

Original Research Article

Socio-Demographic Factors, Knowledge and Attitude as Determinants of Utilization of Antenatal Care Services among Pregnant Women in Gesusu Hospital, Kisii County, Kenya

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Abstract: Maternal mortality and morbidity is a crucial public health concern. Every year, more than half a million women die from pregnancy-related causes and majority of these deaths occur in sub-Saharan Africa. This study explored socio-demographic factors, knowledge and attitude as determinants of antenatal care services utilization in Gesusu Hospital, Kisii County, Kenya. Cross-sectional research design was used. The study was conducted among pregnant women of reproductive age attending antenatal care clinic at Gesusu Hospital. Fisher's *et al.* (1998) formula was used to determine the required sample size of 268 respondents. Quantitative data was collected using a pre-tested, semi-structured interviewer-administered questionnaire and checklist. Data was analyzed, presented and stored using SPSS version 20. Bivariate correlation and regression was done for the independent and dependent variables. Presentation was done using tables and bar graphs. The results showed that none of the independent variables was strongly associated with the dependent variable. The study concluded that there was poor utilization of ANC services; none of the socio-demographic characteristics examined was a true influencer of utilization of ANC services; general awareness on ANC was low; and, that there was an attitudinal problem towards the recommended number of ANC visits. It's thus recommended that comprehensive longitudinal studies are done to help in better understanding of the underlying factors for late prenatal attendance and incomplete utilization of the services offered during antenatal care in order to improve their uptake.

Keywords: Focused antenatal care, utilization of antenatal care services.

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INTRODUCTION

Antenatal care (ANC) refers to the care that is given to an expectant woman from conception until the beginning of labour. It is one of the eight pillars of Safe Motherhood (SM) and a very important pillar in the SM programme. Its goal is to promote the health and survival of mothers and babies. ANC is a very important component of maternal health which aims at identifying complications and danger signs during pregnancy. Research has shown that expectant mothers who obtain sufficient ANC generally have better pregnancy outcomes than those who lack such care, both in terms of their own health and that of their babies. Research has also shown that women who receive regular ANC are far more likely to give birth with a skilled health attendant and are better able to recognize the signs of complications before, during and after delivery. The World Health Organization (WHO)

recommends a minimum of four ANC visits for a woman with a normal pregnancy (Safe Motherhood, 2010; World Bank, 2012; WHO, 1999).

ANC is under Sustainable Development Goal (SDG) 3: Ensure healthy lives and promote well-being for all at all ages; Targets 3.7: By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes (United Nations, 2015).

Regular ANC is helpful in identifying and preventing adverse pregnancy outcomes when it is sought early in the pregnancy and is continued until delivery. Focused antenatal care (FANC) is the new model of antenatal clinic attendance introduced by WHO that is goal-oriented, reduces the number of

required antenatal visits, and provides focused services shown to improve maternal outcomes. While being a strategy, it is also an important determinant of safe delivery which provides an opportunity for women to be educated to recognize and act on symptoms associated with potentially serious conditions (such as pre-eclampsia, malarial infection and obstructed labour) as a strategy for reducing maternal mortality. ANC is more likely to be effective if women begin to receive care in the first trimester (i.e. the first three months of pregnancy) and continue to receive care throughout pregnancy. It is possible during these visits to detect health problems associated with the pregnancy and to plan interventions. In the event of any complications, more frequent visits are advised, and admission to a health facility may be necessary (WHO, 2001).

Maternal health is closely linked with the survival of newborns. For every woman who dies, about thirty others suffer lifelong injuries. FANC is one of the interventions to reduce maternal morbidity and mortality. Attending the WHO recommended four ANC visits has the strongest correlation with reducing the maternal mortality ratio (MMR) of all the other maternal health variables. The correlation between antenatal visits and MMR increases with the number of visits (African Union Commission *et al.*, 2012).

Every year, more than half a million women die from pregnancy-related causes and majority of these deaths occur in sub-Saharan Africa. Every minute, at least one woman dies from pregnancy and childbirth globally. On average, in developing countries, a pregnancy is 18 times more likely to end in the women's death than in developed countries. Variations in maternal mortality estimates between different regions can be attributed, to a large degree, to differences in the availability of and access to modern maternal health services. More than a decade of research has shown that small and affordable measures can significantly reduce the health risks that women face when they become pregnant. Research also shows that most maternal deaths could be prevented if women had access to appropriate health care during pregnancy, childbirth, and immediately afterwards (United Nations Population Fund, 2012; World Health Organization, 2012).

Nyathi *et al.* (2017) submit that maternal and infant mortality remains a huge public health problem in developing countries. They further suggest that one of the strategies to minimise the risks of both maternal and infant mortality is access to and utilisation of ANC services. In addition, Owino (2010) upholds that maternal health is a big thermometer for development and an important indicator of a country's health and economic status, emphasizing on the importance of women reproductive health services. He further observes that, because maternal health care services are usually preventive, and the women are generally not ill, it is easy for the services to be underutilized. Much

work has yet to be done to assure maternal health for women worldwide. In order to reduce life-threatening risks and reduce mortality, good-quality maternal health services by trained health care workers must be available and must be used. Also, safe motherhood strategies must be comprehensive in nature.

Data shows that the majority of pregnant women in Africa do not receive adequate ANC (World Health Organization, 2012). For example, in Kenya, the 2013 Kenya Demographic and Health Survey (KDHS) showed that 96 percent of women with a live birth in the five years preceding the survey received ANC at least once. However, only fifty-eight percent of pregnant women made four or more ANC visits during their pregnancy. In Kisii County, an average of 2.3 percent of mothers did not receive ANC at all compared to a national average of 4 percent. 58.7 percent completed the recommended four visits or more while 2.4 percent of the mothers started ANC at eight months or above (Kenya National Bureau of Statistics, 2014).

The ANC coverage in Masaba South Sub-County in 2014 for at least one visit was 76 percent. However, only 27 percent completed the recommended minimum of four visits. Only 28 percent of the pregnant women who utilized ANC services in Gesusu Hospital completed the recommended four visits (Masaba South Sub-County Reproductive Health Office, 2015).

There are many factors that affect the utilization of ANC services among pregnant women. Many studies, both past and current, have shown that there is an association between socio-demographic factors, knowledge and attitude with ANC. The socio-demographic factors associated with seeking ANC services include maternal age, education, marital status, occupation, wealth status, culture, religion, place of residence, type of employment of the pregnant woman, and history of pregnancy and delivery among many other factors (Abosse *et al.*, 2010; Addai, 2000; Adekanle & Isawumi, 2008; Afulani *et al.*, 2019; Ali *et al.*, 2018; Aliyu & Dahiru, 2017; Akowuah *et al.*, 2018; Aminur *et al.*, 2017; Assefa & Tadesse, 2017; Awasthi *et al.*, 2018; Ayalew & Nigatu, 2018; Bloom *et al.*, 2001; **Chaurasiya, et al., 2019**; Chorongu *et al.*, 2016; Dansou *et al.*, 2017; Dapaah & Nachinaab, 2019; Efendi *et al.*, 2017; Emelumadu *et al.*, 2014; Fagbamigbe & Idemudia, 2017; Fulpagare *et al.*, 2019; Gebre *et al.*, 2018; Gitonga, 2017; Hijazi *et al.*, 2018; Islam & Masud, 2018; John *et al.*, 2019; Konlan *et al.*, 2020; Kumar *et al.*, 2019; Magadi *et al.*, 2000; Makate & Makate, 2017; Mathe, 2017; Muchie, 2017; Muinde, 2010; Nachinab *et al.*, 2019; Ndambuki *et al.*, 2017; Ngeresa, 2007; Nisar & White, 2008; Nketiah-Amponsah *et al.*, 2013; Nyathi *et al.*, 2017; Okedo-Alex *et al.*, 2019; Okutu, 2011; Othman *et al.*, 2017; Ousman *et al.*, 2019; Owino, 2010; Pandey & Karki, 2014; Paudel, *et al.*, 2017; Rowe & Garcia, 2003; Roy *et al.*, 2013; Rurangirwa *et al.*, 2017; Sakeah *et al.*, 2017;

Sibiya *et al.*, 2018; Simkhada *et al.*, 2008; Singh *et al.*, 2019; Tekelab *et al.*, 2019; Terefe & Gelaw, 2019; Tiruaynet & Muchie, 2019; Tsegay *et al.*, 2013; van Eijk *et al.*, 2006; Varma *et al.*, 2011; Verney *et al.*, 2018; Yaya *et al.*, 2018; Zakar *et al.*, 2017; Zhao *et al.*, 2012).

Despite the significant role ANC plays, African Union Commission *et al.* (2012) posit that many women do not have enough information on the importance of multiple antenatal check-ups, and so health providers [especially midwives] must urge women to return for check-ups, and provide incentives for them to do so. They argue that if more women can attend the recommended four check-ups, Africa will undoubtedly see a steep fall in maternal mortality.

However, despite efforts by various agencies, mothers still start ANC late and end up not completing the four ANC visits. Low antenatal attendance underscores the importance of ANC and thus calls for identifying subgroups of women who do not utilize such services and in planning improvements to these services in order to increase ANC services utilization and reduce maternal mortality. This warrants studying of the underlying factors for late prenatal attendance and incomplete utilization of the services offered during ANC. This study thus sought to explore the relationship of socio-demographic factors, knowledge (awareness of) and attitude (personal perception) concerning ANC as the independent variables and utilization of ANC services (denoted by the timing and number of ANC visits) as the dependent variable.

MATERIALS AND METHODS

Study area

The study was carried out in Gesusu Hospital, Gesusu Location, Masaba South Sub-County, Kisii County, Kenya.

Research design

Cross-sectional design was used in this study.

Study population

The study was conducted among pregnant women of reproductive age (15-49 years) attending ANC clinic at Gesusu Hospital. The target population for the study was 891. The inclusion criteria was all women of reproductive age (15-49 years) who were pregnant and attended ANC clinic at Gesusu Hospital during the study period, who reported that they had lived in Gesusu Location for at least one year prior to the study, and were willing to participate in the study. The exclusion criteria were unwillingness to participate in the study, and all women of reproductive age who were not pregnant during the study period.

Sample size determination

To provide a sample of participants for the study, Fisher *et al.* (1998) formula was used to determine the required sample size of 268 respondents.

Thus,

$$n = \frac{z^2 pq}{d^2}$$

Where,

n = the desired sample size (if the target population is greater than 10,000)

z = the standard normal deviate at the required confidence level (usually set at 1.96, which corresponds to 96% confidence level)

p = the proportion in the target population estimated to have the characteristics being measured (if there is no estimate available, then 50% (0.5) is used)

q = 1.0 - p (1.0 - 0.5)

d = the level of statistical significance set (maximum tolerable error, usually set at 5% or 0.05)

Thus,

z = 1.96

p = 50% (0.5)

q = 50% (0.5)

d = 5% (0.05)

Hence,

$$n = \frac{1.96^2 (0.5) (0.5)}{(0.05)^2} = 384 \text{ respondents}$$

If N (the target population) is less than 10,000 (in this study the target population is 891), the required sample size will be smaller. Thus, the final sample estimate (nf) was calculated using the following formula:

$$nf = \frac{n}{1 + (n / N)}$$

Where,

nf = the desired sample size (when the population is less than 10,000)

n = the desired sample size (when the population is more than 10,000)

N = the estimate of the target population size (in this case = 891)

Thus,

$$nf = \frac{384}{1 + (384/891)} = 268$$

Sampling methods

Multi-stage sampling was used in this study. The two sampling methods used were purposive and simple random sampling. At the first stage, Gesusu Hospital was selected through purposive sampling because of its low ANC coverage among the seventeen health care facilities in Masaba South Sub-County. At the second stage, simple random sampling method (fishbowl technique) was used to select the respondents whereby clients were requested to pick a piece of paper from a box containing 623 NOs and 268 YESs. Only those clients who picked a YES participated in the study.

DATA COLLECTION METHOD

The research team comprised of five research assistants and one supervisor. The role of the supervisor was to train the research assistants, supervise the data collection process and perform quality checks. Intensive training of the research assistants by the supervisor was done for three days on their roles and responsibilities, interviewing skills, how to fill in the research tools and research ethics.

Data was collected using a pre-tested, semi-structured interviewer-administered questionnaire and checklist. The questionnaire comprised of both open-ended and close-ended questions. It collected information on the independent variables (i.e. socio-demographic factors, knowledge and attitude). The checklist collected information on the dependent variable (i.e. utilization of ANC services). Information about utilization of ANC services was checked from the respondents' ANC booklets then filled into the checklist.

Validity and reliability of the data collection tools

The questionnaires and checklists were pre-tested before the study was conducted to determine their validity and reliability. Adjustments were done to correct any mistakes and ambiguity noted in order to reduce errors, and to enhance the validity and reliability of the tools.

Data collection procedure

After obtaining ethical approval from the Department of Research of Kisii County to conduct the study, the research assistants were then selected and trained. The research team then pre-tested the data collection tools and adjustments made before the actual data collection.

The consenting process

Every client who attended the ANC clinic during the data collection period was contacted by a research assistant who introduced him/herself to the client and explained that a study on ANC attendance was being carried out in the clinic. The research assistant then found out if the client met the inclusion criteria. All the clients who met the criteria but had not participated in the study on prior visits were requested to pick a piece of paper from a box containing 623 NOs and 268 YESs. Clients who picked a NO did not participate in the study and thus were thanked and allowed to proceed with other services.

For clients who picked a YES, before engaging them in the interview, they were appropriately informed about the survey's intentions and how their personal information and survey responses were to be used and protected. The research assistants were truthful and furnished as much information as possible and the respondents were able to provide informed voluntary consent through signing the consent form.

Data analysis and presentation

Data was processed, analyzed, presented and stored using SPSS version 20. Presentation was done using frequencies, percentages, means, tables and bar graphs.

Ethical considerations

The study was approved by the Department of Research of Kisii County. Participation was voluntary for all the selected respondents. A written and signed consent was obtained from all the respondents using an informed consent form. To maintain confidentiality, the interview was conducted in privacy. Research results were reported accurately and honestly and the study findings communicated to all the interested parties.

Study limitation

The methodological nature of the cross-sectional study design limited the causality inference of the study variables.

RESULTS AND DISCUSSION

Results

Socio-demographic characteristics of the respondents

The results on socio-demographic factors are shown in table 1 below. A total of 268 respondents were interviewed and their socio-demographic characteristics are shown in table 3.1. The age group between 20-29 years was the majority, accounting for slightly above half (50.7 %). Almost a fifth of the respondents were between 10 and 19 years (18.3 %) showing that under age pregnancies is common in this region. Majority (66.1 %) of the respondents were married. However, a quarter of the respondents (25.4 %) were single, showing that single-parenthood is common in the region.

Those who had completed secondary education (i.e. secondary complete and tertiary) accounted for 51.9 %. However, those who had gone beyond secondary education to tertiary education accounted for only 15.7 %. Those who had attained primary education and below were 78 (28.1 %), which showed there is low level of education in the region. Only 33 respondents (12.3 %) were formally employed. Students/pupils were 18 (6.5 %) denoting an adverse effect on the education sector in the region when girls fall pregnant while in school.

A total of 128 respondents (47.8 %) were Seventh Day Adventists. This was expected because it is the prominent religion in the region. The majority (51.9 %) had two or three children before this current pregnancy. Majority of the respondents (70.2 %) were from the Gusii community. This was expected because Abagusii is the prominent ethnic tribe in the study area.

Table-1: Socio-demographic characteristics of the respondents (n = 268)

Characteristics	Frequency	Percentage
Age		
10-19 years	49	18.3
20-29 years	136	50.7
30-39 years	72	26.9
40 years and above	11	4.1
Marital status		
Married	177	66.1
Single	68	25.4
Widow	17	6.3
Divorced/separated	6	2.2
Level of education		
None	3	1.1
Primary incomplete	31	11.6
Primary complete	44	16.4
Secondary incomplete	51	19
Secondary complete	97	36.2
Tertiary	42	15.7
Occupation		
Homemaker	56	21
Farming	104	38.8
Formal employment	33	12.3
Business woman	57	21.4
Student	4	1.5
Pupil	14	5
Religion		
No religion	7	2.6
Seventh Day Adventist	128	47.8
Catholic	79	29.5
Muslim	3	1.1
Protestant	51	19
Parity		
1 or no child	62	23.1
2or 3 children	139	51.9
4 or 5 children	61	22.8
6 or more children	6	2.2
Ethnicity		
Kisii	188	70.2
Luo	22	8.2
Kalenjin	4	1.5
Maasai	25	9.3
Kikuyu	21	7.8
Kamba	6	2.2
Borana	2	0.8

Table 2 below shows the means for age and parity. Mean age was 21.604 years (with a standard deviation of 0.77918), which showed that the mothers

were relatively young; while the mean for parity was 2.0336 deliveries (with a standard deviation of 0.75127) which showed that the respondents had few children.

Table-2: Mean for age and parity (n = 268)

Variable	Mean	Standard deviation
Age	21.604	0.77918
Parity	2.0336	0.75127

Knowledge on antenatal care

The results on knowledge on ANC are shown in table 3 below. The results showed that 12 (4.5 %) of the respondents sought ANC merely to get an ANC card in order to avoid being harassed by midwives

during delivery. This shows that they did not understand the importance of ANC.

As for the time the respondents thought a pregnant woman should start ANC, 146 of the

respondents (54.5 %) thought a pregnant woman should start ANC between four to five months. However, records from their cards showed that those who actually started ANC in the fourth and fifth months were only 115. Those who thought they should start clinic in the sixth to seventh month were 53 compared to 105 who actually started ANC in the two months, showing a lack of knowledge on when to start ANC.

Only 36.2 % of the respondents knew that pregnant women should attend the antenatal clinic four times and above. This showed that the remaining 63.8 % did not know the recommended number of ANC visits.

Table-3: Knowledge on antenatal care (n = 268)

Variable	Frequency	Percentage
Reason for seeking antenatal care		
To get ANC card to avoid being harassed by midwives during delivery	12	4.5
To detect, treat and prevent complications during pregnancy	93	34.7
To get advice on how to care for the pregnancy	82	30.6
To know about the growth and wellbeing of the baby	68	25.4
To get vaccinations	13	4.8
Time to start antenatal care		
As soon as she suspects she is pregnant	61	22.8
At 4-5 months	146	54.5
At 6-7 months	53	19.7
At 8 months and above	8	3
Number of visits for antenatal care		
1	3	1
2	32	12
3	136	50.8
4 or more	97	36.2

Attitude towards antenatal care

The results on attitude towards ANC are shown in table 4 below. A total of 97.4 % of the respondents felt that ANC was important, showing a positive attitude towards ANC.

Concerning opinion on the recommended minimum of four ANC visits, 51 (19 %) and 26 (9.7 %) of the respondents said that they were many and very many respectively, showing some degree of poor attitude towards ANC.

Table-4: Attitude towards antenatal care (n=268)

Variable	Frequency	Percentage
Opinion whether antenatal care is important		
Yes	261	97.4
No	0	0
Don't know	7	2.6
Opinion on the recommended minimum of 4 antenatal visits		
Very few	0	0
Few	12	4.5
Average	179	66.8
Many	51	19
Very many	26	9.7

Utilization of antenatal care services

Utilization of ANC services was evaluated using the women's gestation at first visit (timing) and the number of visit during the study period. These two variables were checked from the ANC booklets and filled in the checklists.

Table 5 below shows the means for gestation at first ANC visit and number of visits. The average months for the first ANC visit was 5.45 which showed that mothers reported late for the first visit; while the

mean for number of visits was 2.23 which indicated inadequate number of visits compared with the recommended minimum of four ANC visits.

Bivariate correlation of timing of ANC and number of visits was positive (0.154) at 95 % CI. Regression of the two showed an OR of 0.024 (AOR=0.020) with a standard error of the estimate of 1.45928. This regression results shows that only 2.4 % of timing explains the number of visits.

Table-5: Means for gestation at first visit and number of visits (n=268)

Variable	Mean	Standard deviation
Gestation at first ANC visit	5.4515	1.47179
Number of visits	2.2472	1.13005

Gestation at first antenatal care visit (timing)

Figure 1 below shows the respondents’ gestation of the pregnancy at first visit (in months). Almost half of the respondents (48.1 %) started ANC in their fifth or sixth month of pregnancy. 4 (1.5 %) of the respondents actually started ANC in their last (ninth)

month of pregnancy! Overall, 244 (91 %) of the respondents started ANC from four months and above. Only 24 (9 %) of the respondents started ANC as recommended within the first trimester (i.e. first three months of pregnancy).

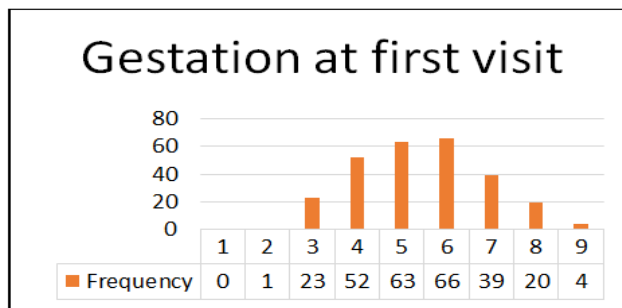


Fig-1: Bar charts for gestation at first visit in months (n = 268)

Number of antenatal care visits

Table 6 below shows the respondents’ number of visits during the study period. Only 28 (10.4 %) of

the respondents had attained the recommended minimum of four ANC visits during the study period.

Table-6: Number of visits during the study period (n=268)

Number of visit	Frequency	Percentage
1	76	28.4
2	86	32.1
3	78	29.1
4	19	7.1
5	4	1.5
6	4	1.5
7	1	0.3

Correlation results

Bivariate correlation was computed using the SPSS (Version 20) software tool. The results were at 95 % and 99 % confidence interval. Table 7 below shows the correlation of the independent variables with timing of ANC visits; while table 8 shows the correlation of

the independent variables with the number of ANC visits.

All the variables in table 7 had a negative correlation with timing of ANC visits except marital status, parity and knowledge of timing of ANC.

Table-7: Correlation of independent variable with timing of antenatal care visits

Variable	Timing of antenatal care visit		
	P value	95% CI	99% CI
Age	-0.259	-	0.000
Marital status	0.067	0.276	-
Level of education	-0.192	-	0.002
Occupation	-0.145	0.017	-
Religion	-0.271	-	0.000
Parity	0.328	-	0.000
Knowledge of timing of ANC	0.068	0.267	-
Knowledge of number of visits recommended	-0.032	0.599	-

In table 8 below, all the variables had a negative correlation with the number of ANC visits except age, parity and knowledge of timing of ANC.

Table-8: Correlation of independent variables with number of antenatal care visits

Variable	Number of antenatal visits		
	P value	95% CI	99% CI
Age	0.121	0.048	-
Marital status	-0.289	-	0.000
Level of education	-0.263	-	0.000
Occupation	-0.180	-	0.003
Religion	-0.023	0.714	-
Parity	0.006	0.926	-
Knowledge of timing of ANC	0.507	-	0.000
Knowledge of number of visits recommended	-0.519	-	0.000

Regression results

Linear regression analysis was done to all the independent variables that had a positive correlation with the dependent variable to find out the amount of the variance explained or predicted by the independent variables. Table 9 below shows regression analysis for marital status, parity and knowledge of timing of ANC with timing of ANC visits.

For marital status, the OR of 0.004 (AOR=0.001) showed that marital status predicted only 0.4 % (AOR=0.1 %) of the variance in the timing of ANC. For parity, the OR of 0.108 (AOR=0.104) showed that parity predicted 10.8 % (AOR=10.4 %) of the variance in the timing of ANC. For knowledge on timing of ANC, the OR of 0.005 (AOR=0.001) showed that knowledge on timing of ANC predicted only 0.5 % (AOR=0.1 %) of the variance in the timing of ANC.

Table-9: Regression of independent variables with timing of ANC visits

Independent variable	Odds Ratio (OR)	Adjusted Odds Ratio (AOR)	Std. Error of the Estimate
Marital status	0.004	0.001	1.47127
Parity	0.108	0.104	1.39280
Knowledge on timing of ANC	0.005	0.001	1.47114

Table 10 below shows regression analysis for age, parity and knowledge of timing of ANC with number of ANC visits. The OR of 0.015 (AOR=0.011) for age showed that age predicted only 1.5 % (AOR=1.1 %) of the variance in the number of ANC visits. For parity, the OR of 0.000 (AOR=-0.004)

showed that 0 % (AOR=-0.4 %) of the variance in the number of ANC visits was predicted by parity; while for knowledge on timing of ANC, the OR of 0.257 (AOR=0.254) showed that knowledge on timing of ANC predicted 25.7 % (AOR=25.4 %) of the variance in the number of ANC visits.

Table-10: Regression of independent variables with number of ANC visits

Independent variable	Odds Ratio (OR)	Adjusted Odds Ratio (AOR)	Std. Error of the Estimate
Age	0.015	0.011	1.12387
Parity	0.000	-0.004	1.13216
Knowledge on timing of ANC	0.257	0.254	0.97593

DISCUSSION

Many studies have shown that there is a relationship between age and utilization of ANC services (Abose et al., 2010; Awasthi et al., 2018; Bloom et al., 2001; Chaurasiya et al., 2019; Ngeresa, 2007; Nisar & White, 2008; Okutu, 2011; Pandey & Karki, 2014; Tsegay et al., 2013; Zhao et al., 2012). The regression results of this study showed that although age was related to the utilization of ANC services, it was not a strong predictor of utilization of ANC services. Thus, age is not a true determinant of utilization of ANC services. Correlation results, however, showed that older women were more likely to start ANC earlier than their younger counterparts and have more ANC visits. Many studies concur that older women are more likely to have more ANC visits than

their younger counterparts (Assefa & Tadesse, 2017; Ayalew & Nigatu, 2018; Kumar et al., 2019). However, Fulpagare et al. (2019) and Paudel et al. (2017) found that younger women were more likely to start ANC earlier contradicting with these results. However, the 2008-2009 Kenya Demographic and Health Survey shows that the mother's age is not related to use of ANC services.

The results of this study showed that married women were more likely to start ANC earlier. However, they were unlikely to attend antenatal clinic more frequently than their unmarried, divorced or separated counterparts, showing that marital status is not a true determinant of ANC utilization. Rurangirwa et al. (2017) found that married women made fewer ANC visits supporting the results of this study, whereas,

Akouwah *et al.* (2018) found that married respondents were likely to have more ANC visits contradicting with the results of this study.

Those who had attained primary education and below were 28.1%, indicating that there was low level of education in the region. Students/pupils were 6.5% denoting an adverse effect on the education sector in the region when girls fall pregnant while in school. Studies done by Tiruaynet and Muchie (2019), Awasthi *et al.* (2018) and **Chaurasiya** *et al.* (2019) have also highlighted low educational levels among women.

On bivariate analysis, correlation of level of education and timing of ANC was negative (-0.192). This means that as level of education increased, timing of ANC reduced and vice versa; a true reflection of what should actually happen. However, on the other hand, level of education and number of ANC visits were negatively correlated (-0.263) as well. This means that as the level of education increased, the number of ANC visits reduced and vice versa. This, in my view, shouldn't be the case because education is associated with more appreciation of the importance of ANC; hence, women with higher education should attend more ANC visits than their uneducated or lowly educated counterparts. Furthermore, education increases women's knowledge on where and how the best health care can be accessed and enhances women's capability of making autonomous decisions. Many studies have shown that women with higher levels of education are likely to attend more ANC visits and earlier in their pregnancy (Addai, 2000; Aliyu & Dahiru, 2017; Fulpagare *et al.*, 2019; Okedo-Alex, 2019; Bloom *et al.*, 2001; Rowe & Garcia, 2003; Magadi *et al.*, 2000; van Eijk *et al.*, 2006; Adekanle & Isawumi, 2008, Simkhada *et al.*, 2008; Abose *et al.*, 2010; Muinde, 2010; Ngeresa, 2007; Varma *et al.*, 2011; Okutu, 2011; Nketiah-Amponsah *et al.*, 2013; Pandey & Karki, 2014; Zhao *et al.*, 2012; Tsegay *et al.*, 2013).

Dansou *et al.* (2017), Gebre *et al.* (2018) and Verney *et al.* (2018), among many other studies, found that higher educational levels correlated with increased ANC visits. However, other studies have shown that as the level of education increases, the number of ANC visits reduce (Aminur *et al.*, 2017; Akouwah *et al.*, 2018; John *et al.*, 2019).

Bivariate analysis showed that correlation of occupation and timing of ANC was negative (-0.145). This implies that women with better paying jobs were more likely to start ANC earlier than their unemployed or lowly employed counterparts and vice versa. This result is very realistic and a true reflection of what should actually happen. This is because women with better paying occupations/jobs should start ANC earlier than those unemployed or have low paying jobs due to their higher economic empowerment. Unfortunately, occupation and number of ANC visits were negatively

correlated (-0.180) as well. This implies that as women get better occupations, the number of ANC visits reduce, and vice versa. This, certainly, shouldn't be the case because better occupations are associated with higher economic and decision-making power which enables women to make the correct decisions for them and follow them through.

Muchie (2017) and Okedo-Alex (2019) found that better paying jobs correlated positively with earlier start of ANC agreeing with the results of this study. Concerning better occupations and reduced number of ANC visits, similar results have been reported by Akouwah *et al.* (2018), Ousman *et al.* (2019) and Tiruaynet and Muchie (2019). However, Assefa and Tadesse (2017) and Verney *et al.* (2018) found that employed women had higher usage of ANC than unemployed women, refuting the results of this study. But, Nisar and White (2008) found no association between working status of women and utilization of ANC services.

The impact of religion in determining utilization of ANC services lies in the fact that it plays a significant role in shaping beliefs, norms and values. There are very few studies that have been done on the correlation between religion and the utilization of ANC services to conclusively posit the relationship. The negative correlation between religion and timing of ANC in this study means that the more the woman is religious, the earlier she is likely to start ANC and vice versa; while the negative correlation between religion and number of ANC visits means that the more the woman is religious, the higher the likelihood of attending less ANC visits and vice versa.

Ousman *et al.* (2019) found that Islamic women had fewer ANC visits than Christian women. Makate and Makate (2017) found that Christian women were more likely to use ANC services compared with non-Christians (traditional African religion and Muslims), while Assefa and Tadesse (2017) found that orthodox Christians used ANC more than the Protestants and Catholics.

A study carried out by Chorong et al. (2014) found that the more religious the woman is, the less the utilization of ANC services concurring with the results of the current study. However, Simkhada *et al.* (2008) and Nketiah-Amponsah *et al.* (2013) found that women who were religious tended to use ANC more, contrasting with the results of this study.

Many studies have shown that the number of children a woman has delivered has an effect on the utilization of ANC services (Simkhada *et al.*, 2008; Bloom *et al.*, 2001; Nisar & White, 2010; Abose *et al.*, 2009; Muinde, 2010; KNBS, 2004; KNBS, 2010; KNBS, 2014; Ngeresa, 2007; Okutu, 2011). However, regression analysis showed that parity was not a true determinant of utilization of ANC services.

In this study, women had few children with a mean parity of 2.0336. Results for correlation showed that the higher the parity, the higher the likelihood of starting ANC late. Makate and Makate (2017) and Verney *et al.* (2018) found similar results. The results also showed that as parity increased, the number of ANC visits increased as well concurring with many other studies (Kenya National Bureau of Statistics, 2014; Terefe & Gelaw, 2019). However, Afulani *et al.* (2019), Efendi *et al.* (2017) and Zakar *et al.* (2017), among many other studies, demonstrated that higher parity had significant reduction in ANC visits contradicting with this study. Kumar *et al.* (2019) suggest that lower ANC utilization among women of higher parity could be due to increased confidence from previous pregnancy and childbirth experience.

The results of this study showed that the respondents had insufficient knowledge on ANC concurring with what many other studies have shown (Awasthi *et al.*, 2018; Chorongo *et al.*, 2014; Muinde, 2010; Ndambuki *et al.*, 2017; Nisar & White, 2009; Pandey & Karki, 2014; Singh *et al.*, 2019; Tsegay *et al.*, 2013; Varma *et al.*, 2011). These results agree with AUC *et al.* [6] who posit that despite the significant role ANC plays, many women do not have enough information on the importance of multiple antenatal check-ups. However, a study carried out by Dapaah and Nachinaab (2019) revealed that a high percentage of their respondents were knowledgeable about ANC contrasting with the results of other studies. Afulani *et al.* (2019) found that more empowered and wealthier women had more knowledge and ability to advocate for higher quality ANC.

Attitude in this study was assessed using two variables; opinion on whether ANC is important, and opinion on the recommended number of ANC visits. This study found that there was a degree of poor attitude towards ANC, concurring with other studies (Awasthi *et al.*, 2018; Nachinab *et al.*, 2019; Terefe & Gelaw, 2019). This poor attitude was mostly due to the belief that pregnancy is a normal phenomenon that does not require health checkups. Nachinab *et al.* (2019) found that failure to attend ANC was due to perception of pregnancy as natural. Studies have showed that poor perception about the importance of ANC ultimately precipitated in inadequate utilization of ANC services (Chorongo *et al.*, 2014; Varma *et al.*, 2011; van Eijk *et al.*, 2006; Ngeresa, 2007; Okutu, 2011; Abosse *et al.*, 2009).

Abosse *et al.* (2009) found that women who considered pregnancy as a risky event were more likely to seek ANC than those considering it risk free. Regarding the reason for not attending ANC, 65.3 % of the mothers responded that they were apparently healthy during their last pregnancy thus no need for ANC, perceiving ANC as not important. Tsegay *et al.* (2013) found that among those who did not attend ANC, the most frequently mentioned reasons were “not

feeling sick” (32.7 %), and “feeling shame” (16.7 %), showing an attitudinal problem.

Only 10.4% of the respondents had attained the recommended minimum of four ANC visits during the study period. According to the 2014 KDHS, 58 percent of women made the recommended four or more ANC visits during their pregnancy, an increase of 11 percentage points from the 2008-09 KDHS (47 percent). Urban women were more likely than rural women to have had four or more ANC visits (68 percent versus 51 percent). Despite high attendance of at least one ANC visit in Kenya, the uptake of focused antenatal care (FANC) is proportionally low.

Many other studies have reported low attainment of the recommended minimum of four ANC visits (Abosse *et al.*, 2009; Ali *et al.*, 2018; Chorongo *et al.*, 2016; Emelumadu *et al.*, 2014; Hijazi *et al.*, 2018; Ndambuki *et al.*, 2017; Okutu, 2011; Pandey & Karki, 2014; Sibiya *et al.*, 2018). Chorongo *et al.* (2016) argues that even though maternal mortality has decreased over the years and increasing number of women do use ANC services during pregnancy, many women still do not follow the recommendation of four visits or more. They found that only 32 % of their respondents had made the recommended four ANC visits or more. Fagbamigbe and Idemudia (2017) found that the odds of ANC usage were generally lower among the poor and the least educated women living in rural areas. Yaya *et al.* (2018) submit that inadequate usage of ANC services may be due to inequalities of provision of the services.

On bivariate analysis of the independent variables, only three variables i.e. age, parity and knowledge on timing of ANC had a positive correlation with number of ANC visits. Linear regression of the three variables with number of ANC visits showed that age had an *OR* of 0.015 (1.5%), parity an *OR* of 0.000 (0.0%) and knowledge on timing of ANC an *OR* of 0.257 (25.7%), showing that only knowledge on timing of ANC had a significant level of prediction with number of ANC visits. The results of a study done by Mathe (2017) show that education, place of residence and marital status of the respondent were strongly associated with use of antenatal care. Awasthi *et al.* (2018) found that age, type of family, and education of the mothers was significantly associated with utilization of antenatal care services. Konlan *et al.* (2020) found that higher parity was significantly associated with low utilization of FANC ($p = .028$).

John *et al.* (2019), on the other hand, found that the percentage of pregnant women with full ANC was observed to be associated with literacy on ANC.

This study found that timing of ANC was poor, and consequentially, there was poor usage of ANC services. This has been observed by Islam and

Masud (2018), Terefe and Gelaw (2019) and Zakar *et al.* (2017) among many other studies. Thus, early booking is important and should be encouraged in order to ensure completion of the recommended minimum of four ANC visits.

CONCLUSIONS

The study concluded that none of the socio-demographic characteristics examined was a true influencer or determinant of usage of ANC services; general awareness on ANC was low; there was an attitudinal problem towards the recommended number of ANC visits; and finally, there was poor usage of ANC services. It's thus recommended that comprehensive longitudinal studies are done to help in better understanding of the underlying factors for late prenatal attendance and incomplete utilization of the services offered during antenatal care in order to improve their uptake.

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