Sciknow Publications Ltd.
International Journal of Maternal and Child Health

IJMCH 2013, 1(1):7-16
DOI: 10.12966/ijmch.05.02.2013

Practice, Knowledge and Perceptions of Antenatal Care Services among Pregnant Women and Nursing Mothers in Southwest Nigeria

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Abstract - High maternal death in Nigeria is a concern to public health practitioners. Knowledge and perception of antenatal care (ANC) by pregnant women and nursing mothers are important in usage of ANC facilities. This study bridged existing gap in inadequate report of perception and knowledge about ANC services. We conducted cross-sectional study among 460 randomly selected pregnant women and nursing mothers in Okitipupa local government area and used questionnaire to collect data on antenatal issues. ANC Knowledge was measured using point scores. We analyzed the data using descriptive statistics and Chi-square test (α=5.0%). Almost two third of respondents (64.1%) had negative perception about ANC. ANC knowledge of about 15% was good, 61.1% moderate and 58(12.9%) was low. Age, husbands' education level, place of ANC service, sources of information about ANC were significantly associated to knowledge and perceptions of ANC. Knowledge and utilization of ANC were high, but perception was inadequate.

Keywords - Antenatal care, Perception, Knowledge, Free Health, Pregnant Women

1. Introduction

The general health status of pregnant women depends largely on the quality of the Antenatal Care (ANC) services available to them. ANC was described as series of pregnancy related health care provided by a doctor or a health worker in a health facility or home[1]. It is the key entry point of a pregnant woman to receive broad range of health education and preventive services that are useful to improving mother and her pregnancy's health. Globally, World Health Organization (WHO) estimates that more than 529,000 women die every year from complications of pregnancy, childbirth and abortion with 99% of these deaths from developing countries [2] making maternal mortality the health indicator with the greatest disparity between developed and developing countries [3]. The world lifetime chance of deaths from maternal causes stands at 1 in 140 death, but compared with developed nations, the ratios in developing countries are high. For instance in more developed countries, maternal death is 1 in 3600 deaths, 1 in 120 deaths in less developed countries, 1 in 90 deaths for less developed countries excluding china – 1 in 120 deaths, 1 in 31 deaths in sub-Saharan Africa and in Nigeria, the ratio is 1 in 23 deaths [4]. Several studies across the word have shown that the proportions of maternal deaths that are preventable varies from one area of the world to another, they include 40% in the United States of America [5], 37% in Japan [6], 44.4% in South Australia [7] and as high as 70.2% and 90% in Nigeria[8] and Brazil [9] respectively.

The importance of women's knowledge and perception of ANC cannot be over emphasized in terms of utilization of ANC services. It would be expected that in a developing country like Nigeria, many factors inhibit ANC utilization, among which are; financial constraints, distance from the ANC facility, cultural beliefs etc. These play a fundamental role in timing of initiation of ANC as well as its utilization. However, recent studies in this region have revealed that the women's understanding and perception of the need for ANC play a more dominant role. For instance, it was reported that ignorance was the underlying factor in late initiation of ANC in two-fifth of the pregnant women accessing care in a Ni-

gerian Teaching Hospital while only 25% indicated financial constraints [10,11]. Findings from studies carried out in Africa were also in agreement with the reports from studies in most developed countries where late initiation of ANC was attributed to teenage pregnancy, unemployment, single women and race [10,12,13].

Perception of care by pregnant women is a paramount and an important element of quality ANC. It often determines willingness of the pregnant women to subscribe, comply and continue with the service. Some studies have reported women satisfaction with ANC [14-16]. Specifically in these studies, it was evidenced that women were; satisfied with the care received, interpersonal relationship of the care givers and also, the infrastructures for providing the care. Notwithstanding the high satisfaction reported in these studies, the outcome from other studies signified women's dissatisfaction with ANC [17-20]. Reasons for dissatisfaction in most of these studies were long waiting time, inadequate drug supply and poor attitudes of health workers. The studies further revealed that health workers often treated women rudely and some of the women who had poor treatment by health workers during antenatal period were discouraged from delivering at ANC unit [17].

In a Malawian study among pregnant women [21] to assess their knowledge and perception regarding ANC services, the participants perceived ANC services received at Lungwena health centre as satisfactory and adequate. The in-depth interviews with community key informants and FGDs with women in the area revealed negative perception of the ANC contrary to this finding of satisfactory perception. Unacceptable attitudes of health workers have been identified in previous studies [17,22] where health care workers often treated women in an insensitive manner without paying adequate attention to women's concerns. In other studies [23], negative perceptions towards ANC were also identified due to lack of resources and long waiting time.

There is need to give explicit definition to "Expressed satisfaction" of ANC services by women who had such satisfaction [21]. Similar to analysis and report by other previous researchers [24,25], the expressed satisfaction of ANC in some studies "could either mean lack of knowledge by women on what care they could expect at the antenatal clinic or could mean clients avoiding the risk of being denied care during the next visit or clients may also say they are satisfied with care because they want to please the interviewer, worry that care may be withheld in future, or they have cultural reason to fear complaining"[21].

Knowledge and perception of pregnant women varies. For instance, a study on reasons given by pregnant women for late initiation of ANC in the Niger Delta, Nigeria [10] reported that "the women's perceptions of when a pregnant women is likely to have problems requiring treatment by a doctor. A third of the women mentioned the first three months of pregnancy while close to a third stated that this could happen anytime during pregnancy. Another interesting finding of this study was that "nearly a tenth of the study population registered late because they wanted to delay making the pregnancy public or were afraid of perceived enemies who may harm the pregnancy."

Two of the key MDG goals (Reduction of childhood mortality and improving Maternal health) might be unfeasible if adequate knowledge and right perception about ANC services of pregnant women are compromised, as this may influence their subscription, time and rate at which they visit ANC facilities. Therefore, research on knowledge and perceptions of pregnant women about ANC is of paramount importance; however, such studies are very few in Nigeria, particularly in the rural communities. The objectives of the current research were therefore designed to fill this gap. These are; to assess the knowledge of pregnant women and nursing mothers on ANC and to know their perceptions on ANC. This is with the view to improving ANC utilization among pregnant women bearing in mind of its benefit in reducing childhood and maternal mortality.

2. Materials And Methods

2.1. Data Collection

This cross-sectional study was conducted among 460 women of reproductive age (15-49 years) among some selected rural communities in Okitipupa Local Government Area (LGA) of Ondo State, Nigeria in 2012. Okitipupa LGA has a population of about a quarter of a million and covers 803 km^2 with river-rine communities. A pre-tested structured interviewer-administered questionnaire with open-ended and close-ended questions was used to obtain the relevant data. A multistage sampling method was used to select respondents for the survey using the sampling frame of 14 communities in the LGA. Five communities were randomly selected using simple random sampling. All houses in each selected communities were listed using the 2006 National Population Census numbering system. Using sampling proportionate to size, 100 houses were selected from each of the communities and every 5^{th} house in the communities selected using a systematic random sampling method and all eligible women in the selected house interviewed until 460 responses have been obtained. The questionnaires were administered by trained interviewers to every woman who were either pregnant or have had at least one child at the selected houses in English and transcribed to the major local language – Yoruba – if the respondent don't speak English.

Questions on perception of women of child bearing age regarding ANC on services rendered at ANC facilities vi-

sited by respondents were scored 0 (bad) or 1 (good). We categorized perceptions with scores below the mean score as negative while those equal or greater than the mean score as positive perception. The knowledge scores of the respondents on ANC services was determined using responses categorized as "Strongly Agree", "Agree", "Don't Know", "Disagree" and "Strongly Disagree" to questions on ANC Knowledge. We aggregated and categorized knowledge scores 0%-60% (below median) as poor knowledge, 61%-80% (median) as moderate knowledge while others had good knowledge (above median).

2.2. Method of Analysis

Knowledge and perception about ANC were the dependent variables in this study while age, respondents' educational level, husbands' education level, place of ANC service, sources of information about ANC were considered as independent variables. Descriptive statistics were used to describe the distribution of all variables. Bivariate analysis using Chi-square test was used to examine the association between each independent variables and knowledge and perceptions of ANC. Statistical significance was set at 0.05.

2.3. Ethical Consideration

Ethical approval was obtained from the Ondo State Ethical Review of the Ministry of Health in Nigeria. Written informed consent of all respondents was obtained. Purpose and implication of the research was explained and interpreted to participants. Study participants were assured of confidentiality of information.

3. Results

3.1. Patient characteristics

The mean age of the respondents was 29.8(7.3) years with 12.4% aged 20-24 years, 33.9% aged 25-29years and 19.8% aged 30-34 years. About 89.3% were married, 84.6% are from Yoruba, the major ethnic group in the area while 87.6% of the respondents are Christians.

Only 29(6.3%) of the respondents were pregnant as of the time of the interview. As shown in Table 1, 439(95.4%) of the 460 respondents had received at least one ANC service and Fifty nine (12.9%) had been pregnant once, 109(23.7%) twice while others have been at least three times. Only 4.6%, (21), said they didn't attend any ANC services during their last pregnancy before the survey (including those who are currently pregnant), 11.7% attended less than four times, 91(19.8%) attended 4 to 10 times while others attended more than ten times.

Two hundred and seven (45.0%) of the respondents stated that Health workers were their source of information on ANC facility, while 12.4%, 19.1%, 19.3% and 2.2% stated friends, relatives, news media and faith based organizations as their sources of information. The remaining 2% couldn't state categorically how they got to know about ANC.

The level of knowledge of the respondents on ANC services was sought on related ANC issues. On the statement "ANC is for all women whether pregnancy or not", 258(57.2%) disagreed while 137(30.4%) disagreed strongly giving a correct knowledge of 87.6%. Also, on the statement "ANC is only necessary for the purpose of where to deliver", 94(20.9%) disagreed and 36(8.0%) disagreed strongly giving a correct knowledge of 28.9%. The overall correct knowledge rate was 74.6%. Categorisation of knowledge scores into 3 groups revealed that 117(26.0%) respondents had good knowledge of ANC services, 275 (61.1%) had moderate knowledge while 58 (12.9%) had poor knowledge (Table 2).

On the perception of the respondents regarding ANC services, we asked questions pertaining to perception of various areas of ANC service deliveries in facilities visited by the respondents. We scored 1 for positive perception and 0 for negative perception and dichotomised final scores into either positive or negative perception on the basis of the mean score. In all, 156 (35.9%) had positive perception while 278 (64.1%) had negative perception (Table 2)

Table 1. Reproductive Characteristics of the Respondents

Variable	Frequency
Ever receive ANC	
Yes	439(95.4)
No	21(4.6)
Currently pregnant	
Yes	29(6.3)
No	431(93.7)
No of ANC services Attended	
None	21(4.6)
< 4 times	54(11.7)
4-10 times	91(19.8)
More than 10 times	294(63.9)
No of Previous pregnancies	
Once	59(12.9)
Twice	109(23.7)
Thrice	90(19.6)
Four times	100(21.8)
Five times & above	101(22.0)

Table 2. Distribution of perception and knowledge of respondents regarding ANC services

Variables	Frequency
Perception regarding ANC	
Positive	156(35.9)
Negative	278(64.1)
Knowledge about ANC	
Good	117(26.0)
Moderate	275(61.1)
Poor	58(12.9)

We determined if the respondents' practices tally with their knowledge and perception regarding ANC utilization. We sought agreement between respondents' perceived number of times a pregnant woman should visit ANC and the actual number of times they have visited ANC services.

About 18% of the respondents believed that pregnant woman can visit ANC services 10 times or less but 31.5% visited ANC facilities ten times or less, 58.3% versus 63.9% for over 10 times, 12.2% said pregnant women should attend ANC countless numbers of time while 11.2 % said they don't know ideal number of times a woman should visit ANC during pregnancy (Table 3 and Figure 1).

Figure 1. Frequency of ANC Attendance

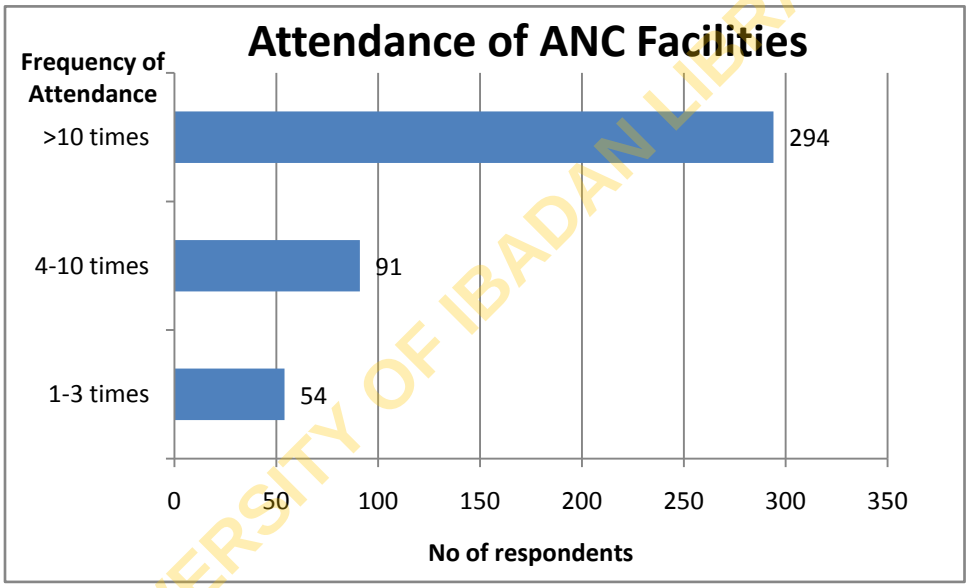


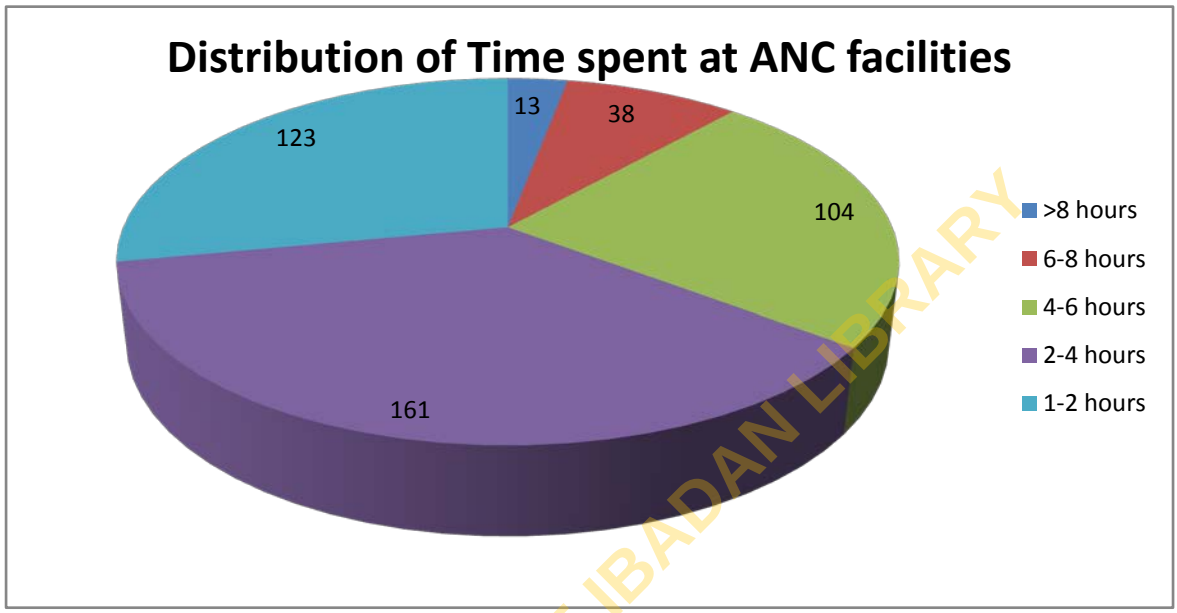
Table 3. Respondents' Knowledge and Practice of number of ANC attendance

Number of Times	How many times should a woman attend ANC		No of times respondents attended ANC	
	Frequency	Percent	Frequency	Percent
1-3 times	35	7.6	54	11.7
4-10 times	49	10.7	91	19.8
Over 10 times	268	58.3	294	63.9
None	0	0	21	4.6
Countless	56	12.2	0	0
Don't Know	52	11.2	0	0
Total	460	100	460*	100

*Including those who never attended ANC

About 179(42.0%) believed ANC is most important at first pregnancy while 42(9.9%), 25(5.9%), and 180(42.3%) said ANC is most important at 2nd, 3rd and after 3rd pregnancy respectively out of 426 respondents. 123(28.0%) out of 439 respondents who had ANC services spent 1-2 hours during each ANC visit, 161(36.7%), 104(23.7%), 38(8.7%) and 13(3.0%) had spent 2-4 hours, 4-6 hours, 6-8 hours and more than 8 hours respectively on each ANC visit (Figure 2).

Figure 2. Time spent at ANC facilities by respondents



The results of test of association between the independent variables and perception of the respondents regarding ANC using the Chi-square test are shown in Table 6. We found that age, education level, husbands' education level, place of ANC service, sources of information about ANC, knowledge about ANC, number of previous pregnancy and whether they have had ANC service before or not were all statistically significantly associated with perceptions of respondents regarding ANC. The respondents who had moderate knowledge about ANC were most likely to have positive perceptions while those who had poor knowledge were most likely to have negative perceptions.

Considering factors associated with respondents' perception about ANC, two thirds (66.0%) of the respondents who had ever received ANC services had negative perception regarding the services while 93.3% of those who never attended had positive perception. Respondents younger than 20 years had highest (60.0%) positive perception, while the respondents with higher educational status had high (81.7%) negative perception regarding ANC services. Only respondents who attended "Faith based organization" ANC facilities had positive perception others had negative perception. Tribe, religion, marital status, respondents' occupation as well as their spouse's occupation and whether the respondents were pregnant as at the time of the study or not were not significantly associated with perception of the respondents about ANC (Table 4).

The analysis of association between the independent variables and level of knowledge of respondents about ANC services show that respondents younger than 20 years had high knowledge (50.0%) while others had high moderate knowledge ranging from 56.0% to 64.7%. When respondents' knowledge was considered across marital status, only the singles had good knowledge (66.7%) about ANC services while others had moderate knowledge. In the occupation categories, only respondents whose occupations were not listed or whose husbands were not listed had good knowledge while respondents with other occupations had moderate knowledge. For the remaining significant variables, respondents had moderate knowledge about ANC services. Variables such as tribe, religion, respondents' education, either the respondents had had ANC services before or not and whether the respondents were pregnant as at the time of the study or not were not significantly associated with knowledge of the respondents about ANC (Table 5).

Table 4. Factors significantly associated with perception of respondents regarding ANC

Factors	% of 460	Positive Perception	Negative Perception	X^2, p-value
		* n (%)	*n (%)	
Age	Mean=29.8(7.3)			
Less than 20yrs	6.5	15(60.0)	10(40.0)	
20-24	12.4	24(46.2)	28(53.8)	
25-29	33.9	50(33.3)	100(66.7)	15.169 .010
30-34	19.8	32(37.6)	53(62.4)	
35-39	16.1	16(22.2)	56(77.8)	
Above 39	11.3	19(38.0)	31(62.0)	
Education				
None	11.5	26(56.5)	20(43.5)	18.764 <0.001
Primary	34.3	59(39.1)	92(60.9)	
Secondary	37.6	58(34.9)	108(65.1)	
Tertiary	16.5	13(18.3)	58(81.7)	
Education of respondents' husband				
None	9.6	22(56.4)	17(43.6)	20.148 <0.001
Primary	22.6	35(36.5)	61(63.5)	
Secondary	39.7	71(41.3)	101(58.7)	
Tertiary	28.1	27(21.6)	98(78.4)	
Place of ANC Facility				
General Hospitals	43.5	35(18.1)	158(81.9)	
Health centres	31.5	58(41.4)	82(58.6)	
Private hospitals	16.1	34(47.9)	37(52.1)	81.195 <0.001
Faith Based organisation	2.2	8(88.9)	1(11.1)	
Home birth attendants	1.0	20(100.0)	0(0.0)	
None	5.2	1(100.0)	0(0.0)	
Main source of Information on ANC				
Friends	12.6	23(41.8)	32(58.2)	12.675 0.013
Relatives	19.5	33(39.8)	50(60.2)	
News Media	19.7	24(29.6)	57(70.4)	
Health workers	45.9	63(31.8)	135(68.2)	
Faith based organization	2.2	8(80.0)	2(20.0)	
Ever received ANC?				
Yes	95.4	142(34.0)	276(66.0)	22.140 <0.001
No	4.6	14(93.3)	1(6.7)	
Knowledge of ANC				
Good	26	42(37.5)	70(62.5)	10.977 0.004
Moderate	61.1	102(38.6)	162(61.4)	
Poor	12.9	8(15.1)	45(84.9)	
No of Previous pregnancy				
Once	12.9	30(56.6)	23(43.4)	
Twice	23.7	38(38.0)	62(62.0)	13.522 0.009
Thrice	19.6	31(35.6)	56(64.4)	
Four times	21.8	29(30.5)	66(69.5)	
Five times & above	22	28(28.6)	70(71.4)	

*didn't add to 460 because of missing values

Table 5. Factors significantly associated with knowledge of respondents regarding ANC

Factors	Good Knowledge n (%)	Moderate Knowledge n (%)	Poor Knowledge n (%)	x^2	p-value
Age	N=450			39.847	<0.001
Less than 20yrs	13(50.0)	12(46.2)	1(3.8)		
20-24	16(29.1)	33(60.0)	6(10.9)		
25-29	39(25.0)	101(64.7)	16(10.3)		
30-34	30(33.7)	54(60.7)	5(5.6)		
35-39	6(8.1)	47(63.5)	21(28.4)		
Above 39	13(26.0)	28(56.0)	9(18.0)		
Marital Status	N= 450			24.959	0.005
Married	99(24.4)	259(64.0)	47(11.6)		
Single	4(66,7)	2(33.3)	0(0.0)		
Divorced	7(38.9)	5(27.8)	6(33.3)		
Widowed	4(50.0)	3(37.5)	1(12.5)		
Separated	1(12.5)	4(50.0)	3(37.5)		
Cohabiting	2(40.0)	2(40.0)	1(20.0)		
Occupation	n=448			39.989	<0.001
Trading	42(29.0)	90(62.1)	13(22.4)		
Farming	10(12.7)	51(64.6)	18(31.0)		
Business	24(21.4)	77(68.8)	11(19.0)		
Civil Servant	27(43.5)	30(48.4)	5(8.6)		
No Occupation	8(19.0)	23(54.8)	11(19.0)		
Others	6(60.0)	4(40.0)	0(0,0)		
Husbands' Occupation	n=448			28.833	0.001
Trading	14(29.2)	29(60.4)	5(10.4)		
Farming	18(16.2)	81(73.0)	12(10.8)		
Business	20(22.0)	64(70.3)	7(7.7)		
Civil Servant	35(34.0)	51(49.5)	17(16.5)		
No Occupation	23(26.7)	48(55.8)	15(17.4)		
Others	6(66.7)	1(11.1)	2(22.2)		
Husbands' education	n=447			24.047	0.001
None	14(32.6)	27(62.8)	2(4.7)		
Primary	34(33.7)	54(53.5)	13(12.9)		
Secondary	41(23.0)	123(69.1)	14(7.9)		
Tertiary	27(21.6)	69(55.2)	29(23.2)		
Place of ANC Facility	N=450			56.48	<0.001
General Hospitals	40(20.12)	117(58.8)	42(21.1)		
Health centres	58(40.3)	81(56.2)	5(3.5)		
Private hospitals	7(9.5)	62(83.8)	5(6.8)		
Faith based organization	3(30.0)	6(60.0)	1(10.0)		
Home birth attendants	8(40.0)	8(40.0)	4(20.0)		
None	1(33.3)	1(33.3)	1(33.3)		
Source of ANC informa-	n=447			66.048	<0.001
Friends	10(18.2)	41(74.5)	4(7.3)		
Relatives	9(10.2)	65(73.9)	14(15.9)		
News Media	22(25.3)	36(41.4)	29(33.3)		
Health workers	69(33.3)	127(61.4)	11(5.3)		
Faith based organization	5(50.0)	5(50.0)	0(0.0)		
Perception of respondents	n=429			10.977	0.004
Positive	42(27.6)	102(67.1)	8(5.3)		
Negative	70(25.3)	162(58.5)	45(16.2)		
No of previous pregnancy	n=449			49.3	<0.001
Once	19(33.3)	36(63.2)	2(3.5)		
Twice	45(42.1)	58(54.2)	4(3.7)		
Thrice	26(29.5)	53(60.2)	9(10.2)		
Four times	13(13.4)	65(67.0)	19(19.6)		
Five times & above	14(14.0)	62(62.0)	24(24.0)		

We found that educational status of respondents, their occupation, number of previous pregnancies and whether they received ANC or not significantly affect their perceptions of ANC. Civil servant respondents were two and half times more likely to have positive perception than their trading counterparts, also the farmers were 50% less likely to have positive perception about ANC compared to respondents who were farmers. Respondents who had received ANC services were about 26 times more likely to have positive perception of ANC than those who had not (p<.001). Uneducated respondents were over twelve times more likely than respondents who had tertiary education to have positive perception of ANC services as presented in Table 6.

Table 6. Multiple logistic regression of reproductive and socio-demographic variables on respondents' perception of ANC services

Characteristics	Perception	
	AOR (95%CI)	p-value
Educational status		
None	12.30(3.91-38.8)	0.00
Primary	4.80(1.79-12.8)	0.00
Secondary	3.74(1.50-9.28)	0.00
Tertiary	Ref	
Occupation		
Trading	Ref	
Farming	0.55(0.27-1.09)	0.08
Business	1.51(0.84-2.70)	0.17
Civil servant	2.51(1.01-6.30)	0.04
Unemployed	1.95(0.85-4.48)	0.12
Others	0.42(0.05-3.68)	0.44
No of Previous Pregnancy		
Once	3.12(1.41-6.91)	0.00
Twice	1.36(0.71-2.62)	0.35
Thrice	1.17(0.59-2.33)	0.64
Four times	0.98(0.49-1.96)	0.96
Above four times	Ref	
Ever received ANC		
No	Ref	
Yes	26.2(3.13-218.9)	0.00

AOR Adjusted odd ratio

We found that there is very high utilisation of ANC with respondents attending ANC more than ten times on the average in the course of one pregnancy and each attendance was about 2-4 hours long. The perception and knowledge of respondents concerning ANC did not match their practices of ANC. Though the respondents had good knowledge of ANC, their perception fell below acceptance. Perception of end-users about ANC services will affect its utilization and the advantages of utilizing ANC facilities in developing countries include reduction in high records of maternal deaths [2] and to reduce wide pregnancy outcomes disparity between developed and developing countries as reported in [3].

In our study, the mean age of the respondents was 29.7(7.3) years, the overall correct knowledge of ANC services among the respondents was about 75% out of which about one quarter of the respondents had good knowledge about ANC services while over 3 of every five respondents had moderate knowledge. Almost two third of the respondents had negative perception regarding ANC services, others had positive perception. This finding is at variance with submissions in a Thailand study [26] carried out to determine ANC users' knowledge and perception of ANC, they found that 59.9% of the respondent had positive perceptions regarding ANC; but our finding and theirs were similar in that nearly 70% of their respondents had good

knowledge about ANC. The identified poor knowledge regarding the importance of ANC in this study was also pointed in a study[21] where it was claimed that the poor knowledge was evidenced by some women in the FGD reported that they attended ANC just to get a card for warm reception during labour. The difference between the respondents' knowledge and perception of ANC in our study is not unusual, our findings are similar to those reported in previous study [10] that higher proportions of women registered for ANC services during the last trimesters and when they begin to sense danger though they have high knowledge basically from health education programs.

Majority (95.8%) of the respondents in our study had attended ANC clinic at one time or the other out of which majority had attended ANC for four or more times. This proportion is good as the minimum number of ANC for pregnant women as recommended by WHO [27] is four times. The proportion of the women who claimed that they attended ANC for at least once in our study is much higher than the rate (76.8%) reported in a study in Ibadan, Nigeria [28]. Our study found no concordance between the knowledge and practice concerning ANC services among the respondents. About nineteen in every twenty respondents had attended at least one ANC service, while all the respondents agreed that attendance of the services is a must for every pregnant woman, only about 5% of the pregnant women interviewed didn't attend any ANC service. Although about 1 in every respondent believed that pregnant woman should attend ANC 4 to 10 times, a double of them claimed to have actually visited ANC facilities. This showed that they had better practices of ANC than the knowledge they have about ANC.

The difference in the proportion of respondents who had never used ANC facilities (4.6%) and the proportion of the respondents who claimed they had never attended any ANC services (10.4%) is probably due to the fact that some ANC workers at the health facilities provide home services to pregnant women. This is justified because 20 respondents claimed that they usually get their ANC services through "Home birth attendants". While two thirds of the respondents reported that each ANC visit takes about 1-4 hours, the major source of information about ANC services was Health workers which include Doctors, Nurses, birth attendants, midwives etc while other sources are News media, Friends and relatives.

About 10% of the respondents had correct knowledge on who should attend ANC services while almost all respondent (98.5%) had correct knowledge that ANC is very important to health of pregnant women and their unborn child. However only about one quarter of the respondents had correct knowledge about the purpose of ANC registration and that it is only necessary for the purpose of where to deliver. Contrary to the findings of a study of in Kosovo[29], our study showed that higher percentage of respondents visited public health facility.

We found statistically significant association between some of the independent variables considered and the level of knowledge of respondents about ANC services, this is similar to findings in a previous study4. For instance, respondents younger than 20 years had high knowledge (50.0%) while those in other age categories had more moderate knowledge ranging from 56.0% to 64.7%. When respondents were considered across marital status, only the singles had good knowledge (66.7%) about ANC services while others had moderate knowledge. In the occupation categories, only respondents whose occupations were grouped as "others" or whose husbands' occupation were grouped as "others" had high knowledge while respondents whose occupations were either farming, business or self-employed had moderate knowledge. Interestingly, variables such as tribe, religion, respondents' education and whether the respondents had had ANC services before or not were not significantly associated with knowledge of the respondents about ANC contrary to findings in similar studies [26,28]. In all, most respondents had moderate knowledge of ANC services irrespective of variables we considered.

Interestingly, respondents who attended public (governmental) hospitals had higher good knowledge than those that attended private hospitals where ANC services would be expected to be better utilized in Nigeria context. Also, respondents who received information about ANC services through Health workers demonstrated high good knowledge compared to those who got the information through friends, relatives and news media. Although respondents who received information about ANC services through Faith based organizations had equal proportion of high and moderate knowledge, this is not comparable to other sources because of the relatively small group size.

Our study showed that positive perception about ANC service was higher among respondents who were teenagers compared with older respondents. While respondents' level of education is not associated with knowledge about ANC, we found that highly educated women were more likely to have a positive perception about ANC than poorly educated women. This could be due to the fact that highly educated women are most likely to be acquainted with the level and type of ANC services that should be available at health facility than those with low education levels. A possible reason for this is good quality of health education prevalent in Nigeria, which makes every reproductive woman to be well informed though the highly educated women could probably be better in considering the benefits of ANC for their health and their babies. The result was supported by the previous research [14] who also concluded that educated

women were more likely to have positive perceptions of maternal health services and their benefits. Respondents whose husband attained secondary level of education had positive perception. Negative perception about ANC services was higher among respondents who patronized public hospitals. There seems to be a pattern between perception and Knowledge of ANC services, positive perception about ANC services was similar among the respondents who had good and moderate knowledge of ANC services but much lower among those with poor knowledge.

The multiple logistic regression of reproductive and socio-demographic variables on respondents perception of ANC services showed that positive perception decreased with increasing number of deliveries as respondents with one previous delivery were almost thrice likely to have positive perception concerning ANC than those with five or more previous deliveries. Unlike in knowledge of ANC, uneducated respondents were over twelve times more likely than respondents who had tertiary education to have positive perception of ANC services. This could be due to the facts that, the educated respondent were getting far less than they expected from ANC.

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