondents at first marriage and first birth of a child are 17 years and 18.7 years respectively.

TABLE 1: Summary of Household Level Characteristics of Couples

Variable	Frequency	Mean	Standard Deviation	Min	Max
Age of Household Head	15544	37.8	9.60	16	90
Age of respondent	15544	29.42	7.18	15	49
Number of years of education of respondent	15544	3.28	4.42	0	19
Number of years of education of partner	15544	4.72	5.28	0	19
Household size	15544	6.22	2.79	1	28
Number of Children ever born	15544	4.73	2.69	1	18
Number of living Children	15544	3.78	2.10	0	14
Age of respondent at first marriage	15544	17.07	3.74	14	45
Age of respondent at first birth	15544	18.71	3.84	14	44

Source: Computed from DHS, 2008

Distribution of Respondents by Socioeconomic Characteristics

From table 2, Geopolitical considerations show that North West Nigeria has the highest number of respondents followed by the North East and the North Central. The South West has the lowest number of respondents within the survey. Also, most of the respondents are female, (92.93%) and thus the survey has more males as the partners and household heads. Educational attainment reveals that there is over 50% illiteracy level in terms of formal education in rural Nigeria, while that of respondents' partners show that there is a marked increase in educational attainment for male members of rural Nigeria than female members. However, educational attainment also reveals that there is low level attainment in terms of tertiary education in rural Nigeria in general. Household level data show that majority of the households in rural Nigeria are living in poverty. The result revealed that about 64% of the couples surveyed are within the poorest and poor wealth quintile status, the middle class made up about 19%, while the rich class was about 15% of the rural population showing the high level of poverty prevalent in rural Nigeria. Most of the couples have also been involved in a marriage union at least once, (90%), while the highest duration of marriage union is 5-9 years, (28.5%).

Table 2: Percentage Distribution of Respondents by Socioeconomic Characteristics

Characteristics	Percentage
Sex	
Male	7.07
Female	92.93
Educational Attainment	
No Formal Education	57.73
Primary	23.07
Secondary	17.02
Tertiary	2.17
Geopolitical Zoning	
North Central	17.23
North East	23.30
North West	32.45
South East	6.79
South South	11.94
South West	8.28
Number of Years of Marriage	
0-4 years	14.58
5-9 years	28.47
10-14 years	22.61
15-19 years	16.78
20-24 years	10.46
25-29 years	4.88
>30 years	2.22
Number of marriage unions	
Once	90.09
More than Once	9.91

Source: Computed from DHS, 2008

Summary of Respondents' Adoption and Use of Family Planning Methods

Summary of couples' use of family planning methods in Table 3 reveals that the level of awareness of family planning methods and use is still very low in rural areas, with over 87% of the couples claiming to be unaware of family planning methods. This translates to low level use where about 90% are non users of family planning methods; with only 6.4% using modern methods. In all, only about 9.6% are current adopters of family planning in rural Nigeria from the data. Of those who are not currently using, only 2.41% have used some form of family planning since the last birth of their child/children. Couples' fertility preference which is an important determinant of the adoption and use of family planning methods also shows that the couples wanted at least 5 children (86.25%), followed by those who want between 3-4 children, (10.96%).

Table 3: Summary of Couples' Contraceptive Characterization

Characteristics	Percentage
Awareness of Contraceptive Method	
Aware	12.42
Not Aware	87.58
Adoption of Contraceptive	
Adopter	9.59
Non Adopter	90.41
Contraceptive use by method	
Folkloric	0.41
Traditional	2.36
Modern	6.82
Contraceptive use by Type	
Pills	1.04
Intrauterine Devices	0.28
Injections	2.17
Condom	1.22
Female Sterilization	0.13

Period Abstinence	1.16
Withdrawal	1.20
Lactational Amenorrhea	1.97
Foam/Jelly	0.02
Others	0.41
Pattern of Contraceptive use	
Currently Using	9.59
Used since last birth	2.41
Used before last birth	8.37
Never used	79.63
Couples' Fertility Preference	
No child	2.10
1-2 children	0.69
3-4children	10.96
5+ children	86.25

Source: Computed from DHS, 2008

The Independent Double Hurdle Model of Family Planning Adoption and Use in Rural Nigeria.

Table 4 is the result of the Craggit alternative used for the double hurdle model assumption in the study. The assumption of conditional independence is upheld as a basic assumption when using a craggit model to determine both decision and level of participation. The maximum likelihood estimate is revealed to have a chi squared significance of 1%, showing that the model fits the variables properly. Heteroskedasticity was found and corrected for as shown with a significant sigma. The result of the first tier, which is the adoption decision stage, reveals that awareness of family planning methods significantly increases the probability of adopting family planning practices among the couples interviewed, (48%). The older the respondent, the more likely it is that the couple will also adopt family planning methods, (0.01). Education significantly increases the probability of the respondent using a family planning methods. Attaining primary, secondary and tertiary levels of education significantly increases the likelihood of adoption of family planning methods by 43%, 70% and 114% respectively. Furthermore, increase in wealth as shown by the wealth classification significantly and progressively increases the probability of adopting family planning practices by 12%(middle class), 33%(rich) and 51%(richest). Regional classification shows differences in the probabilities of adopting family planning practices. The probability of adopting family planning practices reduces significantly for residence in the Northwest (32%) and North East (69%) zones of the country as compared to being in the North central region of the country. However, the adoption significantly increases for being in the South South (35%) and South West (9%) regions as compared to the North Central region.42 respectively. Total number of children born and children living significantly increases the probability of adopting family planning by 2% and 4% respectively. However, larger household reduces the probability of adopting family planning practices by 4%. Couples who have been married for 5-9 years and 10-14 years have the probability of adopting family planning practices by 18% and 12% respectively. The second tier equation is concerned with the extent of use of family planning practices available to the couples in the survey. The results show that age of respondent significantly increases the extent of use of family planning methods by 1%. Differing levels of wealth also significantly affect the extent of use of family planning, as being in the middle, rich and richest wealth classes increases the extent of use by 4%, 7% and 6% respectively. Access to health insurance significantly increases the extent of use of family planning methods by 12%. Having a larger proportion of children alive out of the total of children born significantly increases the extent of use of family planning by 3%. However, variables that significantly reduces the extent of use of family planning include number of children ever born (3%), respondents' age at first marriage (1%); marital duration greater than 30 years (3%), having more than 2 marriage unions (4%).

Table 4: Results of the Maximum Likelihood of the Independent Double Hurdle Model

Variables	1 st Tier(Participation); Coefficients(Standard Error)	2 nd Tier(Extent of Use); Coefficient (Standard Error)
Awareness(Dummy, 0, 1)	0.484***(0.036)	-
Sex of Household Head (ref: male)	-0.046 (0.051)	-
Respondent's Age	0.006(0.004)	0.011**(0.004)
Partners' Age	-0.001(0.002)	-0.001(0.001)
Educational Level of Respondents(ref: No formal)		
Primary	0.434***(0.036)	-0.057***(0.018)
Secondary	0.697***(0.041)	-0.077***(0.020)
Tertiary	1.138***(0.086)	-0.025(0.031)
Household Size	-0.036***(0.007)	-0.001(0.004)
Number of Children born	0.020*(0.012)	-0.035***(0.007)
Number of living children	0.042**(0.014)	0.027***(0.008)
Geopolitical zones(ref: Northcentral)		
Northeast	-0.323***(0.042)	-
Northwest	-0.690***(0.044)	-
South East	0.024(0.053)	-
South South	0.359***(0.044)	-
South West	0.092*(0.048)	-
Wealth Class (ref: Poorest class)		
Poorer Class	0.051(0.063)	-0.010(0.021)
Middle class	0.121**(0.041)	0.040*(0.021)
Rich Class	0.327***(0.047)	0.069**(0.022)
Richest Class	0.510***(0.063)	0.062**(0.026)
Marital Duration(Ref: 0-4 years)		
5-9 years	0.180***(0.044)	0.037(0.026)
10-14 years	0.123**(0.055)	-0.013(0.042)
15-19 years	0.032(0.069)	-0.058(0.059)
20-24 years	0.072(0.086)	-0.057(0.078)
25-29 years	-0.019(0.108)	-0.112(0.098)
>30 years	-0.036(0.138)	-0.295(0.130)
Have health insurance cover(ref: No)	0.163(0.153)	0.119**(0.152)
Fertility Preference		
2-3 children	-	-0.032(0.108)
3-4 children	-	0.012(0.087)
5 and above children	-	-0.028(0.086)
Respondent's age at first marriage	-	-0.013**(0.005)
Number of marriage unions(ref: once)	-	-0.037*(0.022)
Respondent's age at first birth	-	0.004(0.003)
Sigma	-	0.326***(0.005)

Source: Analysis of the DHS 2008 data.

*, **, *** : significance at 10%, 5% and 1% respectively.

VI. DISCUSSION

The study examined the dynamics of observable family planning use in rural Nigeria. The underlying theory is that a positive/observable use is made up of two processes- the choice of adoption and the extent of use/participation. Socioeconomic characterization shows that there is very low level of attainment of formal education among couples in rural Nigeria. There is also a high incidence of poverty as shown by the distribution in the wealth quintile of the data. Low level education and large number of poor people reveals the correlation drawn in poverty studies between education and socioeconomic status of people. There is a fairly large household size, consistent with the agrarian characteristic of rural Nigeria which relies heavily of farm labour for which a large household size will cater for. The low level of awareness of family planning method could also stem from a largely illiterate society. This low level awareness is also implicated in the very low level adoption and even use of contraceptives among couples in rural Nigeria. Understanding the process of an observable contraceptive use determined by its two hurdles was analyzed with the Cragg Independent Double Hurdle model. The result of the first tier which is similar to a probit model reveals that awareness plays a major role in adoption of contraceptive for family planning. Awareness seems to be an important factor in the literature of family planning as seen also in Pradhan, (2011) for South Asia. Educational attainment also increases the likelihood of adopting a family planning method. This reveals the importance of education in both increasing awareness and the ability to make informed decision concerning family development. It shows the importance of education in the choice of adoption of ensuring that family size is commensurate to resources available. This is in consonance with results by Oyedokun, (2004), Dube and Mohammed, (2006), who found positive correlation between levels of education of women and their adoption of family planning in Osun state and northern Nigeria respectively. In certain Sub-Saharan African Countries, having education was found to significantly increase the odd ratio of using family planning contraceptives, (Stephenson *et al*, 2007). The increase in likelihood of planning a family with age of respondent may be as a result of the decrease in fertility with age or the attainment of the ideal family size by the couples as they grow older. This correlates with the finding of Kamal *et al*, (2013), where increased age of the husband and the wives led to an increase in the likelihood of using contraceptive in Bangladesh. Also, the higher the number of living children, the higher the likelihood of using contraceptive. This is intuitively acceptable if the couple's desired fertility preference in terms of number of children has been met. The higher the likelihood of adopting a family planning method is found to be positively correlated with the wealth status of the couple, probably because of the erroneous belief that family planning is expensive. Moreover, in many cases, wealth moves together with education and literacy levels, and thus, wealthier couples who are likely more educated or with a higher level of literacy are more likely to opt for modern medical care as well modern methods of family planning. This is also the case in South Asia, where couples in the higher wealth classes are better adopters of family planning, (Pradhan, 2011). Differences in regional adoption of family planning methods reveal that there is a great unmet need for contraceptive in northern Nigeria than in the southern Nigeria. This is probably because of the characteristic practice of early marriage, greater degree of patriarchal family system and cultural belief of having a large number of children that is predominant in the northern region of Nigeria. The implication of this may be the unequal regional development in terms of education and literacy skewed in favour of the south. There is thus a need to ensure massive development of awareness and probably provision of regional specific types of family planning methods and means of application in order to ensure adequate observed use and bring about the needed effects. The importance of having a health insurance is seen with the increased use of family planning among those who have health insurance cover. Having a health insurance cover confers a sense of need for the couples to use health facilities, where it is highly probable that they get information and help on ideal family size and hence family planning methods.

VII. Conclusion and Policy Recommendations

The study found a low level of observable use of family planning methods among couples in rural Nigeria. Determinants of choice of methods and extent of use of methods include household level and demographic variables. Key variables that will help improve family planning are awareness, education and access to health insurance. Policy implications with respect to the correlates of observed use of family planning should be geared mainly towards the need for education and development of awareness of the need for family planning in the country. Education improves the human capital of people, and is especially important for rural people to move from poverty and other reduced wellbeing status as well. This is also important in having them to make well informed and dispassionate decision on issues that concern their welfare such as family planning and use of contraceptive methods. Developing awareness is also a major means of educating rural households on their family planning options. There is thus a need for government agencies involved in information flow, such as the National Orientation Agency to work in tandem with the health agencies and NGOs such as the Federal Ministry of Health, Community Health Services and Public health services in ensuring there is proper and adequate information flow on the need for family planning and welfare development of households.

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