Quantitative Analysis of Factors Affecting Optimum Utilization of Antenatal Health Services Among Women of Reproductive Age in Nigeria

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Abstract. Antenatal Care (ANC) among pregnant women is one of the greatest important factors in reducing maternal morbidity, mortality, birth injuries and other puerperal issues. In this paper, factors affecting utilization of ANC services, availability of these services, women perception towards it, level of awareness, attendance rate, sources and types of information on antenatal care services among women of reproductive age were investigated. Descriptive analysis such as tables, pie and bar charts was used for the presentation of socio-demographic and research variables. The test of hypotheses (test of association) between women use of ANC health-services and some demographic variables such as age, education, spouse education, religion and others was also carried out at 5% level of significance.

Key words: Antenatal care, morbidity, mortality, maternal health, puerperal.
AMS 2010 Mathematics Subject Classification : 11-Hxx., 62-02, 62PXX, 62P20

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Résumé Les soins prénatals chez les femmes enceintes sont l'un des facteurs les plus importants de la réduire la morbidité maternelle, la mortalité, les traumatismes à la naissance et d'autres problèmes de la puerpérale. Dans le présent article, les facteurs affectant l'utilisation des services de soins prénatals, la disponibilité de ces services, la perception des femmes à son égard, le niveau de sensibilisation, le taux de participation, les sources et types d'informations sur les services de soins prénatals chez les femmes des âge de procréer sont été étudiés. Les outls d'analyse descriptive tels que les tableaux, lees diagrammes à secteurs et à barres sont utilisés pour la présentation des variables sociodémographiques et de recherche. Des tests d'hypothèses sous forme de tests d'association entre l'utilisation par les femmes des services de santé des soins prenatals et certaines variables démographiques telles que l'âge, l'éducation, la formation du conjoint, la religion, etc, sont abordés à un seuil de signification de 5%.

1. Introduction

Women of reproductive age had been defined by Siegel and Swanson (2004), World Health Organisation (World Health Organization (2018)) as those between the ages of 15-49. They constitute more than one fifth of the world's population and they are reportedly exposed to the risk of child bearing (Siegel and Swanson (2004); Bustreo *et al.,* (2013)). Maternal mortality is unacceptably high, and 830 women die from pregnancy-or childbirth-related complications around the world every day (Alkerma *et al.,* (2016); World Health Organization (2018)). It was estimated that in 2015, roughly $303,000$ women died during and following pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings, and most could have been prevented (Alkerma *et al.,* (2016)). The high number of maternal deaths in some areas of the world reflects inequities in access to health services, and highlights the gap between rich and poor. Almost all maternal deaths (99%) occur in developing countries (World Health Organization (2018)). More than half of this deaths occur in sub-Sahara Africa and almost one third occur in South Asia. More than half of maternal deaths occur in fragile and humanitarian settings (World Health Organization (2018)). Antenatal care (ANC) which is known as care during pregnancy is essential for diagnosing and treating complications that could endanger the lives of mother and child. Maternal health refers to the health of mother during pregnancy, childbirth and the postpartum period. Improving maternal health has been identified as one of the eight United Nations Millennium Development Goals (MDG's). Millennium Development Goal 5 calls for a 75% reduction in the maternal morbidity and mortality ratio (MMR) between 1990 and 2015 (Alkerma *et al.,* (2016)). It is widely accepted that the use of maternal health services helps in reducing maternal morbidity and mortality. High maternal morbidity and mortality rate is a huge public health problem in the developing countries of the world including Nigeria. The maternal mortality rate in Nigeria is 630 deaths per thousand live births and Nigeria rank $10th$ position in the world record of health indicators of maternal mortality (Abimbola*et al.,* (2012)). With an estimated $52,000$ annual deaths, Nigeria accounts for about 10% of all maternal deaths globally and has the highest mortality rate in the world after India (WHO *et al.,* (2012)). It is also reported that for every woman that dies from pregnancy related causes, 20 to 30 more will develop short and long term damage to their reproductive organs resulting in disabilities such as obstetric fistula, pelvic

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inflammatory disease, a ruptured uterus and the likes (Okonofua (2009); World Health
Organization (2018)). According to reports from (Antai (2012); Arthur (2012);World
Health Organization (2018) and United Nation International Children Emergency Fund
(2012)), the disturbing maternal mortality ratios cannot be explained by poor antenatal
care attendance alone. Most of maternal deaths occur during delivery or postpartum
period and abortion due to unwanted pregnancy, and low women status in many obstetric
cares (Okonofua (2009)). Increasing the proportion of birth attended by a qualified health
workers and sponsorship of community based maternal and newborn care intervention are
keys to reducing maternal mortality. The direct causes of maternal deaths are haemorrhage,
infection, obstructed labour, hypertensive disorders in pregnancy, and complication of
unsafe abortion. There are birth-related disabilities too that affect many women and go
untreated like injuries to pelvic muscles, organs or the spinal cord. At least 20% of the
burden of disease in children below the age of five is related to poor maternal health and
nutrition, as well as quality of care at delivery (Iyaniwura and Yusuf (2009); Ladipo (2010);
National Population Commission (NPC)). In a study carried out by Ugal*et al.*, (2012),
it was found that maternal death was a function of age, grand multiparity, educational
status and non-utilization of antenatal services. The study further showed health risks
factors contributing to maternal mortality were haemorrhage with 28.1%, Sepsis 21.3%, and
eclampsia (15.7%). The findings above were upheld seven years later after in another study
by Ashir *et al.*, (2013) that was aimed at finding factors contributing to maternal mortality
in north central Nigerian. The study found out that the greatest risk of maternal mortality
rate was among teenagers ($15 \leq Age \leq 18$ years) and elder women (≥ 40 years), illiterate
women were also associated with very high mortality ratio. The major direct causes of
death were haemorrhage 34.6%, sepsis 28.3%, eclampsia 23.6% and unsafe abortion 9.6%.

Bye and large, ANC among pregnant women is one of the important factors in reduc-
ing maternal morbidity and mortality (Federal Ministry of Health (2007); Bustreo *et al.*,
(2013)). Unfortunately, many women in the developing country do not have access to ma-
ternal health care services and it is reported that the use of such services remain low in
Sub-Saharan African including Nigeria (Fatusi and Babalola (2009)). Thus, this study is to
determine the level of awareness and factors affecting utilization of antenatal health care
services among women of reproductive age in Nigeria. Among other merits, this study will
enable the health care professional to determine the factors causing poor or irregular uti-
lization of antenatal care services and how to eradicate it. It will also help the government
to develop and implement new policies or introducing more health education towards en-
couraging proper utilization of antenatal care services, which will help to reduce maternal
and neonatal morbidity and mortality rate.

2. Methodology

This section describes the method of research, study design, study area, study population,
sample size determination, sampling procedure, data collection instrument, validity of in-
struments, reliability of instrument, procedure for data collection and procedure for data
analysis.

2.1. Study Design and Study Population

This is a descriptive cross sectional study designed to find out factors affecting utilization of antenatal and care health services in Adeoyo Maternity Hospital, survey is an exploration of the characteristics of people or group using a self-structured questionnaire to collect data at a point in time (Whiting (2008)). The study population for this study comprises of women of reproductive age.

2.2. Sample Size Determination

Sample size was determined with 150 respondents. According to Cochran (1977) and Lohr (2010) formula for determining sample size is stated as follows;

$$n = \frac{p(1-p)}{d^2} Z_{\frac{\alpha}{2}}^2 \tag{1}$$

where, $\alpha = 0.05$, $Z_{\frac{\alpha}{2}} = 1.96$, $p = 0.45$ (which result from pretest and pilot survey), $q = 0.55$ and $d = 0.0796$ (level of knowledge of ANC with respect to the study population). Substituting for p, d and $Z_{\frac{\alpha}{2}}$ in equation (1) gives

$$n = \frac{0.45 \times 0.55 \times 1.96^2}{0.0796^2} \approx 150 \text{ observations}$$

Anticipating a non-response or attrition of 10%, sample size was increased by 10%. Consequently,

$$n = 150 + \frac{10}{100}(150) = 165 \text{ observations.}$$

2.3. Sampling Procedure and Instrument for Data Collection

Simple random sampling procedure was used for this study. Each individual in study population had equal chance of being selected. The instrument used for this study was a semi-structured questionnaire. The questionnaire was divided into 5 sections: Section A focuses on the demographic data of the respondents, section B deals with attendance, C focuses on awareness, D focuses on knowledge, E focuses on factors affecting utilization of antenatal health care services. Consultation of relevant literature subjecting it for review by experienced researchers in the field of reproductive health to ensure the validity of the instrument.

2.4. Procedure for Data Collection

The questionnaire was personally administered by the researcher with the help of two trained research assistants interpreting to the illiterate respondents and they are collected immediately from the respondents. The hospital was visited and consent obtained from the respondents and confidentiality assured. The questionnaire was distributed with their support to complete the questionnaire and collected on completion. 165 questionnaires were taken to field out of which 148 were returned. However, only 132 were fit for analysis. R-software version 3.5.1 was used as statistical tool during the data analysis.

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Table 1. Socio-demographic characteristics of the respondents

Variable	categories	Frequency $n = 132$	Percentage (%)
	16-20	10	7.6
	21-25	44	33.3
Age	26-30	23	15.9
	31-35	32	24.2
	36-40	10	7.6
	41-45	13	9.8
	Christianity	80	60.6
Religion	Islam	50	37.9
	Traditional	2	0.8
	Single	5	3.8
Marital status	Married	119	90.2
	Divorced	8	6.0
	Hausa	10	7.6
Ethnicity	Igbo	47	35.6
	Yoruba	74	56.1
	Others	1	0.8
Family	Monogamous	110	83.3
	Polygamous	22	16.7
	SSCE	28	21.2
	NCE	26	19.7
Educational	ND	29	22.0
	HND	26	19.7
	B.Sc. and above	23	17.4
	Civil servant	64	48.5
	Employed	40	30.3
Occupation	Unemployed	24	18.2
	Others	4	3.0

3. Results and Discussion

This section presents the result and analysis of the data as well as discussion of results.

Table 1 shows the socio–demography characteristics of respondents. The modal age group
was $21-25$ years with highest frequency of $44(33.3\%)$ followed by $31-35$ years $32(24.2\%)$.
However, the mean age was 20.4 ± 1.5. This is not surprising as this correspond to Siegel
and Swanson (2004); Ajayi, and Osakinle (2013); and World Health Organization (2018)
definition of women of reproductive as ages of $15-49$. Greater percentage of the respondents
$119(90.2\%)$ were married as against 3.85% that were single. Meanwhile, the predominant
religion was Christianity $80(60.6\%)$ while Islam and traditional religion accounted for 37.9%
and 0.8%, respectively. More than half (56.1%) of the respondents were Yoruba while 83.3%
of them came from monogamous family. Regarding education qualification 22% possessed
OND while NCE and HND certificate were competing 19.7%. Only 17.4% of the respondents
had B.Sc. and above. Almost half 48.5% of the respondents were civil servant while 30.3%
were self-employed. The unemployed respondents however accounted 18.2%.

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Table 2. Showing respondent's spouse education, spouse occupation

| Variable	Categories	Frequency	Percent
Spouse education	SSCE	16	12.1
	NCE	25	18.9
	ND	22	16.7
	HND	29	22.0
	B.Sc.	40	30.3
Spouse occupation	Civil servant	78	59.1
	Employed	46	34.8
	Unemployed	8	6.1
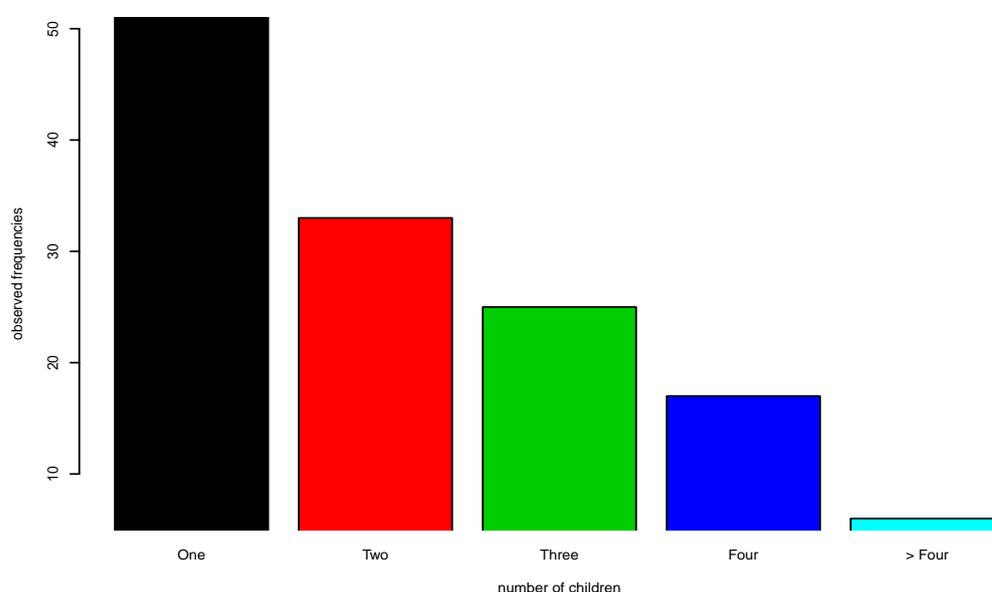
Fig. 1. Parity of the respondents

Table 2 shows respondents' spouse education and occupation. Regarding their spouses' educational qualification, larger percentage of the respondents had B.Sc. and above coupled with HND 22.0%. Respondents with secondary school certificate were few 120%. Also, 59.1% of respondents' spouse were civil servant while 33.8% were self-employed. Only few of their spouses were unemployed 6.1%.

Figure 1 shows that the modal number of children per respondents was one child, followed by two children accounting for 51(38.6%) and 25.0% respondent. Only 7(5.3%) of the respondents has more than four children as stipulated by WHO.
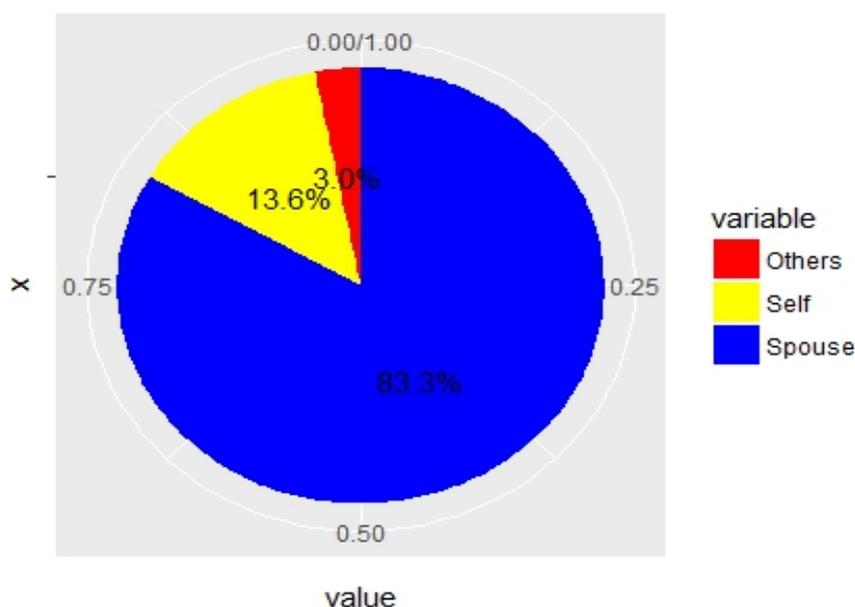
Fig. 2. showing bread winner of respondent's family

From figure 2, it could be depicted that greater percentage 83.3% of the respondents' spouses were the bread winner of the family compared with 13.6% of the respondents that were responsible for their house hold. However, 20% of the respondents ascertained that neither the spouses nor they were responsible for the house hold although others were not stipulated by the respondents.

The above figure 3 shows that vast majority of the respondents 96.2% had high awareness of ante natal care in their community as against 3.8% that were not. In addition, only 38.8% of the respondents had high attendance of antenatal care service as against larger percentage that had low attendance of antenatal care services. This is different to the finding of Fatusi and Babalola (2009) in Ile- Ife where larger proportion 98.8% of the respondents were aware of the ANC services and 60.3% of the respondents attended antenatal care. The low ANC attendance among respondents as indicated by 38.8% in this study might be as a result of some factors such as low literacy rate of the respondents and low economic status among respondents.

Figure 4 shows various sources of information on ante natal services among respondents. It was shown that 55(41.7%) of the respondents majors source of information ante natal service was during their visit to the hospital other sources identified by the respondents were friends 28(21.2%) relatives 30(22.7%) while media accounted for only 19(14.4%).

Table 3 shows distribution of respondents' knowledge on antenatal services. From the table, 78.0% and 17.0% of the respondents strongly agreed and agreed that HIV testing and

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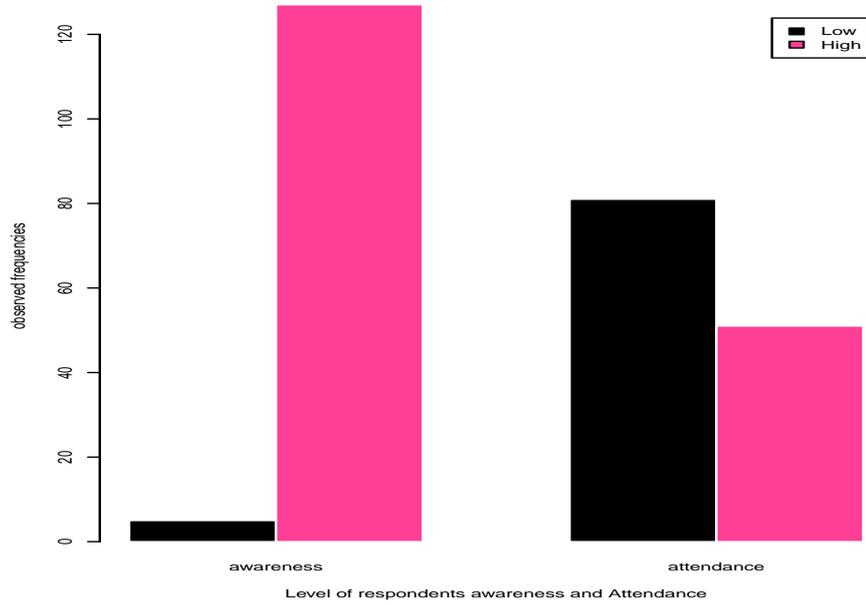
Fig. 3. Awareness and attendance of ante natal care services among respondents
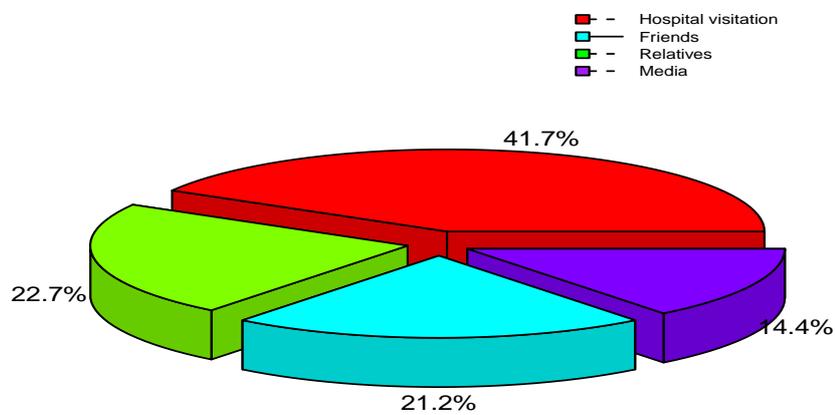
Fig. 4. Various sources of information on ante natal service among respondents

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Table 3. Types of information received during ante natal

Variable	Strongly agree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
HIV testing and counseling	103(78.0)	23(17.0)	4(3.0)	1(0.8)	1(0.8)
Administration of tetanus vaccine	103(78.0)	20(15.2)	8(6.1)	1(0.8)	0(0)
Iron supplementation	83(62.9)	27(20.5)	22(16.7)	0(0)	0(0)
Individual health education	69(52.3)	36(27.3)	21(15.9)	4(3.0)	2(1.5)
De-worming of hookworms	48(36.4)	29(22.0)	43(32.6)	10(7.6)	2(1.5)
Vitamin A supplementation	63(47.7)	35(26.5)	27(20.5)	5(3.8)	2(0.8)
Early detection of abnormality	79(59.8)	37(28.0)	15(11.4)	1(0.8)	0(0)

Table 4. Respondents perception towards ante natal services

Variable	Strongly disagree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
process of pregnancy and its complication	93(70.5)	32(24.2)	4(3.0)	3(2.3)	0(0)
Nutrition and breast feeding	90(68.2)	39(29.5)	2(1.5)	2(0.8)	0(0)
Personal hygiene	89(67.4)	38(28.8)	3(2.3)	2(1.5)	0(0)
Exclusive breast feeding	83(62.9)	43(32.6)	6(4.5)	0(0)	0(0)
Danger signs in pregnancy	81(61.4)	36(27.3)	6(4.5)	8(6.1)	1(0.8)
Harmful habits	63(47.7)	34(25.8)	21(15.9)	12(9.1)	2(1.5)
Consequence use of traditional medicine	44(33.3)	31(23.5)	21(15.9)	25(18.9)	11(8.3)
Plan for delivery	79(59.8)	39(29.5)	8(6.1)	5(3.8)	1(0.8)
Schedule for next visit	75(56.8)	45(34.1)	9(6.8)	3(2.3)	0(0)
Plans for postpartum	64(48.5)	36(27.3)	25(18.9)	7(5.3)	0(0)
Effect of STI	71(53.8)	34(25.8)	22(16.7)	2(1.5)	0(0)

counseling is inclusive during antenatal care. Also 78.0% and 15.2% strongly agreed and
agreed that administration of tetanus vaccine is part of antenatal care services while iron
supplementation and health education accounted for 62.9%; 20.5% and 52.3%; 27.3%. Other
important services highlighted by respondents include de-worming of hookworms, vitamin
A supplementation, and early detection of abnormality. Figure 4 shows the detail.

Table 4 shows types of information received by the respondents during ante natal care from
the table nutrition and breast feeding ranked highest with frequency of 129(97.7%). Followed

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Table 5. Respondents perception towards ante natal services

| Variables	Yes(%)	No(%)
Ante natal service is needed for pregnant women	131(99.2)	1(0.8)
All pregnant woman must take two doses of tetanus-toxoid	124(93.9)	8(6.1)
Ante natal service is important for early intervention	130(98.5)	2(1.5)
ANC services prevents complication pregnancy	129(97.7)	3(2.3)
Health services educate pregnant woman	130(98.5)	2(1.5)
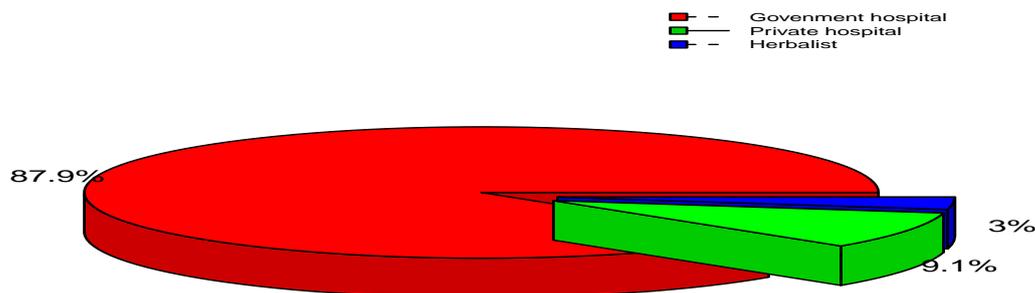
Fig. 5. Respondents places of births during last pregnancy

by personal hygiene 127(96.2%) process of pregnancy and its complication 125, consequence
of used of traditional medicine 118(89.3%) among many others. Table 4 provides the detail.

Table 5 elicits the perception of respondents towards ante natal cares service. From the
table it was shown that majority of the respondents 99.2% perceives ante natal service is
needed for pregnant women while 93.9% opined that all pregnant women must take two doses
of tetanus-toxoid, 98.5% feels that ante natal services is important for early intervention.
Furthermore, ante natal services prevents complication of pregnancy and health services
educate pregnant women were 97.7% and 98.5%, respectively.

Figure 5 shows respondents' places of birth during last pregnancy 87.9% mentioned gov-
ernment hospital as against 9.1% and 3.0% that mentioned private hospital and herbalist,
respectively.

From figure 6, when respondents were asked about what prompted them to attend ante
natal clinic, the commonest response was that they feel it was time to do so 85(64.4%). This
was seconded by the group that ante natal care as a result of sickness 27(20.5%). However,

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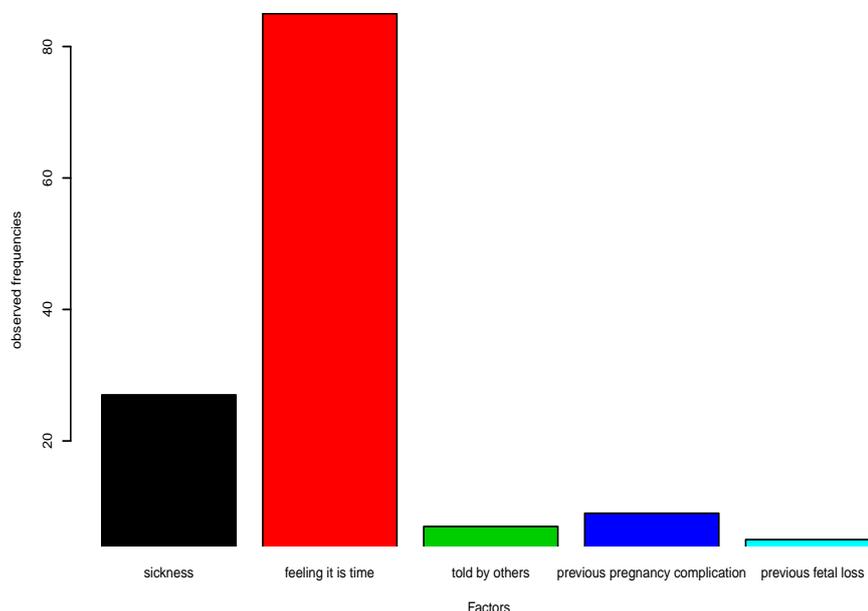
Fig. 6. Determinant of timing of ante natal care

Table 6. Factors influencing ante natal care attendants

Variable	**Yes**(%)	**No**(%)
Transport money	31(23.5)	101(76.5)
Long distance	46(34.8)	86(65.2)
Desirability	38(28.8)	94(71.2)
Perception of high or low risk	30(22.9)	101(77.1)
Waiting for permission from husband	31(23.5)	101(76.5)
Poor health care	31(23.5)	101(76.5)
Lack of transportation	27(20.5)	105(79.5)
Affordability	37(28.0)	95(72.0)
Accessibility	54(40.9)	78(59.1)
Long waiting time	61(46.2)	71(53.8)

other reasons given by respondents include information given by others, previous pregnancy
complication and previous fetal loss. 6 provide the detail.

Table 6 shows factors influencing ante natal care attendants the major factor recognized by
respondents was long wasting time as indicated by 61 out of 132 respondents (46.2%)coupled
with accessibility to ante natal care services 54(40.9%). Other cogent factors mentioned
include long distance 46(34.8%), desirability among respondents 38(28.8%) poor health care
31(23.5%), lack of transportation money 31(23.5%) among many others. Table 6 provides

Table 7. Chi-square test of association between some demographic and ANC services among respondents

Factor	df	Chi-square	p-value	Decision
Age	5	15.984	0.954	Insignificant
Religion	3	0.840	0.840	Insignificant
Marital-status	2	1.922	0.382	Insignificant
Education	4	13.789	0.035	Significant

the details.

Test of Hypotheses: Table summarizes chi-square test of association between some demographic factors and ANC services.

Table 3 above shows that there is no significant association between age, religion, marital status and ANC services as their P-value's less than the pre-defined level of significance (0.05). Level of education is significantly associated with ANC as $p-value < 0.05$.

4. Conclusion and Recommendations

In conclusion, this study reveals high awareness of antenatal care and socio economic status may clearly be the predisposing factors. There is need for encouragement and health education. The study has shown that age, education and parity have significant impact on mothers' utilization of maternal health care. It was discovered from the study that transport money, long distance, desirability, perception of high and low risk, waiting for permission from spouse, poor healthcare, affordability and accessibility are all observed but not barrier-factors influencing utilization of ANC. In addition, low ANC attendance was evident. The results improve and extend the corresponding recent results in the literature and the references therein. Based on this, the following recommendation were made:

- Education should be encouraged among women so that they will have knowledge about the benefits of ANC and the importance of a positive attitude towards it.
- ANC attendance should be prioritized among women of reproductive age and since spouse permission was an observed factor in utilizing ANC, spouses should also encourage their pregnant spouses.
- Public awareness programme centered towards ANC sensitization is suggested to attain better antenatal utilization and improvement of maternal and child health.

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