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Original Article

Determinants of utilization of antenatal care and health facility delivery among women in rural part of Delta State, Southern Nigeria

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Abstract

Aim: The study investigated the predictors of a minimum of four ANC visits and health facility delivery among 900 women in eight rural communities in Delta State, Southern Nigeria.

Materials and Methods: The study is a cross-sectional community health survey, which used a pretested questionnaire to elicit information on ANC and health facility delivery from 900 women within the reproductive ages. Both predictive and descriptive analyses were undertaken. Analyses were undertaken with Stata 13.0 for windows.

Results: Coverage of ANC and health facility delivery was respectively 26.8% and 62.6%. The odds for reporting a minimum of four ANC visits {aOR: 2.68, 95% CI: 0.96-7.47} and having deliveries in health institutions {aOR: 6.46, 95% CI: 1.44 - 28.99} were higher for women who reported the highest income group N (15,000-99,999). Primary educational qualifications {aOR: 1.67, 95% CI: 0.93-3.04} significantly improve the odds for a minimum of four ANC visits. Utilizing ANC from skilled provider {aOR: 3.59, 95% CI: 1.99-6.46} improves the chances for health facility delivery.

Conclusion: Raising awareness on the benefit of adequate number of ANC visits and health facility delivery will no doubt increase women's access to both optimal use of ANC and encourage health facility delivery in rural parts of Nigeria.

Keywords: ANC; health facility delivery; rural women; Nigeria

INTRODUCTION

Globally, it is estimated that 295,000 women die annually from pregnancy-related complications (1). Sub-Saharan Africa (SSA) accounts for 66% of global maternal mortality burden (2). This region has the highest maternal mortality ratio (MMR) puts at 500 per 100,000 live births (3). Nigeria is a major contributor to SSA's crushing maternal mortality burden due to its large population size and its high MMR (4). On the average, its MMR is put at 576 per 100,000 live births (1,5). In a lancet publication, Nigeria was listed as one of the six countries that made significant contributions to global maternal mortality burden (2, 5). In 2017, maternal deaths in Nigeria and India alone account for one third of global maternal deaths (1). Its 58,000 annual maternal deaths account for 19% of global maternal mortality burden (1,4).

The World Health Organization (6) recommends access to continuum of maternal care services as key strategy that can meaningfully reduce maternal and perinatal mortality among low resource countries Nigeria inclusive. However, many women in Nigeria do not adhere to these recommendations (4). The high maternal morbidity and mortality in Nigeria have been attributed to low uptake of maternal healthcare. Evidence from the most recent National Demographic and Health Survey (7), revealed that 57% of women made a minimum of four ANC visits, and that only 59% of births in the five years preceding the Survey were supervised by trained birth attendants.

This study is conducted among women in eight rural communities in Delta State, Southern Nigeria. The State government in November, 2017 initiated the policy of free maternal and under-five healthcare as part of its health contributory scheme (8). Anecdotal evidence shows that the scheme has improved both maternal care behaviour and results in reduction in maternal mortality (9,10). However, the dividend of the policy is not equally distributed between the rural and the urban women. According to a report from the Delta State Ministry of Health, which was documented in Azubuike and Odagwe (9), ANC attendance among rural women of the State has remain unimpressive,

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and a high number of home deliveries are being recorded among women in rural part of the State. While a handful of studies examined the determinants of ANC utilization, there is dearth of evidence on determinants of health facility delivery among rural women of the State. Also, it was reported that several women who came for ANC checkup did not return to health facilities at the time of delivery (9), and no study investigated the kind of relationship that exists between ANC attendance and health facility delivery in the study area.

In the light of the foregoing, this study assessed the coverage of a minimum of four ANC visits and health facility delivery among 900 women within the reproductive ages across eight rural communities in Delta State, Nigeria. The potential beneficiaries of the findings from the study are the society in general and women and children in particular since they bear the greatest share of the burden of maternal mortality. This study provided evidenced-based information on the current state of maternal care utilization in the study area, and as such provided baseline data that will aid the design of pragmatic health intervention programmes that will improve women's access to modern care services in the study area.

MATERIALS and METHODS

Study Settings

This study is a community-based cross-sectional study design that employed a quantitative data collection method to investigate the predictors of ANC and health facility delivery in eight randomly selected rural communities in Ughelli North Local Government Area (LGA) in Delta State, Nigeria. Ughelli North is one of the LGAs in Delta State. It lies between 90 45 'N and 80 43'E with a land mass of 818 square km. The population census of 2006 puts the population figure of the LGA at 321,028. Women constitute approximately 50% of the population. Administratively, there are eleven political wards with 105 communities embedded in those wards. People living in the area comprise several ethnic groups, which include Urhobo, Itshekiri, Okpe and Ijaw. Christianity is the main religion in the area. There is pervasive rate of poverty in the area. The men in the area are predominantly engage in farming, which comprise crop plantation and fish farming, while majority of the women are petty traders. There are 30 Primary Healthcare Centers in the LGA and few private hospitals (11). The only general hospital is located in the local government head quarter.

Sample Population

The study population comprised all women within the reproductive ages residing in the communities at the time of the Survey. Unpublished data from the PHC Department of Ughelli North LGA puts the number of women within the reproductive age at 7,967. This constituted the target population for the study.

Sample Size Calculation

Assuming a 50% health facility delivery in study area due to lack of reliable information, a z-score value of 1.96 for 95% confidence interval (CI), an error margin of 0.05, a non-response rate of 17.2% and design effect of 2, a minimum sample size of 900 was worked out using the Cochrane formula for a single proportion.

Sampling Procedure

A multi-stage sampling procedure was used in selecting respondents for the study. In the first stage, a random sampling technique was used in selecting four political wards out of the eleven political wards that make up the LGA. Second, two communities were selected from each of the political wards using simple random sampling techniques. Third, Household Survey was conducted in the eight selected rural communities. In participatory communities, households were numbered and women within the reproductive age counted. Households, where there was at least one woman within the reproductive age, were enlisted in the Survey. In households with more than one qualified woman, simple balloting was used to select one out of the lot.

Due to lack of accurate and reliable data to work out proportional sampling, we assumed there were equal numbers of qualified women in the eight communities. The sampling plan proposed to recruit 113 women from each of the community. However, some communities have fewer qualified women; hence more women were recruited from communities with more qualified women to make up the required sample size of 900. However, all the communities were fairly represented in the sample.

Inclusion Criteria

The eligibility criteria were women within the reproductive ages, either currently pregnant or must have given birth in the last five years preceding the Survey, either married or were once married and currently residing in the communities.

Research Instrument

The questionnaire was adapted from UNICEF's multiple cluster indicator questionnaires and JPIEGO's tools for monitoring birth preparedness and complication readiness. The questionnaire was pretested by administering it to 8 women in Gana, a neighboring community that shared similar socioeconomic characteristics with research communities. The questionnaire was also translated in Urhobo language being the mother tongue of residents in the research participatory communities. The questionnaires elicited information on household characteristics such as asset ownership, access to safe water and sanitation, personal characteristics of respondents, Antenatal, Intrapartum, and postnatal experience during the last pregnancy and finally, barriers to utilization of maternal care services in PHCs.

Administration of Questionnaire

Five research assistants with basic qualifications in Social and Management Science disciplines were recruited to administer the questionnaire. Research assistants were given two days training on ethics of the Survey, field conduct and in-depth review of the contents of the

questionnaire. The field Survey lasted for three months. The questionnaire was administered through face-to-face interview by the research assistants, and questions were fielded in one of English language, Pidgin language and Urhobo. During the field Survey, interviewers were closely monitored by Supervisors.

Outcome Indicators

Two outcome indicators were examined (i) receiving at least four ANC visits during the pregnancy of the most recent birth. A minimum of four ANC visits is binary, hence respondents who reported a minimum of four ANC visits were coded 1, while otherwise coded 0(that is less than four visits or none) (ii) Place of delivery examined where the respondent had the most recent birth. The following response options were provided: general hospital, private hospital, PHCs, Homes, other homes and homes of traditional birth attendants. Respondents who delivered in health institutions (general hospital, private hospital and PHCs) were coded 1, while elsewhere (homes, other homes and homes of TBAs) were coded 0.

Independent Variables

For each of the outcome variables, we assessed the predictive value of several independent variables (covariate) which include maternal age, maternal education, religion, marital status, number of children ever given birth to, employment status, monthly income (in naira), time involved in walking to the nearest health center (in minutes), woman's level of autonomy, media exposure, who pays for healthcare bills, spousal education difference, perception of quality of care rendered in the nearest health center, birth preparedness, previous experience with pregnancy-related complications. For health facility delivery, the predictive value of ANC use, early timing of ANC, adequate use of ANC and person providing ANC services were also examined.

Statistical Analysis

Coded data were analyzed with Stata version 13.0 for windows. Univariate analysis involving percentage and frequencies was conducted to describe the summary statistics of the included variables. Test of association involving the use of Chi-square was used to test the level of association among the included variables. Multivariate logistic regression was performed to identify significant predictors. Only variables whose probability values were less than 10% at the bivariate level were included in the logistic regression analysis. The results for the logistic regressions were presented as odds ratio and 95% confidence interval. Statistical analyses for the logistic regression were set at 10% significant level.

RESULTS

In Table 1, we present Chi-square tests of variables that are significant predictors of a minimum of four ANC visits and health facility delivery among the study women. First, 26.8% (241/900) made a minimum of four ANC visits and 62.6% (563/900) delivered their last child in health institutions. A higher proportion of the women who reported a minimum of four ANC was among those who reported at least secondary educational qualifications, in consensual union, highest monthly income stratum, employed, with high level of autonomy, very high media exposure, single-handedly pay health bills , more educated than their spouses, had not previously experienced pregnancy-related complications, had no birth preparedness plan, women who lived within the shortest distance (less than 30 minutes) walk to the nearest health centers and those who reported quality of care in nearest health centers as excellent.

Table 1. Characteristics of women, ages 15- 49, who had a live birth in the five years prior to the survey

Variables	Minimum of four ANC visits		Health facility delivery	
	Yes (n = 241)	Chi-square	Yes (n = 563)	Chi-square
Age in years		3.06		6.14
16-19	30		60	
20-24	32.6		67.4	
25-29	34.5		60.5	
30-34	26.5		68.7	
35-39	27.3		69.3	
40-49	30.6		73.1	
Maternal education		**9.13***		**16.41***
No education	20.4		61.3	
Primary	31.6		66.8	
≥Secondary	32.8		79.6	
Number of ever children given birth to		**2.18**		**2.55**
0-2.	34.3		68.6	
3-4.	30.3		65.9	
≥5	27.2		71.4	

Marital status		**9.24***		**8.33***
Married	26.1		65.8	
Living together	36.7		73.5	
Others	27.8		88.9	
Religion		**1.49**		**0.03**
Catholic	27.1		68.4	
Other Christians	31.1		68.9	
Other religions	30.9		69.1	
Monthly income		**13.91***		**38.6***
0+	28.1		71.9	
<5.000	27.7		60.4	
5.000-9.999	24.5		66.5	
10.000-14.999	36.4		80	
15.000-99.999	45		75	
Employment status		**0.03**		**0.03**
Not employed	28.1		71.9	
Employed	29.5		68.6	
Woman's level of autonomy		**9.53****		**28.11***
No autonomy	22.1		52.1	
Low autonomy	28.9		69.4	
Moderate autonomy	30		74.1	
High autonomy	41.5		72.3	
Very high autonomy	38.7		90.3	
Exposure to media		**20.17***		**6.74**
No exposure	22.2		65.9	
Low exposure	38.1		64.5	
Moderate exposure	34.1		68.3	
High exposure	25.4		70.7	
Very high exposure	51.7		86.2	
Who pays healthcare bills		**9.15****		**7.31*****
Respondent alone	40.9		73.5	
Husband alone	25.9		64.7	
Respondent &husband/others	31.4		73.2	
Spousal education difference		**6.84*****		**23.3***
Both none	15.9		53.6	
Husband more educated	29.5		70.5	
Wife more educated	31.6		77.2	
Equally educated but not none	30.6		40.8	
Pregnancy-related complications		**2.18****		**1.41***
Yes	45.6		76.8	
No	54.4		32.4	
Birth preparedness plan		**2.34****		**6.89*****
Yes	28.9		81.8	
No	41.8		35.8	
Time to nearest health center		**1.98*****		**12.11***
<30 min	76.6		65.8	
30-59 min	58.9		40.1	
≥60 min	25.7		16.7	

Perceived quality of care at nearest health center		**3.28****		**2.39*****
Poor	13.7		8.9	
Good	36.9		57.7	
Excellent	68.4		72.3	
Timing of ANC		**0**		**23.14***
1-3 months	0		80.4	
4-9 months	0		63.5	
Number of ANC		**0**		**2.38**
1-3.	0			
≥4	0			
Person providing ANC		**0**		**83.61***
Skilled personnel	0		78.3	
Unskilled personnel	0		45.6	
ANC use		**0**		**64.11**
Yes	0		75.9	
No	0		45.3	

*p<0.05 **p<0.01 ***p<0.001

On the other hand, compared to women who did not deliver in health institutions during their last child birth, those who did were predominantly women who reported at least secondary educational qualifications, who reported other religious affiliation, who belonged to the highest income group, who had high level of autonomy, who single handedly pay health bills, had at least five children, either single, divorced or separated, belonged to other religion, the unemployed, more educated than their spouses, once experienced pregnancy-related complications, had birth preparedness plan, lived within 30 minutes' walk to the nearest health center, once suffered pregnancy-related complications, reported quality of care in nearest health center as excellent.

Finally, attending ANC, early ANC visits and receiving ANC from skilled providers were significantly associated with health facility delivery among the study women.

Determinants of ANC Use (A Minimum of Four ANC Visits)
Results of the analysis of determinants of ANC use are presented in Table 2. Monthly Income had the strongest significant effect on a minimum of four ANC visits. Women on the highest income group had approximately three-fold increase in the odds for attending ANC for at least four times (aOR: 2.68, 95% CI: 0.96-7.47). The odds for meeting a minimum of four ANC visits is significantly higher for women in consensual union (aOR: 1.51, 95% CI: 1.06 -2.12) compared to women that were married and living with their spouses. Being on a high level of autonomy (aOR: 1.79, 95% CI: 0.89-3.60) and on very high media exposure (aOR: 1.02, 95% CI 0.97- 5.80) increases the odds of making a minimum of four ANC visits. Respondents who pay health bills alone (aOR: 0.56, 95% CI: 0.33-0.94) and those who share health responsibilities with others (aOR: 0.56, 95% CI: 0.97- 5.80) were 44% significantly less likely to have made a minimum of four ANC visits. In reference to respondents who rated quality of care in the nearest health center as poor (aoR: 1.45, 95% CI 0.56 -2.34), those who rated excellent reported one and half increase in the odds for making up to four ANC visits.

Determinants of Health Facility Delivery
In Table 2 we present the analysis of determinants of health facility delivery. Income and person providing assistance had the strongest association with health facility delivery. Women on the highest income stratum reported approximately six and half fold increase in the odds of utilizing health facility delivery (aOR: 6.46, 95% CI: 1.44-28.99). Women who received ANC from skilled providers were approximately four times significantly more likely to have their deliveries supervised in health institutions (aOR: 3.59, 95% CI: 1.99-6.46). The odds for utilizing health facility delivery were significantly higher for women on low autonomy (aOR: 1.51, 95% CI: 0.95-2.39). Women on low media exposure (aOR: 1.87, 95% CI: 1.12- 3.13) and those with very high media exposure (aOR: 2.37, 95% CI: 0.97- 5.80) were significantly more likely to have their delivery supervised in health institutions. Respondents who reported being prepared for delivery reported approximately three-fold increase in the odds for utilizing health facility delivery (aOR: 2.61, 95% CI: 0.34-1.98). In reference to respondents who lived < 30 minutes' walk to the nearest health center those who lived within (30-59) minutes' walk and ≥ 60 minutes' walk were respectively 29% and 71% significantly less likely to have had their deliveries supervised in health institutions. The odds for utilizing facility delivery were 86% higher for respondents that once experienced pregnancy-related complications (aOR: 1.86, 95% CI 0.45- 1.18).

Table 2. Logistic Regression Model Predicting the Likelihood of making a minimum of four ANC visits and having Facility Delivery

Characteristics, column (%)	A minimum of four ANC visits			Health facility delivery		
	OR	95% CI	Prob. Value	OR	95% CI	Prob. Value
Maternal education						
No education (ref)	1			1		
Primary	1.67	0.93-3.04	0.09***	0.99	0.53-1.84	1.84
≥Secondary	1.37	0.69-2.69	0.36	1.65	0.81-3.35	3.34
Marital status						
Married (ref)	1			1		
Living together	1.51	1.06-2.12	0.02**	1.69	1.17-2.45	0.005*
Others	0.81	0.26-2.51	0.72	2.94	0.63-13.90	0.172
Monthly income						
0+ (ref)	1			1		
<5.000	1.05	0.44-2.49	0.92	0.71	0.29-1.72	0.45
5.000-9.999	0.94	0.39-2.26	0.88	0.88	0.36-2.16	0.77
10.000-14.999	1.56	0.63-3.89	0.34	2.02	0.76-5.34	0.16
15.000-99.999	2.68	0.96-7.47	0.06***	6.46	1.44-28.99	0.02**
Woman's level of autonomy						
No autonomy (ref)	1					
Low autonomy	1.21	0.74-1.98	0.44	1.51	0.95-2.39	0.08***
Moderate autonomy	1.16	0.66-2.01	0.61	1.41	0.82-2.43	0.21
High autonomy	1.79	0.89-3.60	0.09***	0.94	0.45-1.99	0.88
Very high autonomy	1.38	0.54-3.51	0.49	2.08	0.54-8.01	0.29
Exposure to media						
No exposure (ref)	1			0		
Low exposure	1.87	1.12-3.13	0.02**	0	0	0
Moderate exposure	1.47	0.85-2.56	0.17	0	0	0
High exposure	1.02	0.63-1.65	0.93	0	0	0
Very high exposure	2.37	0.97-5.80	0.06***	0	0	0
Who pays healthcare bills						
Respondent alone (ref)	1			0.8	0.44-1.45	0.47
Husband alone	0.56	0.33-0.94	0.03**	0.71	0.38-1.31	0.28
Respondent &husband/others	0.56	0.33-0.94	0.04**	0.61	0.03-14.5	0.76
Spousal education difference						
Both none (ref)	1			1		
Husband more educated	1.58	0.72-3.44	0.25	1.17	0.59-2.29	0.65
Wife more educated	1.42	0.59-3.45	0.44	0.63	0.27-1.44	0.27
Equally educated but not none	1.16	0.47-2.82	0.75	1.12	0.48-2.58	0.79
Birth preparedness plan						
No (ref)	1			1		
Yes	1.89	0.17-1.82	0.98	2.61	0.34-1.98	< 0.001*
Time to nearest health center						
<30 min (ref)	1			1		
30-59 min	0.65	0.27-2.81	0.78	0.71	0.34-1.98	0.08***
≥60 min	0.98	0.37-2.54	0.92	0.29	0.87-2.41	0.01*
Perceived quality of care at nearest health center						
poor (ref)	1			1		
Good	1.11	0.43-1.78	0.12	0.23	0.34-1.98	0.78
Excellent	1.45	0.56-2.34	< 0.001*	0.56	0.34-1.98	0.45

Pregnancy- related complications						
No (ref)	1			1		
Yes	2.41	0.31-1.47	0.12	1.86	0.45-1.18	0.08***
Timing of ANC						
1-3 months (ref)	0	0	0	1		
4-9 months	0	0	0	1.60	1.07-2.40	0.02**
Person providing ANC						
unskilled personnel (ref)	0	0	0	1		
Skilled personnel	0	0	0	3.59	1.99-6.46	<0.001*
ANC use						
No (ref)	0	0	0	1		
Yes	0	0	0	1.05	0.56-1.98	0.88

*p<0.05 **p<0.01 ***p<0.001. OR: odd ratios; CI: confidence Interval; Prob: probability values. 0, Stands for variable not included in the particular model; † represent unemployed women

DISCUSSION

In this study, we investigated in eight communities the predictors of both adequate number of ANC visits and health facility delivery among 900 women within the reproductive ages. The results showed that 26.8% of the women made up to four ANC visits, and that 62.6% had their deliveries in health facilities. The minimum of four ANC coverage rates which is 26.8% is far below the 57% coverage rate reported by the most recent Demographic and Health Survey (7), and also below the targeted coverage rate of 90% (12). Also, the facility delivery coverage rate of 62.8% is higher than the 59% recoded by the most recent National Demographic and Health Survey (7), but less than the targeted rate of 100% (12). The high coverage rate of health facility delivery in this study is due to a high number of auxiliary midwives rendering maternal care services in the rural part of the State. Hence, raising awareness on the benefit of adequate number of ANC visits and health facility delivery will no doubt increase women's access to both optimal use of ANC and encourage health facility delivery in study area.

The data showed that income significantly influenced both a minimum of four ANC visits and health facility delivery. Women who belonged to the highest income stratum were 168% and 546% more likely to meet up to the recommended number of four ANC visits and also had their deliveries supervised in health institutions. Studies both for Nigeria (13,14, and 15) and other countries (16,17, and 18) reported household wealth as strong predictors of maternal care utilization. This is because income defines the capacity of a woman to meet her basic needs; hence it is strongly connected to her health seeking behaviour. The fact that income remains significant predictors of maternal care utilization among the study group revealed that the free maternal care policy currently in operation in Delta State has not succeeded in resolving financial barriers to maternal care utilization in the State. The result confirms the presence of disparity in access to maternal care along socioeconomic class. Fagbamigbe and Idemudia (13) recommended that government should go beyond absolving pregnant women of monetary charges by extending the policy to cover other forms of support which include subsidization of transport cost to health centers, educational services, and administration of free drugs.

Time involved in walking to the nearest health center was reported as a significant predictor of a woman's decision whether to utilize care or not. Several Nigerian studies have reported both distance and long walking time to health centers as barriers to utilization of maternal care services, particularly to poor rural women (13,14). In several rural communities, there are no health centers and the distance between communities with PHCs and those without PHCs is often far and involve transportation cost and opportunity cost of time in traveling to health facilities. The result is interesting being that distance only affected the utilization of delivery care at health facility, but not a minimum of four ANC visits. The same report was made by Wilunda et al (3) in an Ethiopian study. This is because a woman in labour does not have the time to travel a long distance to the health center; hence distance may be more insurmountable to a woman seeking delivery care when compared to a woman going for ANC checkup.

This finding conforms to those of other studies (3,19) that reported that women who once experienced complications are more likely to use delivery care. According to Wilunda et al (3), women who experienced complications during delivery are referred out by either traditional birth attendants, other persons supervising delivery or self-referral.

The result revealed that primary education significantly improves the chances to undertake a minimum of four ANC visits. This report was made by a Nigerian study, though with respect to ANC utilization in PHCs (2). Therefore, there is a need to encourage female children in study area to attain up to primary education as recommended by a Nigerian study (13).

The data revealed that ANC has no significant impact on the utilization of delivery care at health facility. This same finding has been reported by a Nigerian study (15). This result showed that some women who go for ANC checkup may not return back to health institutions during delivery. Gabrysch & Campbell (20) reported that several women use the period of ANC to track their pregnancies and if they are told there are no impending complications they may refrain from utilizing facilities in time of delivery. There is, there, a need to reinforced both ANC and health facility delivery as compatible strategy in reducing maternal mortality in rural part of Nigeria (15).

LIMITATIONS

The study is biased in favour of demand-side factors that may influence the utilization of maternal care services in the rural part of Nigeria. Supply-side factors were never considered. In other words, the role of health system factors in maternal care utilization was not examined, hence casting the study within a partial equilibrium framework.

CONCLUSION

The rate of both ANC and health facility delivery is still below recommended levels in Nigeria. It is important to reinforce the need for both adequate number of ANC visits and health facility delivery as effective ways of reducing preventable maternal death in rural part of Nigeria.

Competing interests: The authors declare that they have no competing interest.

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Ethical approval: The study was conducted upon receiving the approved by University of Benin Ethics Review Committee with protocol number ADM/E22/A/VOL.VII/14689.

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