POSTNATAL CARE IN NIGERIA: A MULTILEVEL ANALYSIS

Abstract
Background
Postnatal care is very poor and inadequate in Nigeria. Inspite of the high maternal mortality level in the country, less than half of the women (36%) attend postnatal care services (NPC & ICF Macro, 2009). Previous studies on postnatal care focus on individual and household level factors, but the role of community factors has not been given much attention. This study examines the community contextual predictors influencing the attendance of postnatal care.
Method
Data was drawn from the 2008 Nigeria Demographic and Health Survey and a sample of 17956 women aged 15-49 years. We employed a multilevel regression analysis to identify the individual and community factors associated with postnatal care.
Results
Findings indicate that individual and community contextual factors significantly explain individual and community variations in receiving postnatal care. Women from communities with high level of women's education (OR=2.04; 95% CI=1.32-3.16; p<0.001) and hospital delivery (AOR=17.86; 95% CI=8.34-38.24; p<0.001) were more likely to receive postnatal care. Living in the western region of the country (AOR=1.46; 95% CI=0.95-2.25; p<0.001) was significantly associated with postnatal care.
Conclusion
The uptake of postnatal care services is inadequate in Nigeria. Huge variations in receiving postnatal care exist at both the individual and community levels. Findings suggest that interventions to increase the use of postnatal care services should target the uneducated, and those women who live in disadvantaged communities.

Background

Globally, more than half a million women die of complications due to pregnancy, child birth and postpartum period annually (Glasier et al., 2006). Despite the call to improve access to maternal health services universally and reduce maternal mortality, maternal and neonatal mortality has remained a great challenge in sub-Saharan Africa. In Africa, about 125,000 women and 870,000 newborns die annually in the first one week after delivery (Charlotte et al 2006), and the lifetime risk of maternal mortality in Africa is 1 in 26 (Barate & Temmerman, 2009). UNICEF's estimate of 1100 per 100,000 maternal mortality ratio suggests that the maternal health situation for women in Nigeria is quite poor (Harrison, 2009). With an estimated 59,000 maternal deaths annually, Nigeria contributes 10 percent of the world's maternal deaths (Babalola & Fatusi, 2009). The high level of maternal mortality in Nigeria suggests that the achievement of Millennium Development Goal 5 target to reduce maternal mortality by three quarters, by 2015, is far from reality. Worst still, less than half (36%) of women in Nigeria attend postnatal care services (NPC and ICF Macro, 2009). Postnatal care is among the major recommended interventions to reduce maternal and newborn deaths globally. This intervention enables skilled health professionals to dictate

postpartum problems and potential complications and provide prompt treatment (Titaley et al., 2010). Further, postnatal care if delivered through health facility-based care, or family community care has the potential to enhance both maternal and infant survival (Titaley et al 2009). Attendance of postnatal care by women influences both women and children's lives, in terms of reducing repeat pregnancies and increasing effective contraceptive use (Dhakal et al 2007). Despite the beneficial impact of postnatal care, most women do not attend postnatal care services. It is therefore pertinent to understand the factors influencing the decisions to seek postnatal care. A clear understanding of these factors will provide a policy tool for the development of community interventions that will increase the use of postnatal care services. Existing studies have focused on individual and household predictors of postnatal care and have largely ignored community contextual attributes. For instance, economic status, birth order, place of residence, and region, woman's own occupation and ethnicity, the number of pregnancies and children and the husband's socio-economic status, occupation and education have been found to be important predictors of postnatal care (Ethiopian Society of population studies, 2008; Dhakal et al 2007). Further, exposure to mass media and distance to health facility have been associated with postnatal care (Forte et al 2006; Titaley et al., 2009). Given that individuals are nested within households and households within communities, it becomes imperative to look beyond familial factors influencing the decisions to seek postnatal care. Moreover Mackian (2003) argued that individual decisions can also be influenced by community characteristics and that providing knowledge at the individual level is not sufficient to promote health behaviour change. In line with this argument, Stokols (1996) in his social ecological theory also emphasized the health-relevance of the social environment. The theory also holds that human health (including health-seeking behaviour) is influenced by intrapersonal factors and more so, by a wide range of physical and social environmental conditions. These include various geographic, technologic, organisational and socio-cultural conditions that are present within a particular setting or community. Guided by this theoretical framework, this study builds on previous studies by incorporating the role of community contextual factors in the analysis of postnatal care in Nigeria.

Method

The study draws data from a cross sectional data- the 2008 Nigerian Demographic and Health Survey (NDHS). The 2008 NDHS provided information on population and health indicators at the national, zonal and state levels. The primary sampling unit (PSU), which is referred to as the cluster was selected from the lists of Enumeration Areas (EAs). Sample for the survey was selected using a stratified two-stage cluster design, made up of 888 clusters (NPC and ICF, 2009). A weighted probability sample of 36,800 households was selected in the survey. In all, a total sample of 33,385 women aged 15-49 years and 15,486 men aged 15-59 were interviewed. For the purpose of this study, a sample of 17956 women aged 15-49 years whose recent delivery occurred in the five years preceding the survey was utilized.

Variables and definitions

The outcome variable is postnatal care and is defined as receiving postnatal check from a trained medical personnel and in the first 41 days after childbirth. This measure was used because the timing of postnatal care in the DHS data is 41 days. Postnatal care is a binary variable categorised as 1 if postnatal care was received and 0 otherwise. The individual control variables include age, education, religion, ethnic affiliation, occupation, women's autonomy, household wealth index and household size. The community contextual variables considered in the study include region of residence, community hospital delivery, community women's education and ethnic diversity.

Maternal age is defined as the age of the woman at the birth of the last child in the five years preceding the survey. This is calculated by subtracting the century month code (CMC) of the date of birth of the child from the century month code of the date of birth reported by the respondent. Maternal age is further classified into: 15-24, 25-34 and 35-49 years.

Education is defined as the highest level of education attended by the respondent and categorised as: no education, primary, and secondary or higher.

Religion is measured as the religious affiliation of the respondent, while ethnic affiliation is categorised as Hausa\Fulani\Kanuri (a merger based on common language, culture and social identity), Igbo, Yoruba and Others (a merger of all the minority ethnic groups). Occupation is measured as the respondents occupation and re-grouped into formal employment (a merger of all professional and none professional white collar jobs) agricultural employment and manual workers. Women's autonomy is measured as decision making on a woman's own health care. Household wealth index is the DHS wealth index measured as a standardized composite variable made up of quintiles. This is determined through Principal Component Analysis (from Factor Analysis) and based on household assets (e.g., type of flooring, water supply, electricity, radio, television, refrigerator, type of vehicle). Each quintile represents a relative measure of a household's socioeconomic status (Rutstein and Johnson, 2004). Household size is measured as number of usual members in a household.

Region of residence is defined as geopolitical zones with administrative boundaries and categorised as: North central, North east, North- west, South east, South-south and South west. Community hospital delivery is the proportion of delivery in a health facility in the primary sampling unit (PSU) and categorised as low, medium and high. Community women's education is the proportion of women's education (secondary and higher) in the primary sampling unit and categorised as low, medium and high. While ethnic diversity is defined as the proportion of women from different ethnic groups (Hausa, Igbo, Yoruba, and other minority ethnic groups) in the PSU (Olalekan, 2010). This is categorised as Low, medium and high.

Statistical analysis:

The distribution of respondents by key variables was assessed and expressed as percentages. While at the bivariate level, frequencies and cross-tabulations were used to identify the distributions of the dependent variable by selected background characteristics. The chi square test of association was used to test the statistical significance of these bivariate distributions.

Sample weights provided in the DHS data were applied for the univariate and bivariate analyses in order to adjust for non-response and over sampling of some areas. For all analyses, Stata 11.1 software package was used. Multilevel analysis was utilized to assess the role of measured individual and community level factors as well as unmeasured factors. Multilevel analysis was considered appropriate in order to account for the hierarchical structure of the DHS data (Antai, 2009). A two-level multilevel logistic regression model was applied. Individuals (level 1) were nested within communities (level 2). Overall, four models containing variables of interest were fitted. Model 0 (empty model) contained no covariates, but decomposes the total variance into individual and community components. The empty model also enables the researcher to verify if the random effects at the community level is large enough to justify assessing random effects at that level (Babalola & Fatusi, 2009) Model 1 contained individual level variables, while Model 2 included community contextual variables. Model 3 contained both the individual and community level variables.

The two level multilevel model is written as follows:

$$\text{Log} [P_{ij}/ (1-P_{ij})] = \beta_0 + \beta1\ X_{1ij} + \beta_2 X_{2ij} + \ldots\ldots + \beta n X n_{ij} + u_{Oj} + e_{ij}$$

Where P_{ij} is the probability of the presence of the event of interest for the ith woman, in the jth community.

$(1-P_{ij})$ is the probability of the event not happening

β_0 is the log odd of the intercept

$\beta_1, \beta_2 \ldots \beta n$ are the regression coefficients to be estimated from the data

$X_{1ij},\ X_{2ij} \ldots \ldots.. X n_{ij}$ are the covariates (independent variables) which may be defined at the individual and community level

The quantities u_{Oj} and e_{ij} are random errors at the community and individual levels respectively.

The average probability (intercept) of receiving postnatal care is assumed to vary randomly across individuals and communities. Fixed effects were expressed as odds ratios (OR) and 95% confidence interval (95% CI). The random effects which are the measures of variation are expressed as Variance Partition Coefficient (VPC), while precision was measured by the standard error (SE) of the independent variables using the wald chi statistics (Antai, 2009). Regression diagnostic, Akaike Information Criteria (AIC) was used to determine the goodness of fit of the model. For all significance tests, statistical significance was defined at 5% alpha level.

Descriptive results:
Overall, the percentage of women who received postnatal care for their most recent delivery in the five years preceding the survey was 33.2%. Results in table 1 indicate that percentage increased along the younger age groups (15-24) and decreased at older ages. A significant proportion of women had no education (45%). However, the sample also indicates some level of literacy with 26% and 6% of women having attained secondary higher education respectively. The lower proportion of women with higher education is consistent with the observation that sub-Saharan Africa is among the world regions where the percentage of

tertiary education enrolments have dramatically declined in recent years (NCRIM, 2005. For the entire sample, 54% are Muslims, 44% are Christians, while others are traditionalists. A significant proportion (30%) of the women is unemployed. Ethnic origin of women reflects the dominance of the three major ethnic groups in Nigeria; Hausa 40%, Igbo 12% and Yoruba 15%. More than half of the women (58%) reported that their husbands or other people have a final say over their own health. Most of the women were in the two poorest wealth quintiles, while the lowest proportion was in the richest wealth quintile. Majority of the women (71%) were from large households. The largest proportion of women resided in the North west zone (30%), while the lowest proportion lived in the south east zone. A significant proportion of women resided in communities with low level of women's education, hospital delivery and ethnic diversity.

Bivariate Results

The bivariate results in table 1 show variations in postnatal care by selected individual and community factors. Significant differences were observed by education, religion, ethnic affiliation, occupation, religion, women's autonomy, household wealth index and household size. Results also indicate significant variations by community women's education, community hospital delivery and ethnic diversity. Postnatal care increased with higher education and formal employment. Meanwhile, the relationship with maternal age at last delivery is not linear as the result showed that women aged 25-34 years were the most likely to receive PNC. Muslims were less likely to receive postnatal care compared to Christian women. Ethnic differentials in receiving postnatal care were observed. Yoruba, Igbo and women from minority ethnic groups were more likely to report receiving postnatal care than the Hausa women. Receiving postnatal care services was less common among women whose husbands make decisions concerning their health care. Women from the richest wealth quintile were more likely to receive postnatal care than those in the poorest wealth quintile status. However, receiving postnatal care decreased with large households. Furthermore Women from the southern region were more likely to receive postnatal care compared to those from the northern region. Receiving postnatal increased consistently among women living in communities with higher women's education, hospital delivery and ethnic diversity.

Table 1: Percent distribution of women who had a live birth in the five years preceding the 2008 NDHS by postnatal care and by background characteristics

Characteristics	All women		Skilled Postnatal Care		P-value
	Number	%	Received %	Did not receive %	
Individual					
Maternal age at last birth					
15-24	6476	36.9	28.0	72.0	
25-34	7847	44.7	38.1	61.9	
35-49	3238	18.4	31.7	68.3	0.001
Educational attainment					
No education	7969	45.4	10.8	89.1	
Primary	4004	22.8	36.6	63.4	
Secondary	4542	25.9	58.3	41.7	
Higher	1045	5.9	81.2	18.8	0.001
Occupation					
Unemployed	5312	30.4	24.9	75.1	
Formal employment	7235	41.4	43.1	56.9	
Agricultural employment	3005	17.2	25.4	74.6	
Manual workers	1910	10.9	30.8	69.2	0.001
Religion					
Muslims	9482	54.3	21.5	78.5	
Christians	7685	44.0	48.4	51.6	
Traditional/Others	297	1.7	15.6	84.4	0.001
Ethnic affiliation					
Hausa	6924	39.6	10.6	89.4	
Igbo	2033	11.6	51.7	48.3	
Yoruba	2627	15.0	70.7	29.3	
Others	5887	33.7	37.1	62.9	0.001
Women's autonomy (decisions over own health)					
Wife alone	1450	8.8	52.1	47.9	
Wife/husband	5477	33.1	45.5	54.5	
Husband alone/Others	9634	58.2	22.8	77.2	0.001
Household wealth index					
Poorest	4059	23.1	6.7	93.3	
Poor	3898	22.2	15.3	84.7	
Middle	3332	19.0	30.9	69.1	
Rich	3187	18.2	50.7	49.3	
Richest	3084	17.6	75.1	24.9	0.001
Household size					
Small (<5 members	5041	28.7	40.9	59.1	
Large (5 or more members)	12519	71.3	30.1	69.9	0.001
Community contextual characteristics					

Region of residence					
North Central	2516	14.3	37.7	62.3	
North East	2745	15.6	15.5	84.5	
North West	5337	30.4	10.9	89.1	
South East	1599	9.1	44.6	55.4	
South South	2303	13.1	44.6	55.4	
South West	3061	17.4	69.9	30.1	0.001
Community women's education					
Low	7487	42.6	9.2	90.8	
Medium	5097	29.0	40.1	59.9	
High	4976	28.3	62.5	37.5	0.001
Community hospital delivery					
Low	7072	40.3	5.8	94.2	
Medium	4807	27.4	37.4	62.6	
High	5682	32.4	64.0	36.0	0.001
Ethnic diversity					
Low	7223	41.1	14.6	85.4	
Medium	4984	28.4	51.1	48.9	
High	5354	30.5	41.7	58.3	0.001

Multilevel regression analysis

The multilevel model was used to determine the predictors of postnatal care and to assess how much of the variations observed from the bivariate analysis were attributed to the community and individual differences. In table 2, we started with the empty model which contained no covariates but partitions the total variance in receiving postnatal care into the sum of the individual level and community level variances. The reason for this is to test the hypothesis that the community level variance and the individual level variance in receiving postnatal care is zero. This also enabled us to test if our data justifies the random effects model used in this analysis. The results presented in the empty model in table 2 showed that the between community variance in postnatal care expressed as variance partition coefficient (VPC) or intra-class correlation coefficient (ICC) is estimated at 68.1%, while the within community between individual variance is estimated at 31.9%. This shows that the community and individual variances in postnatal care are large and significant suggesting huge differences in receiving postnatal care across communities and between individuals.

In model 1 we assessed the individual predictors of postnatal care. Education, religion, ethnic affiliation, household wealth index and household size were the most significant predictors of postnatal care. Women with secondary or higher education (OR=6.97; 95% CI= 4.24-11.45) had a higher likelihood of receiving postnatal care compared to the reference category. The likelihood of receiving postnatal care was lower for traditional religious women (OR=0.22; 95% CI=0.10-0.48) and Christian women (OR=0.60; 95% CI=0.44-0.81) compared to Muslims. The likelihood of receiving postnatal care was higher for women from Igbo

(OR=8.21; 95% CI=4.35-15.51), Yoruba (OR=17.86; 95% CI=8.51-37.46) and Other (OR=6.88; CI=4.09-11.58) ethnic groups compared to Hausa women. Women from the richest (OR=74.75; 95% CI=27.29-204.71) had a higher likelihood of receiving postnatal care compared to those form poorest households. Meanwhile, the likelihood of receiving postnatal care was lower for women from large households compared to those from small households. Compared to the empty model, the variations in postnatal care in model 1, remained significant across individuals and communities. However, the intra-individual correlation increased, while the intra-community correlation decreased indicating that the proportional change in variance of odds of postnatal care across individuals and communities can be explained by individual level characteristics. Further, this indicates that the considerable clustering of postnatal care at the community level are attributable to the composition of communities by individual characteristics.

We examined the effects of community level factors on the likelihood of receiving postnatal care in model 2. As shown in the model, women from south west (OR=1.98; 95% CI=1.29-3.04) had a higher likelihood of receiving postnatal care compared to the reference category, whereas women living in the North east had 62% (OR=0.38; 95% CI=0.24-0.61), North- west 72% (OR=0.28; 95% CI=0.16-0.49) and South east 72% (OR=0.28; 95% CI=0.15-0.50) lower likelihood of receiving postnatal care compared to women living in North central region. Women living in communities with high level of women's education (OR=16.20; 95% CI=6.77-38.77) and community hospital delivery (OR=31.02; 95% CI=11.13-86.48 had higher likelihood of receiving postnatal care compared to those living in communities with low level of women's education and hospital delivery. The data showed a rather intriguing and unexpected relationship with ethnic diversity. Compared to women living in communities with low ethnic diversity, women living in high ethnic diversity communities had 40% (OR=0.60; 95% CI=0.40-0.90) lower likelihood of receiving postnatal care. The intra-individual correlation in the model increased, whereas that of the community decreased further suggesting that the proportional change in variance of odds of postnatal care across individuals and communities was explained by individual level characteristics. In otherwords this indicates that the differences in the likelihood of receiving postnatal care were partly as a result of composition of communities by community level characteristics.

Finally we included both the individual and community variables in model 3. Results shown in the model indicated that education, religion, ethnic affiliation, household wealth, household size, community women's education and community hospital delivery remained consistently and significantly associated with the likelihood of receiving postnatal care. For the individual level variables, the relationship was consistent with that observed in model 1. Women with higher education, those from the richest households, Muslim women Yoruba, Igbo and women from Other ethnic groups had a higher likelihood of receiving postnatal care compared to their counterparts in the reference category. Furthermore, the likelihood of receiving postnatal care remained significant and higher for women living in communities with high women's education (OR=2.04; 95% CI= 1.32-3.16) and community hospital delivery (OR=17.86; 95% CI=8.34-38.24) even after controlling for all the individual and community factors. Meanwhile, the relationship with ethnic diversity still showed an

unexpected result as women from communities with high ethnic diversity had lower likelihood of receiving postnatal care compared to women living in low and medium ethnic diversity communities. In comparison to model 2, the individual and community level variation remained significant at (5.254 $p<0.001$) and (0.925, $p<0.001$) respectively. However, the variance partition coefficient across individuals increased to 85.1%, while the VPC across communities decreased (15.1%). The proportional change in the variance of the odds of receiving postnatal care across individuals and communities was explained by both individual and community characteristics. This indicates that the differences in the likelihood of receiving postnatal care are due to the composition of both the individual and community characteristics. The smaller value of the Akaike Information Criteria (AIC) shown at the bottom of the table indicates a significant improvement of the each model and the goodness of fit of the model used in this analysis.

Multilevel logistic regression models for the predictors of postnatal care from skilled provider for the most recent birth in the five years preceding the 2008 Nigeria DHS

Characteristics	Empty model	Model 1 Individual variables	Model 2 Community variables	Model 3 Community/individual variables
		Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)
Fixed effects *Individual characteristics* *Maternal age at last birth*			-	
15-24		1.00		1.00
25-34		1.13 (0.93-1.36)		1.07 (0.89-1.28)
35-49		1.26 (0.99-1.61)*		1.19 (0.94-1.51)
Educational attainment			-	
No education		1.00		1.00
Primary		2.81 (2.04-3.87)***		2.21 (1.65-2.95)***
Secondary/Higher		6.97 (4.24-11.45)***		5.13 (3.23-8.15)***
Religion			-	
Muslims		1.00		1.00
Christians		0.60 (0.44-0.81)***		0.52 (0.38-0.71)***
Traditional/Others		0.22 (0.10-0.48)***		0.26 (0.12-0.55)***
Ethnic affiliation			-	
Hausa/Fulani/Kanuri		1.00		1.00
Igbo		8.21 (4.35-15.51)***		5.93 (2.92-12.05)***
Yoruba		17.86 (8.51-37.46)***		2.82 (1.66-4.78)***
Others		6.88 (4.09-11.58)***		3.21 (2.06-5.00)***

	Empty	Individual	Community	Community/Individual
Occupation				
Unemployed		1.00	-	1.00
Formal employment		1.25 (1.01-1.56)*		1.23 (1.01-1.51)*
Agric employment		1.06 (0.81-1.41)		1.02 (0.79-1.32)
Manual workers		1.17 (0.86- 1.59)		1.22 (0.91-1.62)
Women's autonomy				
Wife alone		1.00	-	1.00
Wife/Husband		1.19 (0.89- 1.60)		1.22 (0.93-1.61)
Husband alone/Others		0.84 (0.62-1.12)		0.96 (0.72-1.27)
Household wealth index			-	
Poorest		1.00		1.00
Poorer		2.93 (2.03-4.23)***		2.28 (1.63-3.17)***
Middle		8.33 (4.85-14.29)***		4.46 (2.83-6.99)***
Richer		20.65 (9.97-42.74)***		7.53 (4.25-13.32)***
Richest		74.75 (27.29-204.71)***		19.43 (8.80-42.92)***
Household size				
Small (<5members)		1.00	-	1.00
Large (5 or more)		0.71 (0.58-0.87)***		0.73 (0.60-0.89)**
Community characteristics				
Region of residence				
North Central			1.00	1.00
North East			0.38 (0.24-0.61)***	0.80 (0.55-1.16)
North West			0.28 (0.16-0.49)***	0.56 (0.35-0.90)*
South East			0.28(0.15-0.50)***	0.16 (0.07-0.35)***
South South			0 .53 (0.35-0.80)**	0.42 (0.28-0.64)***
South West			1.98 (1.29-3.04)**	1.46 (0.95-2.25)
Community women's education[a]				
Low			1.00	1.00
Medium			4.28 (2.54-7.23)***	1.36 (0.97-1.91)
High			16.20 (6.77-38.77)***	2.04 (1.32-3.16)***
Community hospital delivery[b]				
Low			1.00	1.00
Medium			11.78(5.62-24.70)***	7.76 (4.45-13.53)***
High			31.02 (11.13-86.48)***	17.86 (8.34-38.24)***
Ethnic diversity[c]				
Low			1.00	1.00
Medium			1.06 (0.75-1.50)	1.10 (0.78-1.56)
High			0.60 (0.40-0.90)**	0.87 (0.58-1.30)
Random effects	*Empty*	*Individual*	*Community*	*Community/Individual*
Community level Variance (SE) (VPC) (%)	10.352(2.924)*** 68.1%	2.211 (0.525)*** 26.3%	1.456 (0.439)*** 24%	0.925 (0.250)*** 15.1%
Individual level Variance (SE) (VPC) (%)	4.855 (2.211)*** 31.9%	6.184 (2.058)*** 73.6%	4.602 (2.199)*** 75.9%	5.254 (2.009)*** 85.1%
Log-likelihood	-8232.0508	-6823.4022	-7648.0695	-6602.0188

Model fit statistics				
AIC	1647	1369.8	1532.1	1327

Note: The empty model contains no variables
a Proportion of women with secondary and higher education in the PSU
b Proportion of women that delivered in a health facility in the PSU
c Proportion of women from different ethnic groups in the PSU
SE = Standard error, VPC= Partition variance coefficient
AIC=Akaike Information Criteria
Significance level ***p<0.001 **p<0.01 *p<0.5

DISCUSSION

This study generally shows the differences in the pattern of receiving postnatal care across individuals and communities. The results indicate that the level of receiving postnatal care in Nigeria is low. This is consistent with the findings of Babalona and Fatusi (2009). In addition, our results showed that individual level variables (education, religion, ethnic affiliation, women's household wealth, and household size) and community level variables (region of residence, community women's education and proportion of women that delivered in a health facility) are important predictors explaining the differences in receiving postnatal care among women in this study. Women with higher level of education had a higher likelihood of receiving postnatal care. Further, the likelihood of receiving postnatal care increased for women in the richest wealth quintile. The significant effect of education and household wealth index could suggest higher socio-economic status which is an important determinant of health-seeking behaviour as documented by other studies (example Stephenson et al, 2006). Individual's and populations' social and economic conditions (for instance education and wealth) strongly influence their behaviour and consequently influence health-seeking behaviour including postnatal care. As noted by Antai (2009), higher socio-economic status is associated with better health outcome.

The finding that ethnic affiliation is a significant predictor of postnatal care is confirmed by Babalola and Fatusi's study. Women from Igbo, Yoruba and Other minority ethnic groups had a higher likelihood of receiving postnatal care compared to Hausa women. The effect of ethnic origin highlights cultural differences, social identity, attitudes and socio-economic position (Antai, 2009) which could explain disparities in receiving postnatal care. The most intriguing and unexpected finding of the study is the relationship between religion and postnatal care. Muslim women had a higher likelihood of receiving postnatal care compared to their Christian counterparts. This however requires further investigation.

The main focus of the study is on community contextual factors, and our results showed that region of residence, community women's education and community hospital delivery were important predictors of postnatal care. Regional disparities in receiving postnatal care as found in the study could reflect the importance of socio-economic development of the social context in which women live and their influences on women's health care behaviour. The study also showed that women living in communities with low women's education and hospital delivery had lower likelihood of receiving postnatal care. This finding is in line with

expectation as communities with high level of women's education and hospital delivery could reflect greater awareness of maternal health service and availability of maternal health care services including postnatal care as well as the health practices of other people in the community which could influence health behaviour (Stephenson et al., 2006).

Conclusion

The uptake of postnatal care services is inadequate in Nigeria. Huge variations in receiving postnatal care exist at both the individual and community levels. The results of this study suggest the need to focus on individual and community-level differences in the likelihood of receiving postnatal care. Findings suggest that interventions to increase the use of postnatal care services should target the uneducated, and those women who live in disadvantaged communities.

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