International Journal of Advanced Scientific Research
ISSN: 2456-0421; Impact Factor: RJIF 5.32
Received: 08-10-2020; Accepted: 23-10-2020; Published: 10-11-2020
www.allscientificjournal.com
Volume 5; Issue 6; 2020; Page No. 37-43

Demographic factors associated with fourth antenatal care visits in borabu sub-county, Nyamira county, Kenya

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Abstract
Approximately 580,000 women die each year worldwide from pregnancy related causes, 99% of them in developing countries and more than 50% in Sub-Saharan Africa with most deaths concentrated around the time of delivery (WHO, 2016). Most of these delivery time deaths would have reduced if antenatal services were readily available and fully utilized by all expectant mothers. The study was set to explore the association between demographic factors and utilization of fourth antenatal care visit in Borabu Sub County, Nyamira County, Kenya. The study targeted mothers aged 15 years to 45 years who had delivered in the preceding 1 year and were residents of Borabu Sub County at the time of pregnancy and delivery. Sample size was determined by use of a formula provided by Krjcie and Morgan. Structured Questionnaires were pre-tested before the commencement of the study. Data was collected by the research assistants over a period of three weeks. All questionnaires were be edited, and responses coded before data was entered into the computer using the Statistical Program for Social Scientists (SPSS). Data was analyzed using IBM-SPSS version 20, focusing on the Pearson product-moment correlation and the logistic regression model to observe any significant relationship between independent variables and dependent variable. The findings show that, Age, Highest level of education and gestation of pregnancy have a significant association with attaining the Fourth Antenatal Care Clinic Visit. On the other hand, marital status does not have a significant association with attaining four Antenatal Care Clinic Visit. Based on these findings, it was recommended that counties and sub counties to conduct health education programmes to create awareness and importance of completing ANC clinic visits. Also Counties to give priorities to CHVs training in order to extend the scope of ANC services.

Keywords: Demographic Factors, Fourth Antenatal Care visits

1. Introduction
The health of women and children remains an unfinished agenda and global challenge. The World Health Organization recommends that a woman should have at least four visits to get enough prenatal care. However, global estimates indicate that only about half of all pregnant women receive this recommended number of care visits (UNICEF, 2015). Receiving antenatal care at least four times increases the likelihood of receiving effective maternal health interventions during the antenatal period. Recently, the WHO changed the antenatal care model increasing the number of (antenatal care) ANC contacts with a health provider from four contacts to eight contacts (WHO, 2016). The national policy on ANC care services requires that pregnant women receive a focused antenatal care which comprises at least four or more antenatal care visits in each pregnancy (MOH, 2014). ANC attendance is 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 like pre-eclampsia or a malaria infection, mother to child transmission Human Immunodeficiency Virus (HIV) infection and obstructed labor as a strategy for reducing maternal mortality. Antenatal care links a woman to formal health system to increase her chances of a healthy pregnancy with adequate nutrition, including access to iron supplements which are essential to combat anemia, and support from a skilled health worker at birth (Lincetto, Mothebesoane-Anoh, Gomez, & Munjanja, 2012). Access and utilization of ANC services is one of the key pillars of safe motherhood initiatives. The low antenatal care coverage may lead to challenges in implementing programs such as Prevention of Mother-to-Child Transmission of HIV (PMTCT) and Intermittent Preventive Treatment (IPT), which target pregnant women. Globally scientific evidence has shown that low utilization of focused antenatal care services is influenced by some factors such as low maternal education, teenage pregnancies, multiparty, unplanned pregnancies and cultural factors (Hamata, 2014). There are increased cases of fresh still births 0.52%, Neonatal Deaths (0.41%; high PMTCT positivity rate (3.4%); Low birth weight (4.08%) and obstructed labor cases (0.61%) and anemia in pregnancy which are associated with low uptake of fourth ANC visits (DHIS2, 2018). It is worrying that despite availability of the health policy and initiatives promoting adequate utilization of antenatal care services, few pregnant women still utilize these service (Kabongo, Mukumbang, Delobelle, & Nicol, 2019). The study intends to explore the association between demographic factors such as age, marital status, education and parity with utilization of fourth antenatal care visit. The World Health Organization Report on maternal mortality estimated that there were 580,000 maternal deaths worldwide. Majority of these deaths were reported in developing countries with 99% of them occurring in Sub-Saharan Africa. Maternal mortality rate (MMR) in USA is 14/100,000 live birth, Poland is 3/100,000 live birth, Japan is 5/100,000 live birth; Nigeria is 814/100,000 live birth and Tanzania is

460/100,000 live birth. Comparison of maternal death in industrialized countries (1 in 8,000) versus in Sub-Saharan Africa (1 in 22) and Asia (1 in 59) presents a particularly stark picture of persisting global disparities in maternal health (WHO, 2016). In Kenya, maternal mortality remains high (510/100,000 live births) despite several interventions initiated by different stakeholders with a reported maternal death (WHO, 2015). In Nyamira County, MMR stands at 385/100,000 live births, which is much higher than the national (WHO, UNICEF, World Bank Group, & United Nations Population Division, 2019). While scholars agree that Focused ANC care is one of the interventions in reducing maternal deaths, uptake of this important intervention remains quite low. Global coverage of fourth ANC is 58.6%; developing countries is 48.1%; Northern Africa is 70.4% and Southern Africa it stands at 24.9% which is the lowest. In Tanzania forth ANC coverage is 42.8%, while in Kenya it is 58% (KNBS, *et al*., 2015).

The year 2018, fourth antenatal care visit coverage for Nyamira County was at 62%, Lamu county fourth ANC visit is at 74% and Nairobi County at 71%. Nyamira has five sub counties whose coverage is as follows; Borabu sub county fourth antenatal coverage was at 28%, Manga sub county: 49%, Masaba North sub county: 56%, Nyamira North sub county: 71% and Nyamira South sub county: 71%. Fourth ANC visit coverage in Borabu Sub County is the least with 28% of the pregnant mothers completing fourth ANC visit (DHIS2, 2018).With the low turnout of fourth antenatal care visit (28%) at Borabu sub county, it will be difficult to achieve sustainable development goal three (SDG 3). The low turnout coverage of fourth antenatal care visits may be attributed to age, marital status, parity and education of an individual. Underutilization of safe motherhood services is considered as the main factor contributing to high maternal mortality. The results of this study will help improve the understanding of the relationship between demographic factors and fourth antenatal care uptake therefore serve as an important tool for any possible intervention aimed at improving uptake of four or more antenatal care visits in the country.

2. Material and Methods

Globally 30% of women between age group of 15-40 years do not attend ANC, 46% of those who do not have ANC are in South Asia while 34% are in sub-Saharan Africa. The low use of services leads to death and disability due to untreated hypertensive disorders or due to malnutrition like iron deficiency anemia (Fourn & Ducic, 2002). Maternal health is defined as the health of the women during pregnancy, childbirth and postpartum period (Tran, *et al*., 2011). Health problems during pregnancy may have serious consequences, not only for the woman but also for her baby, her family and her community. Women play an important role in rearing children and in the management of family affairs, and their death due to maternity related causes is a significant socio and personal tragedy. Studies demonstrating the high levels of maternal mortality and morbidity in developing countries and research identifying causes of maternal deaths have repeatedly emphasized the need for antenatal care and availability of trained personnel to attend women during labor and delivery (KNBS, *et al*., 2015). during and after childbirth is a key strategy for saving women`s lives and ensuring the best chance of delivering a healthy baby. Antenatal care is considered a basic component in any maternal healthcare program (WHO, 2016).

3. Fourth Antenatal Care Visit

Antenatal care (ANC) can be defined as the care provided by skilled health-care professionals to pregnant women and adolescent girls in order to ensure the best health conditions for both mother and baby during pregnancy. The components of ANC include: risk identification; prevention and management of pregnancy-related or concurrent diseases; and health education and health promotion (WHO, 2016). The purpose of ANC is to monitor and safeguard the wellbeing of the mother and fetus, detect any pregnancy complications, prepare mother for birth and promote healthy behaviors of mothers. They are tested and treated for anemia, malaria, human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), and sexually transmitted infections (STIs). The FANC model suggests that visits should take place before 16 weeks, between 16 and 28 weeks, at 28–32 weeks, and about 36 weeks (MOH, 2014). Focused Antenatal Care utilization with at least four visits is a factor associated with antenatal care services which in turn determines the condition of the new born baby and mother. Each of the four main visits consists of a well-defined set of activities related to three equally important general areas, namely, screening for conditions likely to increase adverse outcome, providing therapeutic interventions and educating pregnant woman about planning for a safe delivery. The fourth visit of the pregnant woman to the facility requires the health service provider to review an individualized birth plan guide. Several studies among expectant mothers indicate that women with at least four ANC visits were more likely to have skilled care delivery hence having little complications during their maternal period. A community-based study among rural women in Western Kenya who did not visit antenatal clinic, only 1.6 percent delivered in a health facility compared with 10 percent among women who made one to three visits, and 27 percent among women who made four or more visits (Ouma, *et al*., 2010). The cross cutting factor that derailed most of the women from attending antenatal clinics is that most of them felt that the services were too expensive for them because antenatal care visits are not a onetime thing but a series which makes it more expensive and unaffordable hence resulted to seeking traditional attendants who are unskilled in case the development of the baby is in jeopardy. A study aimed at examining the attendance to antenatal care and its association with infant care practices in Nepal using demographic and Health Survey found out that, children of mothers with no antenatal care were at increased risk of neonatal death**.**

Demographic Characteristics: Demographic is also defined as social studies relating to human populations and the information collected about them, such as their size, growth, ages and education (Cambridge Dictionary - English Dictionary, Translations & Thesaurus, n.d.). For this study, the variables will include: age, marital status, parity and education.

Age of the mother: Age refers to the period someone has been alive, or something has existed (Cambridge Dictionary - English Dictionary, Translations & Thesaurus, n.d.). For this study, age will be categorized as follows: - category 1: 15-24 years adolescents and youths, category 2: 25-34 years mothers in early adult life and category 3: 35 years and above mature mothers. Studies conducted in Ghana and

Nigeria on determinants of utilization of antenatal care services in developing countries found out that women of less than 20 years of age are a significant predictor of the intensity of antenatal care services utilization (Nketiah-Amponsah, Senadza, & Arthur, 2013; Ugbor, Onyinye, Arua, & Nwanosike, 2017). A study conducted in Kenya showed similar finding that women aged below 20 years were associated with least uptake (31%) of focused antenatal care compared to women aged 30-34 years (63%) (Gitonga, 2017). Another study conducted in Ethiopia showed the similar finding that factor of age was associated with antenatal care services utilization (Mulat, Kassaw, & Aychiluhim, 2015).

According to a research on demographic and socio-economic factors affecting antenatal care services utilization in Nepal based on age groups, findings indicate that only 69.7% of women in their 20s have four or more ANC visits in their previous pregnancy. A high percentage who are younger at the time of their first child birth **(**10-14 and 15-19 years) have four ANC visits as compared to the pregnant women in their twenties (Acharya, 2018). However, this is contradicting a study done on determinants of utilization of antenatal care services in rural Lucknow India where by increased age is associated with more utilization of ANC services (Manas, Uday, Shivendra, Vijay, & Anand, 2013). A population-based study using the demographic and health survey data on factors associated with use and quality of antenatal care in Nepal, half the women had four or more ANC visits. Older age, higher parity, higher level of education and those involved in occupations other than agriculture were more likely to attend four or more ANC visits (Joshi, Torvaldsen, Hodgson, & Hayen, 2014).

Marital status: Marital status refers to the state of being married or not For this study, single mothers will comprise all mothers who don't have partners by either rejection, divorced or never got married, married will be all those mothers either in a polygamous or monogamous relationship and windowed mothers will be all those whose husband died. A study which was conducted in South Africa on access to antenatal care services indicated that married women were more likely to adequately attend antenatal care visits compared to unmarried women, although the association of it was non-significant (Muhwava, Morojele, & London, 2016).

Education: Education is the process teaching or learning in a school, or the knowledge that you get from this: a high school/college education (Cambridge Dictionary).The following indicators will be used to differentiate level of education. No formal education representing all those who never went to school, primary will be all those who attended primary education plus dropouts at primary, secondary will represent all those who attended secondary education either finished or drop out at secondary and tertiary will be those who attended college or university education. Report by World Bank indicates that investments in health education and communication can increase demand for Maternal and Newborn health (MNH) care. Improvements in women's status through education and economic opportunity have a strong influence on demand for MNH services (World Bank, 2006). Although these could be confounded by several other factors, their role in influencing health-seeking behavior cannot be denied. Another study showed that increased educational attainment influences health service use in many ways. A study conducted in Nigeria on the socio-economic factors that determine women utilization of health care services identified that the women's level of education is one of major factors influencing health services among pregnant women (Ugbor, Onyinye, Arua, & Nwanosike, 2017). Another study conducted in Nigeria on patterns and determinants of dropout from maternity care continuum found out that 63.8% of women with no formal education and 2.7% of those who attained higher education did not access antenatal care. Further, the community-based study in North Gonder revealed that the higher the level of mothers' education the more likely mothers were to attend to antenatal clinics since education was also associated with availability of jobs hence better economic status.

In a Demographic and Health Survey aimed to identify factors associated with attendance at four or more ANC visits and receipt of good quality ANC, findings indicated that half the women had four or more ANC visits and 85% had at least one visit. Older age, higher parity, and higher levels of education and household economic status of the women were predictors of both attendance at four or more visits and receipt of good quality ANC. Women whose husbands had higher levels of education and were involved in occupations other than agriculture were more likely to attend four or more visits. Other predictors of women's receipt of good quality ANC were receiving their ANC from a skilled provider, in a hospital, living in an urban area and being exposed to general media. It concludes that continued efforts at improving socio-economically disadvantaged households require targeting focus on improving female education (Mrisho, *et al*., 2009).

Parity: It is defined as the number of times that a woman has given birth to a fetus with a gestational age of 24 weeks or more, regardless of whether the child was born alive or was stillborn (Naik & Smith, 2015). A study conducted in India indicated that utilization of antenatal care services was found to be better among primigravida compared to the multigravida (Baruah & Boruah, 2016). A study conducted in Nigeria on patterns and determinants of dropout from maternity care continuum found out that non-use of antenatal care increased with birth order from 33.5% among the woman of first birth to 43.8% in those with 4 or more living children (Akinyemi, Afolabi, & Awolude, 2016). A similar study conducted in Canada on barriers, motivators and facilitators related to prenatal care utilization found out that childcare was one of the barriers (Heaman, *et al*., 2014). Another study conducted in the Netherlands on factors affecting the use of prenatal care by non-western women in industrialized countries showed that multiparty was a barrier which associated with late prenatal care entry (Boerleider, Wiegers, Mannien, Francke, & Deville, 2013).

Theoretical Framework: This study adopted Health Belief Model. That is a psychological health behavior change model developed to explain and predict health-related behaviors, particularly regarding the uptake of health services (Janz & Marshall, 1984). This model was developed in the 1950s by social psychologists at the U.S. Public Health Service and remains one of the most well-known and widely used theories in health behavior research (Rosenstock, 1974). It suggests that people's beliefs about health problems, perceived benefits of action and barriers to action, and self-efficacy explain engagement (or lack of engagement) in health-promoting behavior (Janz & Marshall, 1984). This model hypothesizes that health-related action depends upon the simultaneous occurrence of

three classes of factors: This study adopts these models because antenatal care given to a pregnant woman with no complication or illness to prevent the same, very few will achieve the four required visits because there is no perceived threat.

Methods used: The study methodology included, study population, study area, study design, distribution of the respondents, sample size, tools for data collection, data sampling analysis, techniques and ethical consideration. The target population consisted women aged between 15-49 years who had given birth within the past one year. According to Population and Housing Census of 2019, Borabu Sub County had a population of 73,167 and the study targeted women of reproductive age in Borabu Sub County, whose population was 18,292 (KNBS, 2019).

Post-natal women who had delivered in the preceding 1 year and were residents of Borabu Sub County at the time of pregnancy and delivery. Women who were not residents of Borabu Sub County at the time of pregnancy and delivery were excluded in this study. The study was conducted in Borabu sub county, Nyamira County, Kenya. Borabu Sub County is one of the five sub counties that make up Nyamira County. According to the Kenya National Population and Housing Census of 2019, Borabu Sub County has a population of 73,167 with an approximate population density of 740 km^2. Administratively Borabu Sub County has four Wards namely Esise, Nyansiongo, Mekenene and Kiabonyoru. This Sub county has forty health care facilities. Agriculture is the major economic activity with tea being the major cash crop. The study adopted retrospective correlational study design to enable the researcher to explore the relationship between demographic factors and utilization of fourth antenatal care visit in Borabu sub County, Nyamira County. The study targeted women of reproductive aged 15-49 years in Borabu Sub County whose population was 18,292 (KNBS, 2019). A formula for calculating sample size by Krjcie & Morgan (1970) was used. From the proportion of skilled deliveries of 49% in Borabu Sub County, a sample size of 204 respondents was determined using the formula below:

$$\frac{n=1.96^2 \times 0.49(1-0.49)}{0.05^2} = 204$$

Stratified sampling was used to select study subjects. The first stage involved selection of health facilities per administrative Ward and the second stage involve random selection of interviewees. The respondents were selected randomly for interview until the desired sample size was attained. A structured questionnaire with one section, formulated from the objectives of the study was used for data collection. Ten research assistants with secondary school level of education with a mean grade of above C plain and with experience in data collection prior to this study were recruited and trained for this study. To ensure validity, questionnaires were pre-tested in five health facilities in the study area. These respondents were not included in the final study. Data cleaning was done manually to identify incomplete, incorrect and inaccuracies before coding the questionnaires and entering data into the computer. Data analysis was done using the statistical package for social sciences (SPSS) version 20, focusing on the Pearson product-moment correlation and the logistic regression model, to observe the relation between independent variable with the dependent variable. Permission for conducting this study was sought from Great Lakes University of Kisumu research ethics committee, National Commission for Science, Technology and Innovation (NACOSTI), Nyamira County director of Education, and the Nyamira County Department of Health Services. Informed consent was sought from each respondent and only those who willingly signed the consent form were allowed to participate in the study. For those under age of 18, consent was obtained from their guardians.

4. Results

The findings are presented according to the research objectives; (1) to establish the relationship between mother's age and utilization fourth Antenatal care visits. (2) to ascertain the association between mothers' parity and fourth antenatal care service utilization. (3) To determine the relationship between marital status and utilization of fourth antenatal visit utilization (4) to examine the association between mothers' education level and utilization of fourth antenatal care visit. A total of 210 questionnaires were administered in nine health facilities out of which 206 were returned therefore resulting in a 98.09% response rate which was considered adequate. The final sample size adopted in this study was 201 respondents. According to the research findings, 45% (were in the age bracket of 25-34 years, 38% were in the age bracket of 18-24 years while 17% of them were in the age bracket of 35 years.49% of the respondents had primary education as their highest level of education, 40% had secondary education, 5% had tertiary education and 5% of them had none. Further, 86% of respondent were married, 13% were either single or divorced and 1% (n=2) were widowed. A set of married respondents were at 48% had secondary education as their highest level of education, followed by 43% having primary education, 7% of them had tertiary education whereas 2% had no education. 29% of respondents had a parity of two, 28% had a parity of four and above, 24% had a parity of one and 18% had a parity of three. Majority of the respondents at 49% made the first antenatal care clinic visit at gestation 5-6 of pregnancy, 35% (of them were at gestation of 3-4 of pregnancy, 9% (n=17) at gestation 7-8 of pregnancy and 7% (n=14) at gestation 1-2 of pregnancy.50% attained four Antenatal Care Clinic Visits were in the age bracket of 25-34 years and on the other hand, majority of the respondents 50% (n=60) who did not attain four Antenatal Care Clinic Visits were in the age bracket of 18-24 years. Also, majority of the respondents 71% (n=24) in the age bracket of 35 years and above attained four Antenatal Care Clinic Visits compared to 29% (n=10) of them who did not attain. 37% attained four Antenatal Care Clinic Visits had a parity of four and above while on the other hand, 31% did not attain four Antenatal Care Clinic Visits had a parity of one. The Pearson Chi-Square test results between marital status and attained four Antenatal Care Clinic Visits showed a Chi-Square value of 4.897 with a p-value of 0.086 which is greater than 0.05 hence there was no significant association between marital status and attaining four Antenatal Care Clinic Visits. 52% of respondents who attained four Antenatal Care Clinic Visits had secondary education as their highest level of education and on the other hand, 60% (n=71) who did not attain four Antenatal Care Clinic Visits had primary education as their highest level of education.

Furthermore, respondents at 82% (n=9) with tertiary education as their highest level of education attained four Antenatal Care Clinic Visits compared to 18% of them who did not attain and majority of the respondents without education 90% (n=9) did not attain four Antenatal Care Clinic Visits compared 10% (n=1) of them who attained. The gestation of pregnancy when made first antenatal care clinic visit and attained four Antenatal Care Clinic Visits showed that 50% attained four Antenatal Care Clinic Visits made during gestation 3-4 of pregnancy while 55% who did not attain four Antenatal Care Clinic Visits made their first antenatal care clinic visit during gestation 5-6 of pregnancy

5. Discussion

The relationship between mothers age and utilization fourth Antenatal care visits: The study results indicated that majority of the respondents (50%) who attained four Antenatal Care Clinic Visits were in the age bracket of 25-34 years showing a significant association between age and attaining four Antenatal Care Clinic Visit. According to a research on demographic and socio-economic factors affecting four antenatal care visits utilization in Nepal based on age groups, findings indicate that 69.7% of women in their 25s and above had made four or more ANC visits in their previous pregnancy (Wagle ettal, 2015). Further, our research findings concurred with a study of 15 developing countries which found that younger women were less likely to make four or more four antenatal clinic visits (Heidi W. Reynolds, 2006).A study conducted in Peru in its findings revealed that older women were more likely to make at least four ANC visits (R William Stones, 2007). The authors suggested that this could be due to the fact that older women have more knowledge and place more value on modern health care

The association between mothers' parity and fourth antenatal care service utilization: Majority of the respondents (37%) who attained four Antenatal Care Clinic Visits had a parity of four and above while respondents (31%) who did not attain four Antenatal Care Clinic Visits had a parity of one, suggesting that there was a significant association between mothers' parity and attaining four Antenatal Care Clinic Visit. Our findings concur with a study done in Boricha Ethiopia on antenatal care utilization and its associated factors findings which indicate multiparous women (3-5 pregnancies) (80.8%) more likely to attain four or more ANC visits than their counterparts who have been pregnant for less than/equal to 2 (75.5%) (Wakgari, 2017).

The relationship between marital status and utilization of fourth antenatal visit utilization: The Pearson Chi-Square test results between marital status and attained four Antenatal Care Clinic Visits shows a Chi-Square value of 4.897 with a p-value of 0.086. The p-value is greater than 0.05 hence there was no significant association between marital status and attaining four Antenatal Care Clinic Visits. This implied that marital status was not a key determinant in attaining four Antenatal Care Clinic Visits. This is contrary to a study which was conducted in South Africa on access to antenatal care services which indicated that married women were more likely to attend four or more antenatal care visits compared to unmarried women, although the association of it was non-significant (Muhwava, Morojele, & London, 2016).Contrary to a cross sectional descriptive study on determinants of focused antenatal care uptake among women in Tharaka Nithi County, Kenya, whose results indicated that married women were more likely to attend the four targeted visits compared to the unmarried (Gitonga, 2017).

The association between mother's education level and utilization of fourth antenatal care visit: The study showed that the respondents at 52% who attained four Antenatal Care Clinic Visits had secondary education as their highest level of education. This also concurs with a study conducted in Nigeria on the socio-economic factors that determine women utilization of four ANC identified that the women's level of education is one of major factors influencing health services among pregnant women (Nwanosike, 2017). Similar studies from developed countries found a barrier to antenatal care utilization was less education among pregnant women (Deo, *et al*., 2015). Educated women tend to have a greater awareness of the existence of ANC services (Efendi, Chen, Kurniati, & Berliana, 2016). It is argued that educated women were more aware of health problems, know more about availability of health care services, and utilize the information more effectively than non-educated women (Onasonga, Afolayan, & Oladimeji, 2012).

6. Conclusion

The study findings show that, Age, Highest level of education and gestation of pregnancy have a significant association with attaining the Fourth Antenatal Care Clinic Visit. On the other hand marital status does not have a significant association with attaining four Antenatal Care Clinic Visit. Based on these findings, it is recommended that counties and sub counties to conduct health education programmes to create awareness and importance of completing ANC clinic visits. Counties to give priorities to CHVs training in order to extend the scope of ANC services.

7. Acknowledgement

The author would like to thank the following people who offered guidance in the development of this proposal. My Supervisors, Dr. Richard Kimetto and Mr. Damian Opemo for their practical guidance, support and assistance during the development of this research proposal. Their input greatly shaped this work and improved the quality. Special thanks to my husband George, my parents, brothers and sisters for their continuous encouragement, moral and material support. The assistance obtained from the Kenya National Bureau of Statistics (KNBS) and District Health Information System (DHIS2) is hereby acknowledged. Great appreciation to the County Government of Nyamira through the County Director of Health for permitting me to conduct the study in their jurisdiction.

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