UTILIZATION OF PRIMARY HEALTH CARE SERVICES BY MOTHERS FOR MATERNAL AND CHILD HEALTH SERVICES IN RURAL NIGER STATE, NIGERIA

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Abstract

The overall aim of the study was to identify factors which determine utilization of Primary Health Care (PHC) services for Maternal and Child Health Services (MCHS) in rural Niger State. Following World Health Organization's 1991 systematic cluster sampling technique, three clusters with twelve households from each cluster were selected through Probability Proportional to Size basis to ensure equal spread of population across the selected study area. The data collected through the household survey were processed using SPSS version 18.0 software. A codebook was developed for using the data files indicating the variable name, label, description of code values and column locations, and finally estimates of the overall effects of independent variables on the use of PHC services for MCHS were determined using logistic regression. It was found that family education was associated with the use of PHC facilities: the higher the education levels the higher the use of PHC. Socio-economic condition of people was also found to be a factor in the use of the PHC: people of relatively higher socio-economic condition use the PHC more than people of low and medium status. People are not well informed about the services that are meant to be available in the PHC. Poor quality of services was found to be the main reason for underutilization of the PHC. The study recommends the formation of a "Local Health Authority" comprising representatives from different government and non-profit organizations along with people's representatives as this will improve the utilization of PHC in rural Niger State.

Keywords: Primary Health Care, Maternal and Child Health, Mother, Logistic Regression, TT vaccination

Introduction

More than 150 million women become pregnant in developing countries each year and an estimated 500,000 of them die from pregnancy-related causes (Maternal Mortality, 2005; Gilda *et al.,* 2007; Lynn *et al.,* 2009). Maternal health problems are also the causes of more than seven million pregnancies resulting in stillbirths or infant deaths within the first week of life (Hotchkiss, 2005; Save the Children, 2009). Maternal death, the death of a woman in reproductive age, has a further impact by causing grave economic and social hardship for her family and community. Other than their health problems, most women in the developing countries lack access to modern healthcare services and this increases the magnitude of death from preventable problems (Adeyemo, 2005; Omoleke, 2005; Gilda *et al*, 2007; Abiodun, 2010).

The major determinants of maternal morbidity and mortality include pregnancy, the development of pregnancy-related complications, including complications from abortion and, the management of pregnancy, delivery, and the postpartum period. However, a lot of factors contribute to the low health status of women in the developing countries including Nigeria. These factors include socio economic development of the country that has serious impact on morbidity and mortality (USAID, 1994; Gatrell, 2000; Meade &Earickson, 2001; Galloway, 2002; WHO, 2003; Gupta, Gauri, and Khemani, 2004). It is evident that the Infant Mortality Rate (IMR), Under Five Mortality Rate

(UFMR) and Maternal Mortality Rate (MMR) are still at unacceptable levels in rural areas of Nigeria (World Bank, 2003; Federal Ministry of Health, 2004; Ehiri, Oyo-Ita, Anyanwu, Meremikwu, and Ikpeme, 2005). So it is important to obtain information about the MCHS provided through the PHC to identify reasons for utilization of those facilities (Guidelines for Implementing Supportive Supervision, 2003; Sustainable Development Goals, 2015).

The focus of this study is on mothers and child health care services since improvement in Maternal and Child Health (MCH) is an important aspect of any health care delivery system. The success of PHC mostly depends upon the reduction of Maternal and Child Deaths (MCD) (Sule, Ijadunola, Onayade, Fatusi, Soetan and Connell, 2008). Data from Niger State's Ministry of Health indicates the dwindling health status of women; Maternal mortality rate: 500 – 700 per 100,000; Malnutrition among women in reproductive age group: 17%; Total fertility rate: 6.2; Teen-age pregnancy: 20%; Low birth weight

deliveries: 17%; Weight gains during pregnancy: 5-6 KGs; Ante natal care utilization: 20%; Deliveries assisted by trained health worker: 14%; and Family planning coverage less than 10% (Wunsch and Olowu, 1996; National Bureau of Statistics (NBS), 2012; Nigeria Demographic and Health Survey (NDHS), 2013; National Population Commission (NPC) and ICF Macro, 2009). Thus, in Niger State, there is a research gap in this field due to inadequate research on the utilization issue from the perspective of users and what should and/or could be done to improve the situation.

Research hypothesis

H_o: Utilization of health services is not determined by the population's socio-economic factors such as peoples' income and level of education.

H_1: Utilization of health services determined by the population's socio-economic factors such as peoples' income and level of education.
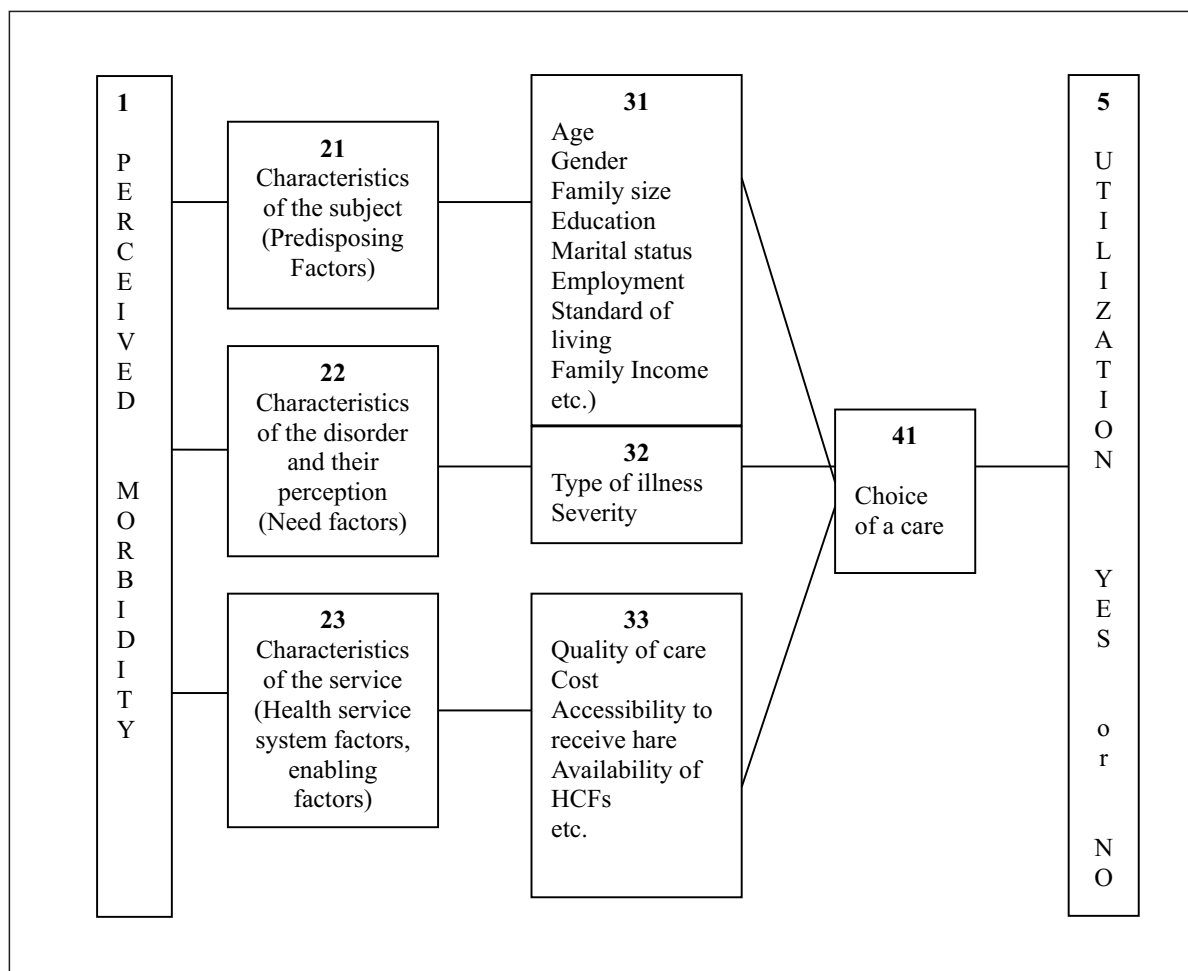
Figure 1: Utilization Model (Modified after Aday and Andersen, 1974)

Healthcare services utilization model

This model was introduced by Aday and Andersen (1974) to explain variations in use of healthcare services. It also serves as a proxy for measuring socioeconomic and cultural barriers of accessibility to healthcare utilization. The model classifies determinants of health care use into Need, Predisposing and Enabling components (Figure 1). The goal of PHC is to provide accessible health for all by the year 2000 and beyond, but regrettably, the rural populations in Nigeria are seriously underserved when compared with their urban counterparts (Gupta et al., 2004; NBS 2008a, 2009; 2009a; 2009b). While most PHC facilities are in various states of disrepair, with equipment and infrastructure being either absent or obsolete, the referral system is almost non-existent. The health services, based on PHC, include among other things: education concerning prevailing health problems and the methods of preventing and controlling them, promotion of food supply and proper nutrition; Material and Child Care (MCC), including family planning immunization against the major infectious diseases, prevention and control of locally endemic and epidemic diseases and provision of essential drugs and supplies (Alma-Ata, 1978; Adeyemo 2005; Federal Ministry of Health, 2004).

The Study Area

Niger State is located on latitude $8^0 15^{'}N$ to $11^0 20^{'}N$ and longitude $3^0 30^{'}E$ to $7^0 25^{'}E$ bounded to the south by the Niger River. The Federal Capital Territory, Abuja is on Niger state's eastern border, and the Republic of Benin is its western border, while Kebbi, Zamfara, and Kaduna States were to its northern border. The State housed a Federal University of Technology; a Polytechnic in Bida; a Rice Research Institute and an Agricultural Research Station in Mokwa. Most of the inhabitants are engaged in farming. The 2006 population census put Niger State's at 3, 975, 526 people (National Population Commission (NPC), (2009a; 2010). In 1999, there were 938 hospitals in Niger state of which 650 were government hospitals (NDHS 2013). The total hospital beds in 1999 were 38,106, which represent a rate of one bed for 3,261 persons. In addition to the Tertiary Health Center (THC), there are 3,275 Family Welfare Centres constructed at the Local Government Level all over the state. There were 546-registered physicians in the State in 2013 of which 347 work in the government health services.

Methodology

Data Sources and Sampling Techniques

Community based household survey was conducted among 180 mothers in households to understand the utilization pattern of the health services, characteristics of the users and non-users of PHC services, particularly Maternal and Child Health Services (MCHS). Following a systematic cluster sampling technique (WHO, 1991a; 1991b), 3 cluster village with fifteen households (15x3 = 45 households) from each cluster were selected from each zone.

The sample frame for this study is the total number of mothers in rural areas in the categorized zones (A, B, and C) in Niger State. Given that the 2018 mothers' population in rural areas of Niger State in each of the sampled Local Government Area is between 102 to 130 mothers (Niger State's Ministry of Agriculture and Rural Development, 2018). The sample size was calculated by controlling *type I* error with probability α; the variance (σ) of the population is unknown and the sample size is large (n ≥ 30). Since σ is not known and we have a random sample, we estimate o by the standard deviation of the sample on hand. By replacing σ by the sampling (margin of) error E = 0.29 (Moors, 1991; Casley and Kumar, 1998) in the below z-interval, we reach at the following interval, that is, 100(1 − α)% Confidence Interval (C.I) on μ, and zα/2 = 1.96 (two tail) indicating the heterogeneity of the survey population (1):

$$\tilde{e} - z_{\frac{\alpha}{2}}\sqrt{\frac{\tilde{e}(1 - \tilde{e})}{n}} < E < \tilde{e} + z_{\frac{\alpha}{2}}\sqrt{\frac{\tilde{e}(1 - \tilde{e})}{n}} \quad \ldots \ldots \ldots . (1)$$

Consequently, the upper limit of the computed 95% C.I. is taken as the percentage of sample size (that is, 37%), therefore, 37% of 130 = 48.1 copies of questionnaire to be administered for each of the surveyed population. However, an analysis which involved multivariate analysis (logistic regression) needs large samples such as 100 – 180 (Israel, 1992). Hence it was increased to 180 (that is, 60 copies of questionnaire x 3 clustered areas = 180 copies of questionnaire); to take care of autocorrelation and to avoid poor prediction of the model's coefficients.

The clusters were found to be distributed all over the study area. The clusters include; Doko village in Latin Local Government Area (Zone A); Gunu village in Shiroro Local Government Area (Zone B); and Wabe village in Paikoro Local government Area (Zone C). The total population of mothers in each of these zones is not known. The field work lasted from

31st October, 2018 to 30th December, 2018. The household was considered as the basic sampling unit. A central point of the cluster (village) was located and then the number of household from the central point to the edge of the village was counted. One household in the middle of each village was selected randomly as a starting point and identified the first household. The rest of the households were selected to provide widespread coverage of the villages.

Two female Research Assistants one supervisor were recruited for this study. Adequate training was provided to them through a five days training session before starting the actual survey. The training related to interview and supervision technique, explanation of the questionnaire and the way of collecting relevant information for the study. The supervisor was responsible for identification of the village and starting point for questionnaire administration and ensured quality of data in the field.

The Household Survey

The questionnaire administered elicited information on the demographic, socio-cultural and economic characteristics of the users, illness experiences and use of healthcare services, the knowledge and attitude of the people towards health services, and the cost of using services by mothers who are the respondents in this study. The final part contained questions relating to MCHC that includes antenatal care, delivery, post-natal care, immunization of children and expectant mother, acute respiratory infection (ARI) and Diarrhea diseases. The pilot survey was conducted four weeks before starting the final fieldwork. Piloting was done in a similar situation with 45 respondents. A few changes were made to improve pre-coding and record entry for interviewees on the basis of the field experiences of the interviewers, supervisors and the researcher (Mike, 2010).

Method of Data Analysis

Data Storage and Processing

Initial data entry and storage involved the use of Microsoft Office Excel, where all the responses were recorded and handled. The statistical software SPSS for windows (version 18.0) was used for the analysis because it provides a better means of analyzing the data.

The data were coded (Robson, 2011) using SPSS for easy interpretation and analysis. The analysis uses logistic regression modeling to explain some of the patterns of usage among mothers in the study area.

Dependent variables (Y)

In this analysis use of MCHS such as Tetanus (Toxic) (TT) vaccination during pregnancy, place of TT vaccine, received antenatal care, place of antenatal care, number of antenatal care visit, place of child delivery, types of person attending the delivery, received postnatal care, and place of post natal care, are considered as dependent variables.

Independent variables (X)

The independent, categorical or predictor variables were explored using tabular analysis in order to provide an initial impression of the response data structure; they include; Socio-economic condition, mother education, mother income, occupation of the respondent's husband and age of the respondents. (X) = All the independent variables are grouped into three categories as follows; X1= Socio-economic condition of the people (1=low, 2=medium, 3=high); X2=Family education (1=no education, 2=up to primary level education, 3=above primary education); X3=Age of the respondent (1=up to 20 years, 2=21-30 years, 3=31-49 years; X4= Family income of the respondent (1=low, 2=medium, 3=high); X5=Occupation of the respondent's husband. (1=Day-labour, 2=service/business, 3=agriculture).

Three logistic regression analyses were performed to examine the unadjusted and adjusted effects of the above selected independent variables on the utilization of MCHS in rural Niger State. Regression models are as follows: Three different logistic regression models were tested in these analyses;

1. Model 1. Logistic regression performed with single independent variable to see the unadjusted odds ratio. (Equation for Model 1) Y (TT vaccination of mother during pregnancy) = f (Socio-economic condition (Xl), or family education (X2) or the age of the respondent X3 or family income (X4) or husbands occupation (X5).

2. Model 2, Socio-economic condition, family education, and age of the respondent are uses as independent variables. (Equation for model 2) Y (Consultation for antenatal care) = f (Socio-economic condition (Xl), family education (X2), and the age of the respondent (X3).

3. Model 3, family income, occupation, education,

and age of the respondent are used in the analysis (Equation for model 3) Y (Place of child delivery) = f (Family education (X2), age of the respondent (X3) family income (X4), husbands occupation (X5)

The above three logistic regressions were performed using SPSS and backward step technique was used to fit the model. Results are presented in terms of odds ratios with significance level and confidence interval. The Logistic: likelihood-ratio test performed to see the chi square and P values.

Logistic Regression

Logistic regression was used to investigate the relationship between the outcome (independent) variables and each of the dependent variables whilst controlling for all other independent variables. For the purpose of this analysis, all the dependent variables (Y) are coded as binary variables in the following ways: Y=1 If the respondent uses PHC facilities for MCH services; Y=0 If the respondent uses other than public health care facilities; Y=1 Yes if the respondent received any type of MCHC; and Y=0 No if the respondent did not receive any types of MCHC.

The choice of logistic regression is because, the response variable is binary (nominal) for example, 1 or 0 (yes or no) rather than continuous or a mixture of the two (see Field, 2009 for more detail). Logistic regression calculates the probability of success (1) over the probability of failure (0) which is one of the advantages of logistic regression. For example, taking one of the binary categorical values 1 or 0, the expected value is simply the probability, (p), that the variable takes the value 1. Therefore, applying other regression methods for this kind of probability test could lead to predicted values of the probabilities outside the interval binary values (Landau & Everitt, 2004). The approach in logistic regression is the modeling of the predicted probability value, p, indirectly via what is known as the logistic transformation of (p) or logit (p) (Landau and Everitt, 2004, pp.222-223; Agresti, 2007; Field, 2009; Paulant, 2010).

Logistic regression is calculated as follows:

logit (p) = ln [p/ (1-p)]   ………… (2)

Or

$$p = \frac{exp\,(\beta_0 + \beta_1 X_1 + \cdots + \beta_q X_q)}{1 + exp\,(\beta_0 + \beta_1 X_1 + \cdots + \beta_q X_q)} \quad \ldots\ldots\ldots\ldots(3)$$

From equation 3, p is the probability that a case is in a particular category; *exp* is the base of natural logarithms; β_0 is the constant of the equation; and, β... are the respective coefficients of the predictor variables.

The computation of the logistic regression was undertaken using SPSS statistical software for Windows. The Stepwise method of entry was used in computing the logistic regression because the study is for exploratory purposes (Field, 2009). The stepwise method of entry is considered optimal in a situation where there is no previous research or theory that exists on which to base the hypothesis for testing the results (Field, 2009). This is particularly relevant to this study where the investigation only tries to find a relationship between events. The stepwise method was chosen using the forward LR method in SPSS (Field, 2009, p.272). The advantage of this entry method is that it uses the likelihood ratio test (chi-square difference) to automatically add the variables with the most significant statistics score into the model (Field, 2009).

Results and discussion

Factors that are Important in Choosing Health Care Services by Mothers

TT Vaccination of Mother during Pregnancy

The TT vaccination of the mothers during pregnancy was not found to be significantly associated with the socio-economic conditions of people, though the results show that the medium socio-economic group received TT vaccine 25% less than the low socioeconomic group. No major difference in receiving TT vaccine was found between the low and the high socio-economic group. Family education was found to be associated with the TT vaccination. The adjusted odds ratios of TT vaccination show that families with above and primary education received TT vaccine 30% and 22% more than the non-educated families. The difference was larger when assessing the effects of education individually (Table 1). The respondents over 31 years of age received TT vaccine 47% less compared to the respondents of young age. It indicates that older women are relatively less likely to receive TT during pregnancy compared to the younger women.

Table 1: Estimates of the Influence of Independent Variables on TT Vaccination of Mother during Pregnancy

Independent Variables	Odds Ratios			
	Odd Ratios Unadjusted (95% CI)	P > | Z |	Odd Ratios Adjusted (95% CI)	P > | Z |
Socio-economic condition				
Low	1.00		1.00	
Medium	0.80 (038-1.67)	0.568	0.75 (034-1.67)	0.496
High	1.04 (0.35-3.22)	0.945	0.94 (0.27-3.22)	0.927
Family education				
No Education	1.00		1.00	
Primary Education	1.66 (0.49-2.70)	0.727	1.22 (0.50-2.97)	0.647
Above Primary Education	1.57(0.51-2.55)	0.739	1.30 (0.52-3.22)	0.569
Age of mother				
15-20 Years	1.00		1.00	
21-30 Years	0.71(033-1.50)	0.379	0.71(033-1.53)	0.392
31-+	0.53 (0.17-1.63)	0.275	0.53 (0.17-1.65)	0.277

Table 2: Odds Ratios of TT Vaccination of Mother during Pregnancy by the Categories of Independent Variables

Independent Variables	Odd Ratios			
	Odd Ratios	95% CI	P | Z |	Model p-value
Socio-economic condition				
Low	1.00			0.829
Medium	0.80	0.38-1.67	0.568	
High	1.04	0.35- 3.22	0.945	
Family income				
Low	1.00			0.734
Medium	0.79	0.34- 1.86	0.604	
High	0.69	0.24-1.93	0.438	
Husband's occupation				
Day labour				
Service/Business	1.00			0.555
Agriculture	1.29	0.57- 2.87	0.534	
	1.57	0.67- 3.68	0.294	
Family education				
No Education				
Primary Education	1.00			0.922
Above Primary	1.66	0.49- 2.70	0.727	
	1.57	0.51- 2.55	0.739	
Age of respondent				
15-20 Years				
21-30 Years	1.00			0.492
30-+	0.71	0.33-1.50	0.376	
	0.55	0.17-1.63	0.275	

Husbands' occupation seems to be a factor for vaccination. The respondents from the agriculture and the service/business families received TT vaccine 57% and 29% more than the respondents of the day labour families. However, differences in vaccination between the occupation groups were not found to be statistically significant. In the case of income group respondents from the higher and medium income group received less TT vaccine than their counterparts (Table 2). Irrespective of the socio-economic condition, family education, age of the respondents, the majority of women received TT vaccine. This was partly due to the availability of TT vaccine free of charge within the reach of rural population at the village PHC and partly due to the frequent home visits of community level health and family planning workers for this purpose.**Table 2:** Odds Ratios of TT Vaccination of Mother during Pregnancy by the Categories of Independent Variables

Place of TT Vaccination

The unadjusted odds ratios of place of TT vaccination show that the middle and the high-income groups visited PHC facilities 71% and 88% respectively less than the low-income group. Individually the family income was found to have significant relationship with the place of TT vaccination (P=0.0004). The choice of the place of TT vaccination was found to be associated with the husbands' occupation. It was found that the respondents from the agriculture and the service /business 'families made 30% and 53% less visit to the public sector health care facilities for vaccination respectively (Table 3) although this association was not found to be statistically significant (p = 0.357).**Table 3:** Odds Ratios of Place of Receiving TT Vaccine during Pregnancy by the Categories of Independent Variables.

Table 3: Odds Ratios of Place of Receiving TT Vaccine during Pregnancy by the Categories of Independent Variables

Independent Variables	Odd Ratios			
	Odd Ratios	95% CI	P | Z |	Model p-value
Socio-economic condition				
Low	1.00			0.015
Medium	0.25	0.09-0.69	0.008	
High	0.31	0.08- 1.17	0.086	
Family income				
Low	1.00			0.004
Medium	0.29	0.10-. 83	0.022	
High	0.12	0.04-. 34	0.000	
Husband's occupation				
Day labour				
Service/Business	1.00			0.357
Agriculture	0.47	0.16- 1.34	0.160	
	0.70	0.22- 2.15	0.537	
Family education				
No Education				
Primary Education	1.00			0.155
Above Primary	0.59	0.17- 2.02	0.408	
	0.39	0.12-1.03	0.058	
Age of respondent				
15-20 Years				
21-30 Years	1.00			0.453
30-+	1.09	0.43- 2.76	0.852	
	0.40	0.13-1.67	0.250	

Table 4: Estimates of the Influence of Independent Variables on the Place of TT Vaccination

Independent Variables	Dependent Variable: Y = 0 if use of other Health Care Facility and 1 if PHC			
	Odd Ratios Unadjusted (95% CI)	P > | Z |	Odd Ratios Adjusted (95% CI)	P > | Z |
Socio-economic condition				
Low	1.00		1.00	
Medium	0.25(0.09-0.69)	0.008	0.30(0.10-0.87)	0.027
High	0.31(0.01-1.17)	0.085	0.42(0.10-1.77)	0.239
Family education				
No Education	1.00		1.00	
Primary Education	0.59(0.17-2.02)	0.408	0.83(0.23-2.96)	0.780
Above Primary Education	0.39(0.12-1.03)	0.058	0.58(0.17-1.93)	0.380
Age of mother				
15-20 Years	1.00		1.00	
21-30 Years	1.09(0.43-2.76)	0.852	1.08(0.42-2.82)	0.861
31-+	0.48(0.13-1.67)	0.250	0.62(0.17-2.23)	0.468

The choice of the TT vaccination place was found to be influenced by the socioeconomic conditions of people in an adjusted analysis. The respondents from the middle and the high socio-economic families received TT vaccination from the PHC facilities 70% and 58% respectively less than the respondents of the low the socio-economic families (Table 4). The association between the medium socio-economic group and the place of TT vaccine was found to be statistically significant even after adjusting for family education and age of respondent (P=0.027). In the case of family education, the adjusted odds ratios of place of TT vaccination show that families with above primary education received TT vaccine from the PHC facilities 42% less compared to the non-educated families. The unadjusted odds ratios show significant association with above primary education. Though it was not found to be statistically significant after adjusting for the socio-economic condition and age of respondents. The respondents aged 31 years or more visited public sector facilities 38% less than that of the respondents of 15-20 years of age. The difference was not found to be statistically significant and no major difference was observed between the young and the middle age group respondents.**Table 4:** Estimates of the Influence of Independent Variables on the Place of TT Vaccination

Consultation for Antenatal Care

Consultation for antenatal care was not found to be related to the socio-economic condition of the population. The possible explanation of this finding is that, the majority of respondents from all the socio-economic conditions received TT vaccine during their pregnancy that was considered as an antenatal care consultation (Table 5). The family education was found to have influence on antenatal consultation. The adjusted odds ratios show that families with above primary education consulted PHC clinics 66% more than the non-educated families. However, the findings were not statistically significant (p = 0.405).

Age of mother was found to be a significant factor for antenatal consultation (P=0.044). The adjusted results show that the respondents of 31 years and over age consulted health care providers for antenatal care 73% less than those of 15-20 years of age (Table 2). This finding indicates that the younger women are more likely to consult a PHC for antenatal care than the older women.**Table 5:** Estimates of the Influence of Independent Variables on Consultation for Antenatal Care during Pregnancy

Table 5: Estimates of the Influence of Independent Variables on Consultation for Antenatal Care during Pregnancy

Independent Variables	Dependent Variable: Y = 0 if no consultation and 1 if consulted			
	Odd Ratios Unadjusted (95% CI)	P > | Z |	Odd Ratios Adjusted (95% CI)	P > | Z |
Socio-economic condition				
Low	1.00		1.00	
Medium	0.90(0.36-2.28)	0.838	0.88 (032-2.39)	0.806
High	1.32 (0.28-6.16)	0.718	1.09 (0.21-5.66)	0.917
Family education				
No Education	1.00		1.00	
Primary Education	0.97(0.35-2.72)	0.968	1.11 (0.50-5.51)	0.844
Above Primary Education	1.38 (0.47-3.99)	0.552	1.66 (0.31-2.30)	0.405
Age of mother				
15-20 Years	1.00		1.00	
21-30 Years	0.85 (0.31-2.29)	0.750	0.84 (0.31-2.30)	0.742
31-+	0.30 (0.08-1.01)	0.053	0.27 (0.08-0.96)	0.044

Table 6: Estimates of the Influence of Independent Variables on the Place of Antenatal Care Consultation

Independent Variables	Dependent Variable: Y -0 If use other health care facility and 1 if use PHC source			
	Odd Ratios Unadjusted (95% CI)	P > | Z |	Odd Ratios Adjusted (95% CI)	P > | Z |
Socio-economic condition				
Low	1.00		1.00	
Medium	0.23 (0.08-0.62)	0.004	0.27 (0.09-0.78)	0.016
High	0.24 (0.06-0.83)	0.025	0.31 (0.08-1.21)	0.093
Family education				
No Education	1.00		1.00	
Primary Education	0.52 (0.16-1.70)	0.285	0.73 (0.21-2.51)	0.629
Above Primary Education	0.32 (0.11-0.94)	0.040	0.59 (0.18-1.91)	0.379
Age of mother				
15-20 Years	1.00		1.00	
21-30 Years	0.90 (0.37-2.21)	0.828	0.90 (0.36-2.25)	0.826
31-+	0.45 (0.12-1.57)	0.211	0.56 (0.15-2.01)	0.377

Place of Antenatal Care during Pregnancy

The use of PHC facilities for ANC was found to be associated with the socio-economic conditions of people. The adjusted results show that the respondents from the middle and the high socio-economic families visited PHC facilities 73% and 69% less than the respondents of the low socioeconomic families respectively (Table 6). The association was found to be statistically significant in the case of middle socio-economic group (P=0.016).

The unadjusted results show that individually the high socio-economic status also has significant effects on ANC consultation. Among the family education groups, families with above primary education used public sector health care facilities 41% less compared to the non-educated families. The difference was found to be more (68%) and statistically significant when checking its association individually with the place of antenatal care consultation (P=0.04). However, the association

became non-significant when socio-economic conditions and age of respondents were controlled for.

The unadjusted and adjusted results show that the women aged 31 years and over age used PHC facilities 55% and 44% less than the respondents of 15-20 years. These findings indicate that comparatively older women are less likely to visit PHC facilities compared to the younger women. **Table 6:** Estimates of the Influence of Independent Variables on the Place of Antenatal Care Consultation

Number of Antenatal Care Visit

The numbers of antenatal care visits among the low, the middle and the high socioeconomic groups were found to be similar, though the unadjusted odds ratios show that the respondents from the high socio-economic families made three or more antenatal care visits (76%) more than the low socio-economic group (Table 7). The level of the family education was found to be significantly related to the number of antenatal care visits (P=0.013). Both the adjusted and unadjusted odds ratios show that families having above primary education made three or more

antenatal care visits and that were more than twice as many as non-educated families. However, no significant difference was found between the primary levels educated families and non-educated families.

The results show that the number of antenatal visit decreased while the age of the respondent increased. The respondent of higher age (31+years) made three or more antenatal visits 71% less compared to respondents of younger age. A similar trend was found in the case of middle age (21-30 years of age) respondents. However, the association was found to be statistically significant only in the case of higher age group (P=0.020). This finding indicates that the mother of comparatively older age are less likely to make more antenatal care visit than the younger women. Husband's occupation was a factor in the use of antenatal care. It was found that the respondents from the service/business families made three or more antenatal visits, 48% higher than that of the day labour families. It is likely that those who are involved in service or business have more interaction opportunity with different people and latest information that may help them to have better understanding of antenatal care that leads them to go for more antenatal visit.

Table 7: Estimates of the Influence of Independent Variables on the Number of Antenatal Care Visit during Pregnancy

Independent Variables	Dependent Variable: Y=0 if up to two visits and 1 If three + visits			
	Odd Ratios Unadjusted (95% CI)	P > | Z |	Odd Ratios Adjusted (95% CI)	P > | Z |
Socio-economic condition	1.00		1.00	
Low	1.22 (0.74-2.03)	0.426	1.02 (0.58-1.78)	0.935
Medium	1.76 (0.87-3.54)	0.111	1.19 (0.54-2.62)	0.657
High				
Family education	1.00		1.00	
No Education	1.09 (0.59-1.90)	0.777	1.08 (0.58-2.04)	0.791
Primary Education	2.14 (1.24-3.70)	0.006	2.20 (1.18-4.11)	0.013
Above Primary Education				
	1.00		1.00	
Age of mother	0.74 (0.46-1.20)	0.227	0.71(0.43-1.17)	0.183
15-20 Years	0.34 (0.12-0.95)	0.041	0.29 (0.10-0.82)	0.020
21-30 Years				
31-+				

The Number of Antenatal Care Visit was found to be associate with the Age of Women.

Place of Child Delivery

The high and the medium socio-economic groups used PHC facilities for delivery 34% and 42% respectively less than the low socio-economic groups. On the other hand the families with primary and above primary level education used PHC facilities 29% and 27% respectively more than the non-educated families. The results for age group show that none of the respondents of 31 years of age and over used PHC facilities for delivery. The older age people are more likely to deliver their baby at home than their counterparts. The birth experience of the older women may be a factor that deters them to deliver their child at the PHC facilities. However, the place of delivery was not found to be significantly associated with the socio-economic condition or level of family education (Table 8).

This result was found to be consistent with the national statistics that in rural areas of Nigeria, the majority of child deliveries are performed at home (NDHS, 2013). This was partly due to the traditional culture of rural population and partly due to non-existence of appropriate institutional child delivery facilities within the reach of the rural population.

Table 8: Estimates of the Influence of Independent Variables on the Place of Child Delivery

Independent Variables	Odds Ratios			
	Odd Ratios Unadjusted (95% CI)	P > | Z |	Odd Ratios Adjusted (95% CI)	P > | Z |
Socio-economic condition				
Low	1.00		1.00	
Medium	0.46 (0.09-2.25)	0338	0.46 (0.08-2.44)	0.363
High	0.64 (0.07-5.39)	0.687	0.58 (0.05-5.94)	0.652
Family education				
No Education	1.00		1.00	
Primary Education	0.98 (0.21-4.48)	0.982	1.29 (0.27-6.14)	0.748
Above Primary Education	0.82 (0.18-3.76)	0.805	1.27 (0.23-6.92)	0.779
Age of mother				
15-20 Years	1.00		1.00	
21-30 Years	1.23 (034-4.40)	0.751	1.25 (034-4.57)	0.779
31-+	00	00	00	00

Table 9: Estimates of the Influence of Independent Variables on the Person Attended the Child Delivery

Independent Variables	Dependent Variable: Y=0 if non -qualified and 1, if qualified person			
	Odd Ratios Unadjusted (95% CI)	P > | Z |	Odd Ratios Adjusted (95% CI)	P > | Z |
Socio-economic condition				
Low	1.00		1.00	
Medium	1.33 (0.65-2.74)	0.427	0.93 (0.42-2.03)	0.856
High	2.14 (0.86-5.27)	0.098	1.10 (0.40-3.01)	0.839
Family education				
No Education	1.00		1.00	
Primary Education	0.91(0.33-2A8)	0.856	0.92 (0.33-2.55)	0.876
Above Primary Education	3.22 (1.47-7.02)	0.003	3.20 (1.34-7.64)	0.009
Age of mother				
15-20 Years	1.00		1.00	
21-30 Years	0.88 (0.73-3.22)	0.727	0.84 (0.42-1.67)	0.628
31-+	0.40 (0.08-1.82)	0.240	0.31(0.06.1.146)	0.140

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Person Attended the Child Delivery.

The use of a trained person in child delivery was found to be low among the study population. Irrespective of socio-economic conditions, an untrained person attended the majority of all deliveries (Table 9). No major difference was found between the socio-economic groups. The choice of the delivery person was found to be significantly associated only with the education level of the family (P=0.009).

The results show that the families having above primary education use the services of trained person three times compared to non-educated families (OR 3.22). No difference was found between the non-educated and primary educated families.

Age of the respondent was found to be associated with choice of health person in child delivery. The result show that the respondents of 31 years or more age used the service of a trained person 69% less compared to the respondents of 15-20 years of age. However, this association was not found to be statistically significant. The unadjusted results show individually high family income has significant

effects on the use of a trained person in delivery. The high-income families used the services of a trained person three times more than the low-income families (OR 3.10). But the difference between the low and the middle-income group were not found to be significant. A significant individual association was found between the service/business occupation group and the types of person was attended the delivery (P=0.008). The service/business group used the services of trained person during delivery almost three times (OR 2.95) more than the day-labour group (Table 10).

Postnatal Consultation

The postnatal care consultation was found to be low among the study population, only 31% of respondents had a postnatal consultation. The adjusted odds ratios of postnatal consultation show that the respondents from the middle and the high socio-economic families consulted a PHC 30% and 44% less compared to the low socioeconomic families. However, the difference was not found to be statistically significant.

Table 10: Odds Ratios of the Person Attended during the Child Delivery by the Categories of Independent Variables

Independent Variables	Odd Ratios			
	Odd Ratios	95% CI	P | Z |	Model p-value
Socio-economic condition				
Low	1.00			0.266
Medium	1.33	0.65- 2.74	0.427	
High	2.14	0.86- 5.27	0.098	
Family income				
Low	1.00			0.038
Medium	1.69	0.76- 3.75	0.194	
High	3.10	1.31- 7.34	0.010	
Husband's occupation				
Day labour	1.00			
Service/Business	2.95	1.32- 6.57	0.008	0.018
Agriculture	1.42	0.58-3.48	0.441	
Family education				
No Education	1.00			
Primary Education	0.91	0.33-2.4	0.856	0.001
Above Primary	3.22	1.47- 7.02	0.003	
Age of respondent				
15-20 Years	1.00			
21-30 Years	0.88	0.73- 3.22	0.727	0.427
30-+	0.40	0.08-1.82	0.240	

The role of family education was found to be important in the case of postnatal consultation. The families with above primary education made postnatal consultation about three times more (OR 2.68) and the primary level educated families consulted 80% more than the non-educated families. The effect of education level on the postnatal care consultation was found to be statistically significant even after controlling for socio-economic condition and age of respondents (P=0.052, P=0.002). The higher the education levels the higher the evidence of postnatal care consultation.

The postnatal consultation was also found to be associated with the age of respondents. The results show that the respondents of 3l years and above consulted PHC for postnatal care 55% less than the respondent of 15-20 years of age. A similar trend was found between the respondent of 21-30 years and 15-20 years of age. The effect of age was found to be marginally significant (P=0.078). The finding indicates that education was the main determinant factor for postnatal care, though other factors; socio-economic conditions, family income, husband's occupation, and age of the respondent have some influence on it.

Place of Postnatal Care

The high and the medium socio-economic group used public sector health care facilities for postnatal care 50% and 20% more respectively than the low socioeconomic condition group (Table 11). Among the family education groups, families with primary education used PHC facilities, 48% less compared to the non-educated families. However, no major difference was found between the above primary educated families and the non-educated families for this purpose.

The respondent's age was not found to be significantly associated with the use of PHC facilities for postnatal care though the respondents of 21-30 years used PHC facilities 61 % less than the respondents of young age (15-20 years). Among the income groups, the high-income group visited PHC facilities 47% more than the low-income groups. In the case of occupation group, the agriculture group visited PHC facilities two times (OR 2.20) than the day labour groups, though the relationship was not found to be statistically significant (Table 12).

Policy implication

Achievements in the coverage of TT vaccination and consultation for ANC are remarkable, a policy decision could be taken by the government to involve people in the management and operation of PHC facilities at rural areas. Formation of a "**Local Health Authority**" comprising representatives from different government and non-profit organizations along with people's representatives could be considered as a strategy for a greater utilization.

Table 11: Estimates of the Influence of Independent Variables on the Place of Postnatal Consultation

Independent Variables	Odds Ratios			
	Odd Ratios Unadjusted (95% CI)	P > | Z |	Odd Ratios Adjusted (95% CI)	P > | Z |
Socio-economic condition				
Low	1.00		1.00	
Medium	1.42 (0.35-5.68)	0.616	1.20 (0.23-6.14)	0.821
High	1.90(0.32-10.97)	0.473	1.50(0.19-11.71)	0.694
Family education				
No Education	1.00		1.00	
Primary Education	0.58 (0.09-3.74)	0.570	0.48 (0.07-3.34)	0.466
Above Primary Education	1.36(0.31-5.92)	0.677	1.07 (0.17-6.44)	0.941
Age of mother				
15-20 Years	1.00		1.00	
21-30 Years	0.41(0.10-1.68)	0.217	0.39 (0.09-1.62)	0.195
31-+	0.93 (0.09-8.82)	0.956	0.94 (0.08-9.92)	0.961

Table 12: Odds Ratios of the Place of Postnatal Consultation visit by the Categories of Independent Variables

Independent Variables	Odd Ratios			
	Odd Ratios	95% CI	P | Z |	Model p-value
Socio-economic condition				
Low	1.00			
Medium	1.42	0.35- 5.68	0.616	0.750
High	1.90	0.32-10.97	0.473	
Family income				
Low	1.00			
Medium	0.91	0.17- 4.72	0.912	0.889
High	1.47	0.27- 7.90	0.652	
Husband's occupation				
Day labour				
Service/Business	1.00			0.603
Agriculture	1.26	0.26- 6.03	0.767	
	2.20	0.45-10.73	0.328	
Family education				
No Education				
Primary Education	1.00			0.573
Above Primary	0.58	0.09- 3.74	0.570	
	1.36	0.31- 5.92	0.677	
Age of respondent				
15-20 Years	1.00			
21-30 Years	0.41	0.10-1.68	0.217	0.424
30-+	0.93	0.09-8.82	0.956	

Conclusion

Use of PHC was found to be universal for two specific MCHS; TT vaccination of mother during pregnancy, and consultation for ANC, which seems to be a big achievement of the government. This service needs to be continued by improving accessibility to and availability of MCHSs. This finding suggests that government needs to concentrate its efforts on increasing use of PHC facilities, if it wants to ensure that PHC services have the impact on health of the rural population.

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