

**ANTENATAL CARE INITIATION VERSUS DELIVERY OUTCOMES AMONG
WOMEN SEEKING DELIVERY SERVICES AT KIAMBU LEVEL FIVE HOSPITAL,
KENYA**

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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DEDICATION

This work is dedicated to my family

To my daughter Natalia Njeri for her prayers and encouragement

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Table of Contents

DECLARATION	ii
CERTIFICATE OF APPROVAL	iii
DEDICATION	iv
ACKNOWLEDGEMENT.....	v
List of Tables	xi
List of Figures.....	xii
Abbreviations and Acronyms	xiii
ABSTRACT.....	xiv
CHAPTER 1: INTRODUCTION.....	1
1.1Background of the study	1
1.2 Problem statement	4
1.3 Justification	6
1.4 Research questions.....	7
1.5 Study Objective	7
1.5.1 Broad objective	7
1.5.2 Specific objectives.....	7
1.6 Expected benefits	7
CHAPTER 2: LITERATURE REVIEW	9
2.1 Introduction.....	9
2.2 Importance of Ante-Natal Care.....	9
2.3 Level of awareness on early antenatal initiation.....	10
2.4 Timing of Ante-Natal Care	11
2.5 Pregnancy Recognition.....	14
2.6 Delivery outcome.....	14
2.7 Theoretical Model	15
2.8 Theoretical framework.....	16
2.9 Conceptual framework.....	16
2.10 Operational framework.....	17

CHAPTER 3: RESEARCH METHODOLOGY	18
3.1 Study design.....	18
3.2 Study area	18
3.3 Study population	19
3.3.1 Inclusion and exclusion criteria.....	19
3.3.2 Inclusion criteria.....	19
3.3.3 Exclusion criteria.....	19
3.4 Sample size determination	20
3.5 Sampling technique.....	21
3.6 Research tool	21
3.7 Research assistants	22
3.8 Pre-test	22
3.9 Validity and Reliability	23
3.9.1 Validity.....	23
3.9.2 Reliability.....	23
3.10 Data collection	23
3.11 Data management plan.....	23
3.11.1 Data cleaning.....	23
3.11.2 Data Analysis and presentation	24
3.11.3 Data storage.....	24
3.12 Ethical Consideration	24
3.13 Limitation and Delimitation	25
3.14 Dissemination of data	25
CHAPTER 4: RESULTS	26
Introduction.....	26
4.1 Response rate.....	26
4.2 Socio-demographic characteristics.....	26
4.3 Knowledge on importance of ANC.....	28
4.4 Pregnancy Recognition.....	30
4.5 Timing of ANC initiation	30
4.6 Perceived right time for ANC first visit.....	31

4.7 Number of ANC visits.....	32
4.8 Reason for late ANC attendance	32
4.9 Pregnancy Outcome.....	33
4.9.1 Antenatal Complications	33
4.9.2 Gestation at Delivery.....	34
4.10 Association of ANC initiation and delivery outcome.....	35
4.11 ANC initiation and perinatal Outcome.....	37
CHAPTER 5: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS	39
5.1 Introduction.....	39
5.2 Social demographic characteristic of the respondents	39
5.3 Knowledge on importance of ANC attendance	40
5.4 Perceptions on timing of first ANC visit.....	41
5.5 Timing on ANC visits	41
5.6 Reason for late timing.....	42
5.7 Antenatal complications	43
5.8 Gestation at delivery	43
5.9 Delivery Outcome	44
5.10 Perinatal Outcome	44
5.11 Summary of the findings	45
5.12 Conclusion	45
5.13 Recommendations	46
References.....	47
Appendix 1: Ethics approval letter	52
Appendix 2: Request to carry out research at Kiambu level five hospital	54
Appendix 3: Kiambu County Research Clearance.....	55
Appendix 4: Informed consent form.....	56
Appendix 5: Questionnaire	57
Appendix 6: Map of the area	66

Operational definitions

Antenatal care - Care provided to women during pregnancy.

Maternal death - Death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Women of productive age - Women aged 15-49 years.

Mothers - Women who are either pregnant or have delivered.

Early antenatal - The proportion of women aged between 15-49 years who delivered after 28 weeks of gestation during the study period who initiated their first antenatal care visit in the first trimester (<12 weeks gestation).

Late antenatal - The proportion of women aged between 15-49 years who delivered after 28 weeks of gestation during the study period who initiated their first antenatal care visit after the first trimester (>12 weeks gestation).

Reproductive health - A state of physical, mental, and social well-being in all matters relating to the reproductive system, at all stages of life.

Delivery outcome - Results of conception and ensuing pregnancy, to include sex, birth weight, congenital malformation, lower birth weight, preterm delivery or stillbirth.

Premature birth - Babies born before 37 weeks of gestation.

Last menstrual period- gestation assessment based on the date of the last menstrual period

Timing-refers to the skill or luck involved in doing something at exactly the right time (Longhorn Dictionary 2007),for this study timing refers to the selection of best time (within the first 12 weeks of pregnancy) to initiate ANC by a pregnant woman.

Knowledge-refers to facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject (Oxford Dictionary) for this study knowledge refers to the ability of a mother to identify more than half of the items listed by the researcher as true.

Far-a verb used to indicate the extent to which one thing is distant from another (Oxford Dictionary) for the study any distance of more than 10 kilometers from a mother's home to antenatal clinic will be considered far.

List of Tables

Table4. 1Demographic data	27
Table4. 2Association of ANC initiation and demographic characteristics of respondents	28
Table4. 3Association of Knowledge on importance of ANC and initiation.....	29
Table4. 4Reason for late attendance	32
Table4. 5Antenatal Complications.....	34
Table4. 6Association of ANC initiation and maternal outcome.....	36
Table4. 7Antenatal initiation and Perinatal outcome.....	38

List of Figures

Figure2. 1 Theoretical model adapted from Anderson and Newman Model	16
Figure2. 2 Conceptual framework	16
Figure2. 3 Operational framework.....	17
Figur4.1 Pregnancy recognition.....	30
Figure 4. 2 Time of ANC Initiation	31
Figure 4. 3 Perceived right time for ANC first visit	31
Figure 4. 4 Number of ANC visits.....	32
Figure 4. 5 Gestation at delivery.....	35

Abbreviations and Acronyms

ANC _____Anti Natal Care

ARV _____Ante Retro Viral

C/S _____Cesarean Section

ERC _____ Ethics Research Committee

FANC _____ Focused Ante Natal Care

FSB _____ Fresh Still Births

HBM_____ Health Belief Model

KDHS _____Kenya Demographic and Health Survey

KNH_____ Kenyatta National Hospital

MM_____ Maternal Mortality Rate

MCH/FP____ Maternal Child Health and Family Planning

MMR _____Maternal Mortality Rate

MSB _____Macerated Still Births

PPH _____Post-Partum Hemorrhage

SDG _____ Sustainable Development Goals

SVD_____ Spontaneous Vertex Delivery

TB_____ Tuberculosis

UN_____ United Nations

UON_____ University of Nairobi

V/D _____Vacuum Delivery

WHO _____World Health Organization

NBU _____ New Born Unit

APGAR score-Appearance, Pulse, Grimace, Activity, Respiration-used to quickly assess newborn status at birth, to determine whether the newborn requires immediate medical attention

ABSTRACT

Background: Antenatal care is provided to pregnant women during pregnancy to ensure a safe pregnancy and delivery. The timing of first antenatal care (ANC) initiation is important for assessment and diagnosis of pre-existing conditions. Studies done elsewhere have shown high mortality among women who start ANC late and therefore there being no such study done in Kiambu, the researcher endeavored to establish initiation of ANC attendance versus delivery outcome thereof.

Objective: To determine first antenatal timing versus delivery outcomes among women seeking delivery services in Kiambu level five hospital.

Methodology: The study adopted a descriptive cross sectional design. Study population comprised of post-natal mothers who delivered in the hospital. Sample size of 235 respondents was used, calculated by Fishers' formula. Study participants were selected by simple random sampling. Data analysis was done using Statistical Package for Social Science (SPSS) version 21 software. Descriptive statistics involved calculation of measures of central tendency and frequencies. Inferential statistics involved seeking association between the variables where P value ≤ 0.05 was considered statistically significant. Ethical approval was sought from University of Nairobi/Kenyatta National Hospital Ethics and Research Committee and permission to carry out research in Kiambu Level five hospital was obtained from the Kiambu County Health Department and hospital administration.

Results: A total of 235 mothers were interviewed during study period in the month of May 2019. Majority 53.1% (n=122) of the respondents initiated first ANC visit late, in the second and third trimester while less than half 46.9% (n=108) initiated first ANC visits early, in the first trimester. Majority, 51.3% (n=118) were aged between 15-25 years; 70% (n=161) were married; 44.3% (n=102) were para1; majority 37.8% (n=87), 42.6% (n=98) had secondary and tertiary education respectively; 53.9% (n=124) earned less than 5000Ksh per month. Of the demographic characteristics, only education had a significance association with first ANC initiation at P value of 0.028. Most respondents were aware of importance of ANC attendance. Of delivery outcome 72.6% (n=167) had vaginal delivery; 87.4% (n=201) had spontaneous onset of labor. There was a significant association of late ANC initiation and post-delivery complications at P-value 0.022. Of the neonates delivered 96.5% (n=222) were born alive while 3.5% (n=8) were still births; 82.9% had APGAR score of ≥ 7 in 5 minutes; 73.5% (n=191) weighed between 2500 and 3999grams, and 84% (n=188) were stable with their mothers 24hours after delivery. Perinatal outcomes analyzed did not show significant association with first ANC initiation.

Conclusion: Despite majority of respondents having knowledge on importance of ANC attendance, most mothers initiated first ANC late after first trimester.

Recommendation: Women need to be educated on early initiation of antenatal clinic attendance and the right time to initiate ANC would go a long in improving delivery outcome.

CHAPTER 1: INTRODUCTION

1.1 Background of the study

Antenatal care is provided to pregnant women to ensure safety and reduce pregnancy-related complications. According to the current World Health Organization (WHO) guidance in Antenatal Care (ANC) attendance, the initial contact should be before twelve weeks of pregnancy (WHO, 2016). It is recommended that the baseline assessment of all pregnant women be done during the first contact. Late timing of initiation of ANC may result to poor birth outcomes.

Globally 80% of pregnant women attend antenatal clinic at least once while in developing countries less than 50% attend the recommended WHO four focused antenatal visits (Moller *et al.*, 2017a). Although antenatal care has notably increased in the recent past, the early initiation has not been embraced over a long time (Moller *et al.*, 2017a). This has seen some women initiate antenatal care late in pregnancy with some presenting with pregnancy related complications. Late initiation of antenatal care has been associated with increased pregnancy related complications and poor delivery outcomes (Beeckman *et al.*, 2013). Early initiation of antenatal care is useful in facilitation of timely detection and management of pregnancy related complications which may result to maternal and infant deaths.

One of the pillars of safe motherhood is antenatal care which aims at prevention of complications, detection and treatment of pregnancy-related complications to reduce maternal mortality (WHO, 2006). Antenatal care is important in ensuring that pregnant women are provided with the necessary support to prevent pregnancy-related complications, which contribute greatly to maternal and infant morbidity and mortality (Bauserman *et al.*, 2015). In general, antenatal care plays a major role in prevention of complications and improvement of

health of pregnant women (WHO, 2006). According to WHO majority of pregnancy related complications can be prevented if quality antenatal care is provided to pregnant women (WHO, 2006). Many women lack knowledge on the appropriate time to begin ANC as such they end up booking the first visit late when pregnancy-related complication have occurred (Gebremeskel, Dibaba and Admassu, 2015). Early initiation of antenatal care is important in facilitation of timely diagnosis and management of complication to reduce maternal deaths (Ewunetie *et al.*, 2018).

The World Health Organization recommended four antenatal visits as follows: the first visit between 8-12 weeks, second visit between 24-26 weeks, third visit at 32 weeks and the fourth visit between 36 and 38 week. The aim of these visits is to ensure timely interventions. The Kenyan guidelines have revised timing as first visit before 16 weeks, second visit between 16 and 28 weeks, third visit between 28 and 32 weeks and fourth visit between 32 and 40 weeks however many women still present late for ANC (WHO, 2006).

Many pregnant women have risk factor, which if detected early they are identified, evaluated and necessary intervention put in place. Some women with chronic conditions example chronic hypertension are on long term drugs which need to be changed or adjusted during pregnancy. Pregnant women need to have adequate nutrition to enable them provide favorable environment for the growth of the fetus. Malnutrition during pregnancy may cause failure of the placenta to develop fully, thus compromise fetal wellbeing, while obesity predisposes the women to gestational diabetes and high blood pressure (Perumal *et al.*, 2013). Births to women under the age of 20 years have increased in the recent past putting adolescents to more risk since this time they require more nutritional for physical growth (Gross *et al.*, 2012). Unless the women visit antenatal clinic early the nutritional advice is usually missed out. Initiation of antenatal care early

is advantageous to the woman it provides an opportunity for the woman to receive advice before any complications arise. The pregnant woman also receives education on lasting health benefits that continue beyond pregnancy. Health education include, danger signs of pregnancy which the women should seek health care once they are noted example bleeding from genital tract. The woman is educated on breast-feeding which will be of benefit to the baby. Educated on parenting skills is also provided to the pregnant woman. Family planning counseling is a topic included which will help the woman in spacing her future pregnancies.

Antenatal visit provides an opportunity for interventions. Conditions like syphilis, anemia are screened for and appropriate actions taken. During pregnancy, counseling is provided on diet, supplementation of minerals like iron, iodine and folic. Diseases that are diagnosed in pregnancy like urinary tract infections are treated. Pre-existing conditions like diabetes are monitored and managed to promote the well-being of the mother and fetus (Beyamo, 2017).The pregnant woman receive immunization during ANC visit to prevent diseases like tetanus. Testing for Human Immune Virus (HIV) to all pregnant women has greatly helped in prevention of Mother to Child Transmission of HIV. This can only be achieved if pregnant women attend ANC early to enable initiation of Anti retro viral therapy for HIV reactive mothers. The earlier the diagnosis is made and drugs initiated the better to prevent infection. Early ANC attendance gives a pregnant woman time to be educated on health issues and it plays a big role in reduction of complications during pregnancy, labor and delivery.

Several determinants of late ANC have been identified which include lack of awareness on importance of antenatal. A woman's level of knowledge on required care during pregnancy will see her initiate early ANC as compared to those women without knowledge (Atisa, 2015). Social support has been associated with better coping with health and well-being individuals with social

support are able to cope with their health issues better than those who lack the support. Although pregnancy is viewed by some as a normal biological process it may present challenges and stressful experiences. A study done in Iran revealed that there is a relation of lack of social support with depression during and after delivery (Bani, Hasanpour and Mohammadalizadeh, 2018). Birth outcomes have also been associated with social support. Economic status has been associated with health seeking behavior, women with low economic status seeking health care less than those with higher economic status (Kim *et al.*, 2018). Birth outcome sometimes depends on care provided in antenatal period. Adverse pregnancy outcomes have been linked to late ANC booking to both mother and infant. A study done in Nepal revealed that prematurity, stillbirths, low birth weight and increased pregnancy related risks were more notable in women who attended late antenatal or did not attend ANC at all (Paudel, Jha and Mehata, 2017)

1.2 Problem statement

One of the key indicators for monitoring progress of maternal outcome is antenatal care uptake. It is notable that regionally and locally, maternal death rates have remained high despite measures put in place to prevent pregnancy-related complications. In an effort to reduce maternal deaths which have persistently remained high in developing countries, World Health Organization (WHO) was prompted to released new guidelines on access to antenatal care for pregnant women on 7th November 2016 (WHO, 2016).

Globally, 58.6% of women attend antenatal clinic during the recommended time and this has greatly improved the health of mothers and outcome of deliveries (Moller *et al.*, 2017c). A systematic analysis of regional and global level and trends of coverage from 1990 to 2013 on: Early antenatal care visit revealed early ANC initiation in developed countries is at 84.8% while in Sub Saharan Africa the coverage is low at 48.1% (Moller *et al.*, 2017c). In some countries

early timing of initiation of antenatal care has been low with some women booking their first clinic at five months. In Ethiopia the number of women who booked the first ANC visit early was slightly high at 48.2 % although it was below 50% (Lerebo, Kidanu and Tsadik, 2015). A study done in Tanzania revealed that only 14% of pregnant women attended ANC in the first trimester (Lilungulu, Matovelo and Gesase, 2016). A similar study done in Uganda revealed that only 11.5% of respondent booked ANC in the first trimester (Turyasiima *et al.*, 2014). In Kenya, many women attend antenatal care late in pregnancy, missing out on important aspects of care (Gitonga, 2017). In the 2014 KDHS report, some Counties not only had high maternal mortality rate but also reported as low as 37% of ANC attendance (Kenya National Bureau of Statistics, 2014). Apart from low turn up for antenatal care pregnant women also initiate ANC later when the pregnancy has progressed and some pregnant related complications are evident. Delayed initiation of ANC attendance leads to pregnancy-related complications which ought to have been identified earlier and appropriate management initiated (Paudel, Jha and Mehata, 2017).

A study done in Tharaka-Nthi County revealed only 26% of respondents attended early ANC (Gitonga, 2017). Consequently, the baseline observations which ought to be done in the first trimester of pregnancy are missed out resulting to increased risks during pregnancy. In Kiambu hospital, based on researcher's observation, women present late for ANC and poor pregnancy outcomes have been reported.

Kiambu level five hospital reported 10 maternal deaths in the year 2018 out of 11,003 live births (Maternal death-register, Kiambu hospital). During maternal death audit it was noted that four out of the ten women who lost their lives attended antenatal clinic late. It is in this regard that this study aims to establish the timing of first antenatal visit and compare with birth outcomes.

1.3 Justification

There is need to emphasize antenatal care in order to achieve Sustainable Development Goal three on reduction of maternal mortality to less than 70 per 100,000 live births. According to KDHS 2014, about 58% of pregnant women attended at least four antenatal visits which were recommended by WHO. Despite the number of visits attended it is important to ensure that antenatal visits are initiated early as per WHO recommendation.

Kenya emphasizes the need to improve the livelihood of all citizens in its social strategy of vision 2030. The country has been lagging behind in implementation of interventions that should lower infant and maternal mortality, as such the vision 2030 aims at shifting the health bill from curative to preventive care, in particular special attention being paid to lowering infant and maternal mortality ratios. In an effort to achieve vision 2030, the big four agenda was launched by the president in March 2018 with a vision to provide universal health care to all Kenyans (Wambugu, 2018).

For developing countries to achieve goal three on Sustainable Development Goals antenatal care needs to be strengthened. Adequate antenatal care will significantly reduce pregnancy-related complication and in turn reduce maternal and infant morbidity and mortality. The care provided ought to be adequate to be effective in reduction of maternal deaths (Atisa, 2015). Different countries face different challenges in their effort in strengthening antenatal care uptake. It is therefore important for individual countries to investigate what hinders the uptake of services and work towards improving them. There is need to identify the determinants of late ante natal attendance in order to put in place intervention which will help reduce maternal mortality.

1.4 Research questions

1. What is the level of awareness of mothers on importance of ANC attendance among mothers delivering at Kiambu level five hospital?
2. What is the timing of ANC booking among women delivering at Kiambu level five hospital?
3. What are delivery outcomes among mothers delivering at Kiambu level five hospital?

1.5 Study Objective

1.5.1 Broad objective

The broad objective of this study was to evaluate antenatal care initiation with their effects on the delivery outcomes among women seeking delivery services in Kiambu level five hospital.

1.5.2 Specific objectives

1. To assess the level of awareness of mothers on importance of ANC attendance among mothers delivering at Kiambu level five hospital.
2. To establish the timing of first ANC attendance among mothers delivering at Kiambu level five hospital.
3. To assess birth outcomes in relation to first ANC timing among women delivering at Kiambu level five hospital.

1.6 Expected benefits

This study assessed the timing of ANC attendance and compared with birth outcomes. The findings will be used to improve the quality of antenatal care, reduce pregnancy-related complications and in return reduce maternal mortality. Assessment of women's knowledge on

timing of early ANC will reveal if there are gaps, and findings can be used by the health facility staff to educate mothers on importance of early ANC attendance. The County health board can put in place measures to strengthen early antenatal care as they plan to implement the WHO new ANC guidelines once they are adopted by the Country.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The chapter presented reviewed literature in relation to importance of early utilization of antenatal services and delivery outcomes. Literature review was mostly done online from peer reviewed journal through data bases like Pub-med, Ovid, Cochrane, and Hanari. Keywords used in this study were early ANC, early initiation, Knowledge on ANC

2.2 Importance of Ante-Natal Care

One of the global health issues is maternal mortality, a burden to the family, community and the nation at large. A number of studies have shown that lack of antenatal care contributes to maternal morbidity and mortality. One such study was conducted in Colorado where the results revealed that early ANC attendance was paramount in prevention of pregnancy-related complications and deaths (Breathett *et al.*, 2018) .Inadequate ANC attendance is also associated with poor delivery outcomes which may result to neonatal morbidity and mortality (Bauserman *et al.*, 2015) . The traditional antenatal care model has been practiced since 1920 the women were visited in homes by nurses. Later in 1950s, the visits were scheduled monthly up to 28 weeks, followed by fortnightly up to birth (Singh, 2016).After adoption of Millennium Development Goals, the WHO adopted focused antenatal care (FANC) in 2002 (WHO, 2006).FANC was recommended by researchers as a goal oriented approach whereby in each visit a target goal was to be achieved. The FANC concept intended to provide simple, safe and cost effective care to pregnant women.

In order to decrease pregnancy complications, maternal and child mortality, pregnant women need to be educated on importance of attending ANC. Increased awareness will see more women attend early ANC resulting in adequate antenatal care. Women who are at risk of pregnancy-related complications are usually identified and appropriate intervention instituted example

patient who have diabetes mellitus are followed up more keenly with their routine anti-hypoglycemic been changed or adjusted. Diabetes is one of the conditions that result to undesired birth outcomes example stillbirths and macrosomic babies. Prevention of pregnancy-related complications is achieved when women attend ANC early and preventive measures are put in place example iron and folic supplementation to prevent anemia and neural tube defect in newborn (Cumber *et al.*, 2016). Health education and health promotion are components of antenatal care which will play part in increasing knowledge and awareness. A pregnant woman is provided with wide range of information that is crucial in prevention of complications and also information that promotes safe pregnancy and her well-being. There has been an increase in the proportion of mothers attending four antenatal clinic visits and deliveries attended by skilled health personnel which could have contributed to decrease in Maternal Mortality Rate (MMR) (Kenya National Bureau of Statistics, 2014). The different governments and stakeholders need to strengthen strategies that will improve on the trend of antenatal care. Once antenatal care is strengthened prevention of maternal and infant mortality and morbidity will be achieved.

2.3 Level of awareness on early antenatal initiation

It is important for pregnant women to start antenatal clinic early so that adequate care can be provided on time. Some women may not be aware of the time they are supposed to start ANC or they may be aware but delay due to some reasons. Knowledgeable women will be aware of their rights and health status the women will often seek appropriate services as compared to women without knowledge. A study done in Ethiopia revealed that utilization of early ANC services depends on women's knowledge of benefits and complications associated with pregnancy (Gudayu, Woldeyohannes and Abdo, 2014).

In a study done in United Kingdom a number of women were found to be lacking knowledge on the appropriate time to begin ANC and knowledge on early diagnosis of pregnancy (Haddrill *et al.*, 2014). In Ethiopia the number of women starting ANC late were noted to be significant and was related to lack of information on when to begin clinic (Ewunetie *et al.*, 2018). The researcher while working in the maternity unit of Kiambu hospital observed that some women booked their initial ANC in second or third semester. This meant that some key components like risk assessment were missed out and the women ended up with pregnancy related complications. The study will give a better understanding on late antenatal booking in the study area.

2.4 Timing of Ante-Natal Care

Globally, a lot of emphasizes has not been put on early initiation of antenatal care. This has seen most women attend their first antenatal clinic in late pregnancy. Millennium Development Goals (MDG) focused on coverage of at least one ANC visit while antenatal care is notably missing as an indicator in monitoring strategies of Sustainable Development Goals.

WHO recommends that all women should receive early antenatal care, the care should be initiated within three months of gestation. According to WHO, progress has been made in accessing of antenatal care, where a total of six women out of ten attend ANC. An estimated 85% of women in developed countries received early antenatal compared to less than half in developing countries in 2013. The discrepancy results to high maternal morbidity and mortality in the developing countries.

WHO guideline has put more emphasizes on early ante natal care with the first contact recommended at or before 12 weeks of gestation. The coverage of early ANC initiation is slowly been achieved globally now at 58.6%. In Sub Saharan Africa early antenatal coverage is lower

with less than 50% of women attending clinic in the first trimester (Moller *et al.*, 2017). Late initiation of antenatal care has been associated with poor birth outcomes example pre-term birth, stillbirths and increased pregnancy-related complications. Evidence has shown that women who initiate early antenatal care are likely to have assisted delivery by skilled health provider and experience less pregnancy-related complications (Paudel, Jha and Mehata, 2017). Early antenatal initiation is advantageous to the pregnant woman as it provides an opportunity for her to receive advice before any complications arise. She also receives education on lasting health benefits that continue beyond pregnancy. Health education include, danger signs of pregnancy which the women should seek health care once they are noted example bleeding from genital tract. The woman is educated on breast-feeding which will be of benefit to the baby. The woman is educated on birth preparedness which is key in achieving skilled birth at delivery. Moreover the pregnant woman also gets educated on parenting skills. Antenatal visit provides an opportunity for interventions which have positive impacts on delivery outcome. Nutritional assessment and advice is an important intervention as poor nutrition has been associated with high risk for poor birth outcomes. Intrauterine growth restriction, premature births and stillbirths are associated with malnourishment (Perumal *et al.*, 2013) .Obese women are also at risk of delivering big babies who can cause obstruction of labor. The most common nutritional deficiency is iron resulting to anemia. Women with anemia may have preterm labor, small for date gestation, infant or even maternal mortality. Early antenatal initiation will result in diagnosis of deficiency and iron supplementation over the gestation period thus improving the status of the mother and the fetus. A combination of iron and de-wormer where hookworm infestation is common is effective for anemia treatment.

Prevention of infections is another antenatal intervention. Pregnant women are vulnerable to malaria, if appropriate preventive measures are not taken, intra uterine growth restriction, premature birth and or abortion may result. Use of mosquito treated nets has significantly reduced malaria infections in malaria endemic zones. Immunization with Tetanus toxoid has helped in reducing cases of tetanus infection to the babies. Disease like syphilis if diagnosed early is treated as infection with syphilis has been associated with congenital syphilis and stillbirths (Hodgins *et al.*, 2016). Modern technological advancement allows for correction of some congenital abnormalities while the baby is in uterus. In severe congenital abnormalities pregnancy termination may be an option. This is after confirmation with ultra sound and counseling the mother instead of carrying the pregnancy to term.

Early detection of condition like preeclampsia ensures that patients are put on drugs and complications are prevented. Diagnosis can be made by simply monitoring the blood pressure and urinalysis. Nurses working at the dispensaries need to be enlightened on signs and symptoms and referral system for uncontrolled cases put in place. Early antenatal visit also provides an entry point for health care providers to give health information to the pregnant woman in order to ensure a healthy pregnancy and good birth outcome. A wide range of health issues are discussed with the pregnant woman to include living in a healthy environment where health risks are minimal and been made aware of environmental hazards (Cumber *et al.*, 2016) .Change in lifestyle is another aspect of health information that is important, adopting a healthy lifestyle is crucial for good birth outcomes. The risks of tobacco use and alcohol consumption should be known to the woman. Male partners who smoke are also made aware of effect of second hand smoke to the unborn infant. Health education on family planning is taught during pregnancy so

that the woman will have the information after delivery and make a choice on spacing of her children since short birth intervals have been associated with poor birth outcomes.

2.5 Pregnancy Recognition

Early pregnancy awareness is important it gives a woman time in making decision on when to initiate care for the pregnancy. Among the benefits of early pregnancy recognition are; the women gets a chance of attending more antenatal care visits in her pregnancy, early detection will also offer the woman a chance for early interventions example change or avoidance of drugs which may affect the developing fetus. Lack of early pregnancy recognition may contribute to late timing of antenatal care. Ayoola 2010 in his study on early pregnancy recognition found an association of early recognition with improved timing and number of antenatal care. A study done in South Africa found that women were not aware of the available services of early pregnancy detection like urine testing. Many women may suspect pregnancy after missing menstrual period.

2.6 Delivery outcome

Birth outcomes are sometimes associated with ANC care offered for example neural tube defects are associated with deficiency of folic acid. Pre-existing diseases may have impacts on the delivery outcome, there is need to identify the diseases early and manage them. Patient with HIV need to have their viral load to non-detectable level before they conceive to prevent infection to the infant. Women with diabetes have eleven-fold higher risk of intra uterine fetal demise as compared to non-diabetic patients (Breathett et al., 2018),they are also at higher risk of preeclampsia. Timely and quality ante natal care has been shown to significantly improve birth outcomes. A study done in France among women who attended less than three antenatal visits

were at higher risk of preterm births than those women who attended more antenatal visits(Requejo et al., 2013).

2.7 Theoretical Model

The study applied Health Belief Model (HBM) which was developed in 1950s and is commonly used in health education, disease prevention and health promotion (Singh, 2016).The model focuses on individual beliefs about health and predicts the individual behavior towards health at attitudes and beliefs of individuals during wellness and illness. The HBM contains four psychosocial variables: Perceived susceptibility that is perceived threat; perceived severity perceived consequences; perceived benefit and perceived barrier to action (Paudel, Jha and Mehata, 2017). Those who are for HBM agree that health-seeking behavior is influenced by person's perception of a threat posed by a health problem and the value associated with the actions aimed at reducing the threat. People will appreciate harmful health behavior if they understand that harmful effects can be prevented.

HBM has six concepts which were applied in this study: perceived susceptibility may be viewed as the level of risk the pregnant women perceive to be in. Pregnant women must be aware of pregnancy related complications. Perceived severity explains how serious the pregnancy related complications may be, ante natal mothers need to know the danger signs of pregnancy so that they can seek help when they experience the signs. It is only when a pregnant woman believes in susceptibility and severity of pregnancy related complications that she will be able to change behavior toward ante natal care. Perceived benefit is felt when the advice on action to reduce risk pregnancy related complications is felt, for this case early ante natal attendance. Perceived barriers of early antenatal initiation may be lack of awareness on when to begin, cultural

believes, low social-economic status and social factors. This can be achieved through health education so that women have adequate information on care during pregnancy.

2.8 Theoretical framework

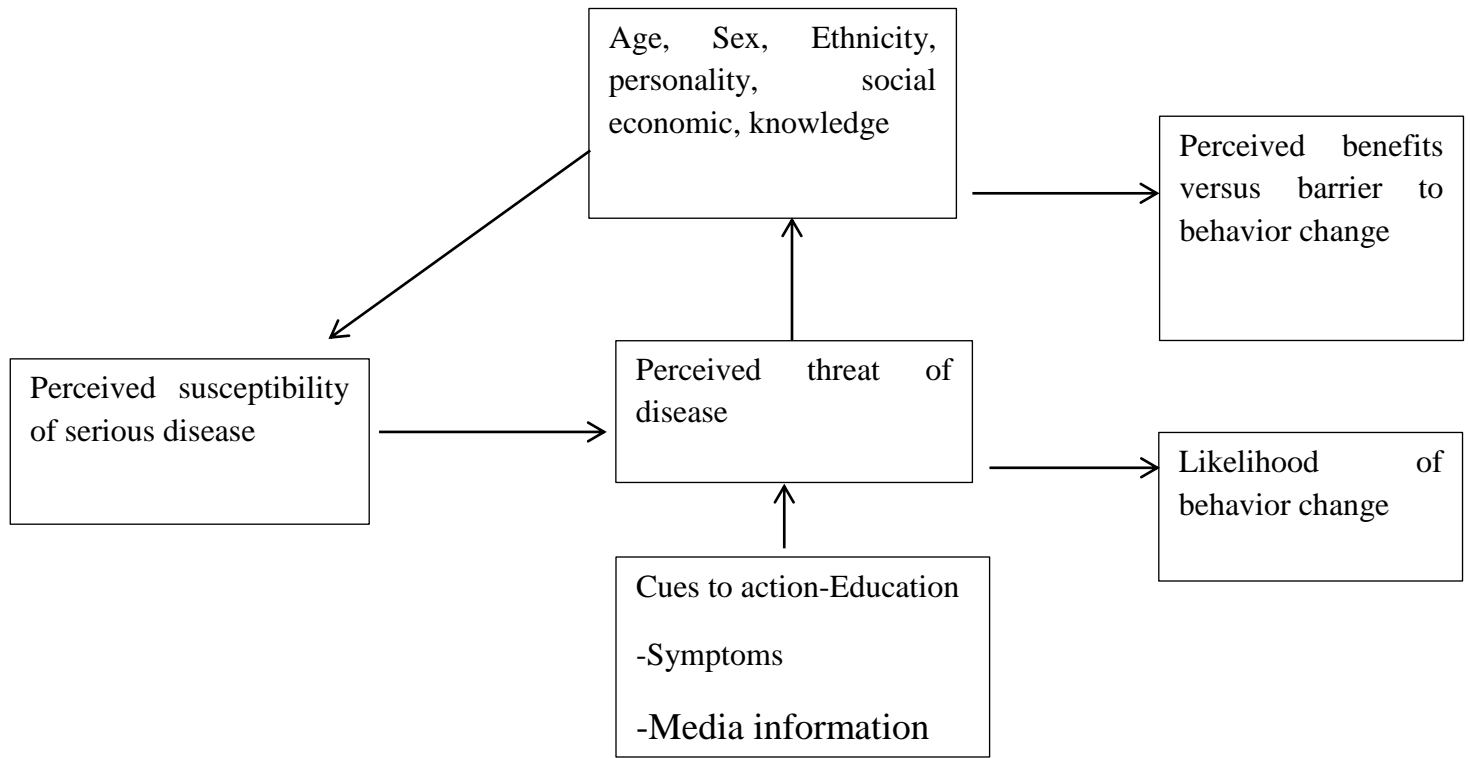


Figure2. 1 Theoretical model adapted from Anderson and Newman Model

2.9 Conceptual framework

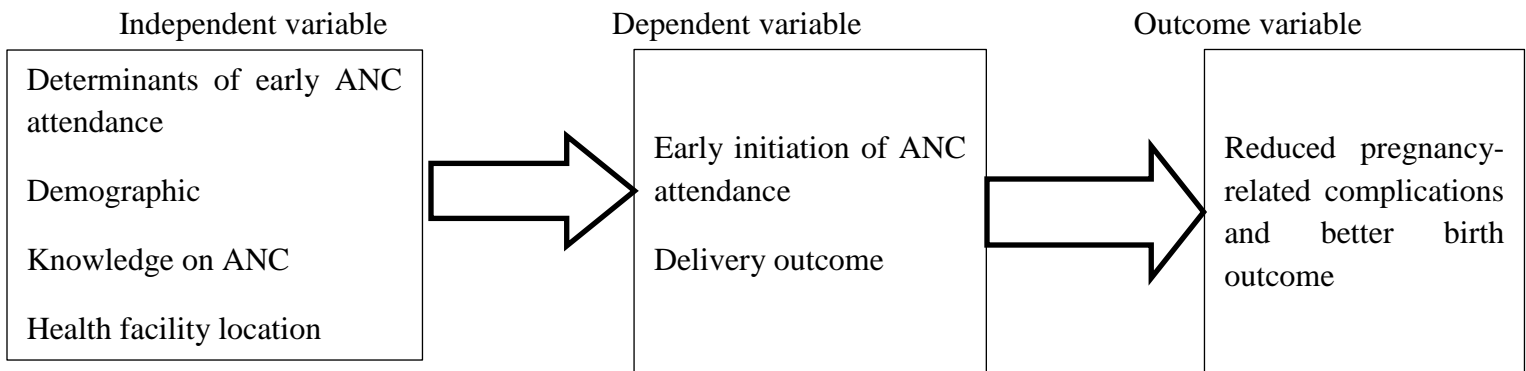


Figure2. 2 Conceptual framework

2.10 Operational framework

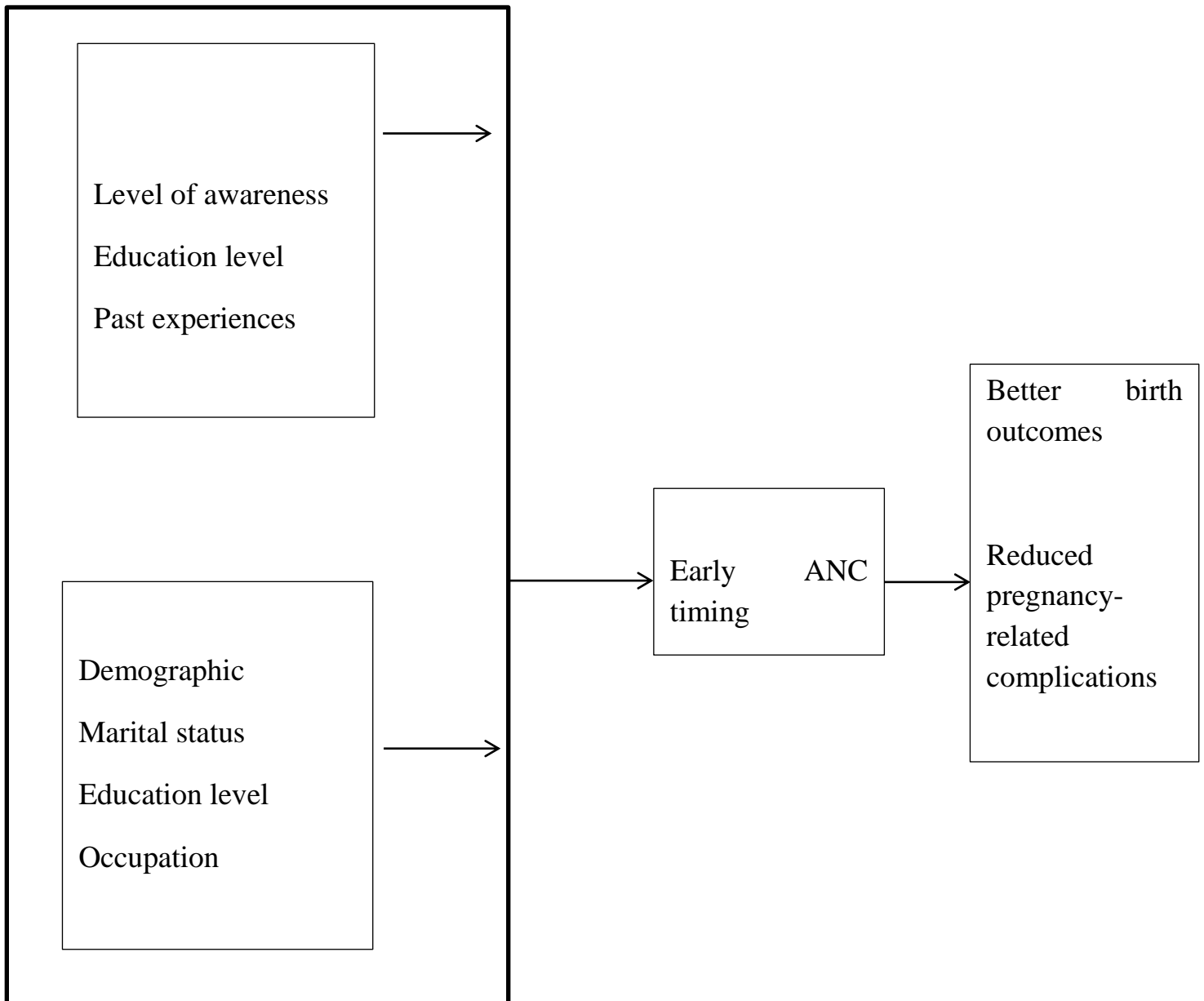


Figure2. 3 Operational framework

CHAPTER 3: RESEARCH METHODOLOGY

This chapter dealt with study design, study area, study population, sample size and sampling procedures, inclusion and exclusion criteria, research tools, pre-test, data collection procedures, data analysis techniques, ethical considerations, validity and reliability.

3.1 Study design

The study utilized descriptive cross-sectional survey design employing quantitative method. Descriptive cross-sectional design was appropriate for this study because the researcher was able to look at numerous characteristics at once with less cost.

3.2 Study area

The study was conducted in postnatal ward in Kiambu Level five Hospital. This is a public hospital in Kiambu County and is located 13 kilometers north of Nairobi along Kiambu - Githunguri road. The hospital was built by colonial government as out-patient in 1925 to cater for workers in coffee and tea estates. A tuberculosis ward (TB) was built later in 1956 in order to isolate TB cases which were on the rise. The government took full control of the hospital in 1963 after independence. The first President of Kenya Jomo Kenyatta laid the foundation stone for Pediatric, Maternity, and a modern out-patient department in 1969. There after former president Daniel Moi opened Nyayo wards with a bed capacity of 144 in 1984. A modern Maternity wing with a bed capacity of 100 was officially opened in 2013.

Currently, the hospital is a level five offering curative, preventive, promotive, MCH/FP services, maternity services, Laboratory, radiological services, and has three operating theatres. The catchment population of the hospital is 101,596 and a bed capacity of 394. Women of reproductive age (15-49 years) constitute a population of 28,305. On average Kiambu maternity

labor ward reports 600 deliveries per month. The hospital serves clients from Kiambu and other neighboring counties example Machakos, Nairobi, Muranga and Kajiado.

Antenatal clinic is conducted from Monday to Friday starting from 8am to 5pm as an integrated service under Maternal Child Health and Family Planning. Maternity ward houses operating theatre, Newborns unit, labor ward, ante natal and post natal ward which has a bed capacity of fifty. The ward has three separate rooms: two rooms are reserved for cesarean section mothers and the third room is used by patients who deliver vaginally. Currently the hospital is under the management of Kiambu County Medical Board.

3.3 Study population

The study populations were post natal mothers who delivered in Kiambu level five hospital during the study period despite where they attended their ANC. Enrolment was done in postnatal ward.

3.3.1 Inclusion and exclusion criteria

3.3.2 Inclusion criteria

All consenting women who delivered at Kiambu level five hospital at or after 28 weeks gestation during data collection period.

3.3.3 Exclusion criteria

Those mothers who delivered elsewhere but were admitted to post natal ward as referral were excluded.

Mothers who did not consent

3.4 Sample size determination

Statistical information from the hospital maternity records indicated that an average of 600 mothers deliver per month. The study was done in one month (a population size of 235 was considered as the number of target population at the time of the study). The desired sample size was determined by using the formula as used by Fisher et.al (1998) where the target population is more than 10,000.

FISCHER'S statistical formula (Mugenda A. & Mugenda O., 1994)

$$n = Z^2 pq / d^2$$

Where,

n :desired sample size(if target population is >10,000)

z : standard normal deviate (1.96) that corresponds to 95% confidence level.

P: the proportion in the target population estimated to have a particular characteristic (0.5) antenatal attendance.

q:is equivalent to (1-p)=(1.0-0.5)=0.5

d :the degree of accuracy desired 5% or 0.05

$$n = ((1.96)^2(0.5) (0.5)) / (0.05)^2$$

$$= 384$$

Alternative formula was used since the target population of women who deliver in Kiambu on average is 600 per month which is less than 10,000.

$$nf = n/1+n/N$$

Where,

n_f =Desired sample population (when population is less than 10,000)

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

N =the estimate of the population size

$384 / (1 + 384/600)$

=234.146

=235

3.5 Sampling technique

Simple Random Sampling technique was used to obtain the study participants. Post-natal admission register was used to form a sampling frame. All mothers admitted in a day were assigned a number. A total of eight mothers were randomly selected and recruited per day for a month to obtain a sample size of 235 respondents. All mothers randomly picked from the list and they met the inclusion criteria and were willing to participate in the research were recruited. Mother who were picked and did not meet the inclusion criteria were replaced by picking others randomly from the sampling frame.

3.6 Research tool

A researcher administered questionnaires was used to collect quantitative data. The questionnaire had sections on demographic data of mothers, knowledge on importance of early initiation of antenatal, timing of ANC initiation and delivery outcomes of mothers. The researcher and

assistants asked the mothers questions and entered the response on the questionnaire accordingly. Mother and child booklet was used to verify the information given.

3.7 Research assistants

Two nurses were identified in postnatal ward and trained as research assistants. Post natal ward nurses were preferred because they are familiar to the postnatal mothers and they can easily calculate gestation for dates using the last menstrual period provided in mother and child booklet. They were trained on data collection technique, training emphasized on how to record answers precisely as they were provided, without sifting through them or interpreting. Questions were asked in a neutral manner. Assistants did not show, by words or expressions, what answers one expected to hear. Assistants did not show agreement, disagreement or surprise on answers provided by respondent.

3.8 Pre-test

Pre-testing was done at Thika level five hospital which has similar characteristics to Kiambu level five hospital since the two hospitals are in the same geographical area and serve similar clients. Questionnaire was administered to thirty eight mothers who were randomly selected this represented 10% of study population. Pre-test helped the researcher in ensuring that the information required is collected, it also ensured that the tool used to collect data is appropriate. The pre-test also helped in determining the time that is required to administer the research tool. In determination of whether the sample is a representation of the population a pre-test is used. During pre-testing the researcher was able to determine if the training of research assistants was effective. The results of pre-test were not included in the study findings.

3.9 Validity and Reliability

3.9.1 Validity

Validity of the research instrument was ensured through the use of a well-designed questionnaire so that the answers obtained from the study were true and accurate. The questionnaire was designed to ensure that consistent results were achieved.

3.9.2 Reliability

Reliability was ensured through selection and training of research assistants engaging them in pre-testing study and supervision them during the data collection process. Completed questionnaires were checked daily and errors corrected.

3.10 Data collection

A research authorization letter was obtained from Kiambu County Education Committee and the medical superintendent, Kiambu level five hospital in order to be allowed to collect data from the hospital for the study. The researcher informed postnatal department of upcoming data collection dates. After obtaining consent from participants the questionnaires were administered by the researcher and research assistants. Each questionnaire was filled in and collected before leaving to the next selected study participant.

3.11 Data management plan

3.11.1 Data cleaning

Data was checked manually for accuracy, completeness, and consistency at the end of every day of data collection. Then, data was edited, coded and entered to a computer, checked for missing values and outlier, analysis was done using SPSS for windows version 22.

3.11.2 Data Analysis and presentation

Knowledge was assessed about importance of ANC visit on; informs on danger signs, ensures on well-being, is best if began before three months, provides chance for health education and immunization. Each parameter was awarded 1 mark for correct answer and 0 mark if the answer was wrong. Total marks for questions on knowledge were five. Those respondents who scored 60% and above were considered as having adequate and those who scored less than 60% were considered to have inadequate knowledge. Data analysis was done using descriptive and inferential statistics. Descriptive analysis was used on each demographic variable by calculating Mean, Median, Mode, Standard Deviation (SD) and Percentages for continuous variables like age. Inferential statistics was used for analyses to show relationship between two or more variables. P -value ≤ 0.05 was considered statistically significance at a confidence interval of 95%.

3.11.3 Data storage

All data gathered were protected by ensuring it was stored in safe custody and key kept by principal investigator. A soft copy of data was generated, stored in a laptop and protected by use of pass-word soft copy data was backed up with a flash disk. To ensure confidentiality of the study participants each entry had a code and the information provided was only shared to authorized persons.

3.12 Ethical Consideration

Ethical approval was sought from Kenyatta National Hospital (KNH) /University of Nairobi (UON) Ethics and Research Committee (ERC). Permission to conduct research was sought from Kiambu County Health Research and Development Office, Kiambu Level five hospital Medical Superintendent and post natal ward in-charge was informed of data collection plan. Research

respondent were properly explained the extent, benefits, risks of the study. The respondents were properly explained that; the study was through interviewer administered questionnaire which took approximately twenty minutes. There was no direct individual benefit of participation but after the analysis the community may benefit through implementation of the recommendations. Informed consent was obtained from participants prior to participation on voluntary basis. The participants were given a consent form to sign after they voluntarily agreed to participate. Participants were not coerced to participate they were free to opt out of the study. Contacts for principal researcher, the supervisors and director ethics and research committee were provided in case of concern that needed to be addressed.

3.13 Limitation and Delimitation

Since nurses were trained as research assistants, some participants may have not given honest answers. As a result research assistants may have been tempted to record responses different from the answers given by respondents. To minimize this limitation, training was done by recording precise answers. The study was done in a public hospital whereas some mothers who may have booked early ANC could have delivered in private hospitals this made generalization of results limited to mothers who deliver in public hospitals.

3.14 Dissemination of data

A report was written and disseminated to all stakeholders including Kiambu level five hospital, University of Nairobi and post natal ward of Kiambu hospital. Dissemination was also done to colleagues through continuous professional development presentations. The information was also published in a peer reviewed medical and nursing journal.

CHAPTER 4: RESULTS

Introduction

This chapter presents the findings of the study on antenatal care visits' timing versus delivery outcomes among women seeking delivery services at Kiambu Level Five Hospital, Kenya. It is organized based on the themes of the study; Level of awareness of mothers on importance of ANC, timing of first ANC attendance, birth outcomes in relation to first ANC timing.

4.1 Response rate

The researcher administered 235 questionnaires to the respondents. However, 230 questionnaires were returned giving a response rate of 85.5%. The response rate is considered as representative as it conforms to Mugenda and Mugenda (1999) stipulation that a response rate of 50% is good and a response rate of 70% and over is excellent.

The results are presented in tables, graphs, pie charts and discussion of the findings thereafter.

4.2 Socio-demographic characteristics

This section provides an analysis, presentation and interpretation of the respondents' age, marital status, religion, education level, parity, monthly income, and distance to health facility.

Majority of the respondent were aged between 15-25 and 26-35 years with a percent of 51.3% (n=118) and 38.6% (n=89) respectively. Most 70% (n=161) of the respondent were married and 19% (n=53) were single. Majority of the respondent 42.6% (n=98) attained education up to secondary level and only 15.3 % (n=35) attained tertiary education. Most of the respondents 44.3% (n=102) were delivering their first baby. Majority 53.9% (n=124) of the respondent's family earnings were between 1000-5000Ksh. Most of the respondents 94.8% (n=218) resided within a radius of 10km from the health facility. The findings are presented in table 4.1.

Table4. 1Demographic data

Variables		Frequency (n)	Percent (%)
Age	15-25	118	51.3
	26-35	89	38.6
	Above 35	23	10
Marital status	Married	161	70
	Single	53	19
	Separated	16	7
Religion	Christian	228	99.1
	Muslim	2	0.9
Level of education	None	10	4.3
	Primary	87	37.8
	Secondary	98	42.6
	Tertiary	35	15.3
Parity	Para 1	102	44.3
	Para 2	64	27.8
	Multipara	64	27.8
Family monthly income	1000-5000Ksh	124	53.9
	6000-10000Ksh	56	24.3
	11000-15000Ksh	11	4.8
	16000-20000Ksh	5	2.2
	Above 20000Ksh	34	14.8
Distance to health facility	1-10 km	218	94.8
	11-20 km	11	4.7
	Over 20 km	1	0.5

Bivariate analysis was further done to identify first ANC initiation association with demographic characteristics. The association was considered significant if the P-value was less than \geq

0.05. The chi square test revealed significant relationship P-value 0.028 between early ANC initiation and education level. The results are presented in table 4.2.

Table4. 2 Association of ANC initiation and demographic characteristics of respondents

Variables		Non-ANC Attendance	First trimester	After 1 st Trimester	P-Value
Age	15-25	5	46	65	0.116
	26-35	10	34	45	
	Above 35	1	12	12	
	Married	11	69	80	
	Single	4	15	32	
	Separated	1	6	9	
Religion	Christian	16	92	120	0.280
	Muslim	0	0	2	
Level of education	None	9	4	5	0.028
	Primary	6	34	48	
	Secondary	1	41	49	
	Tertiary	0	12	21	
Parity	1 st Child	2	38	62	0.070
	2 nd Child	8	20	36	
	3 rd Child or more	6	24	34	

4.3 Knowledge on importance of ANC

The study sought to find out whether the respondents knew the importance of attending ANC. A large number of respondents 70 % (n=161) were aware that ANC informs on danger signs, the respondent also agreed that ANC follow up is necessary for monitoring well-being of both mother and growing baby. Majority of the respondents 64.3% (n=148) agreed that ANC provides

a chance for immunization. Although the study found no significance association of knowledge and first ANC initiation, most of the respondents 60% (n=138) were not aware of the appropriate time to initiate ANC.

Table4. 3Association of Knowledge on importance of ANC and initiation

Variable	Frequency (n)	Percentage (%)	P-Value
ANC informs on danger signs			
True	161	70	0.770
False	69	30	
ANC ensures well being			
True	187	81.3	0.656
False	43	18.7	
ANC is best began before 3 months			
True	92	40	0.970
False	138	60	
ANC provides chance for health education			
True	149	64.7	0.925
False	81	35	
ANC provides a chance for immunization			
True	148	64.3	0.678
False	82	35.7	

4.4 Pregnancy Recognition

The greater majority of respondents 52% (n=119) became aware of their pregnancy status at two months while only 20% (n=46) were aware of pregnancy in the first month.

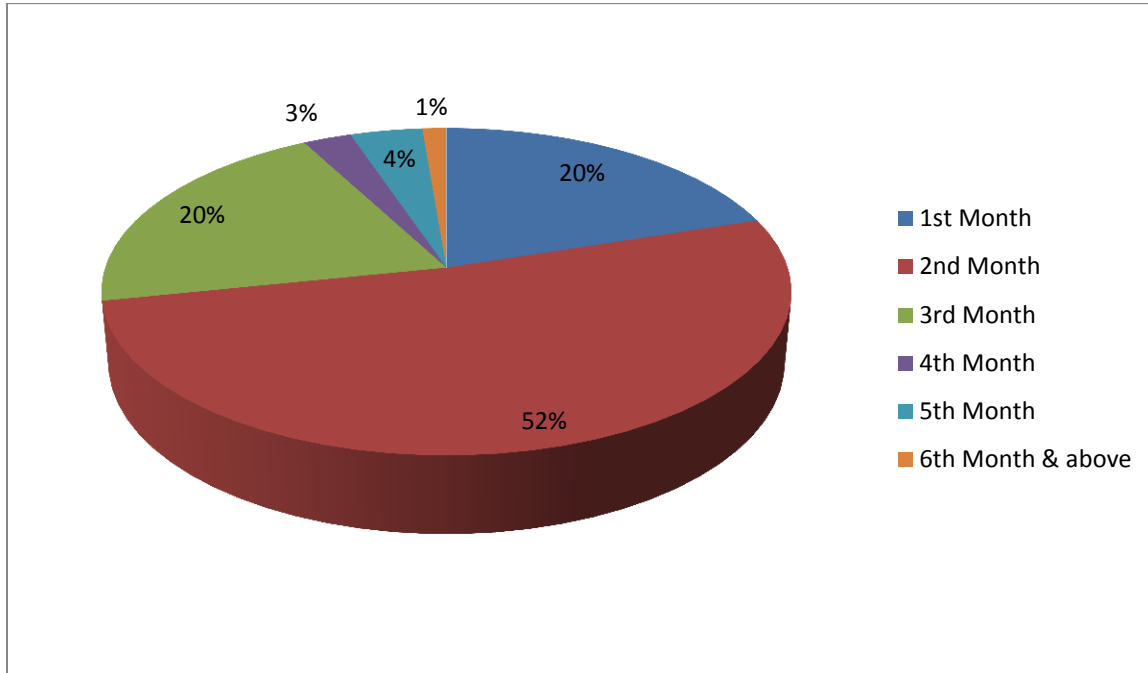


Figure4. 1 Pregnancy recognition

4.5 Timing of ANC initiation

From the study, 45.7 % (n=122) of the respondent initiated their first ANC visit in second and third trimesters and hence had late timing as shown in the figure 4.2.

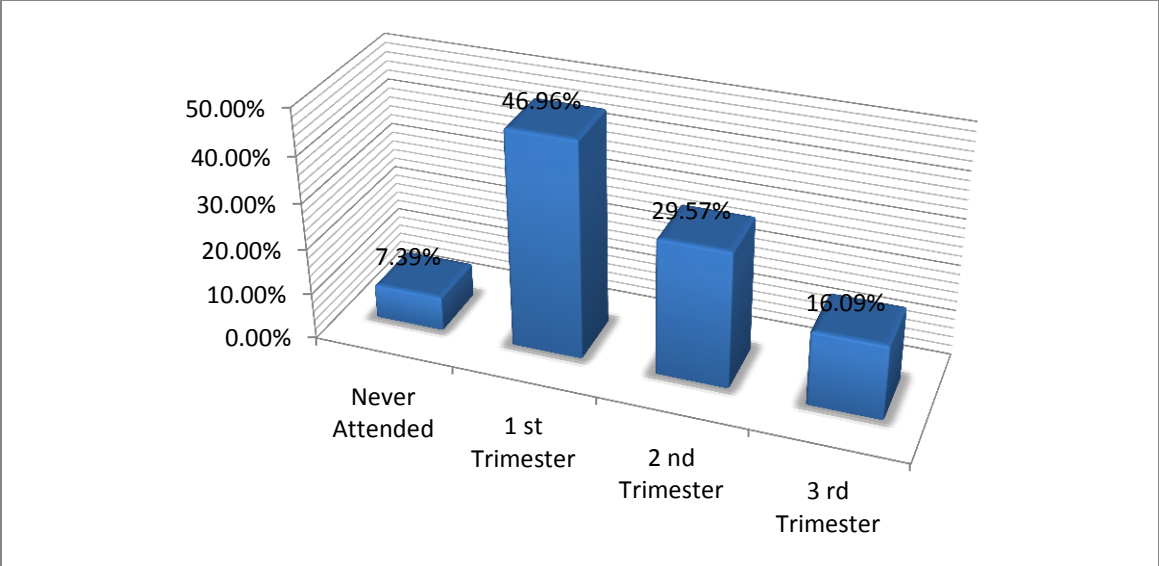


Figure4. 2 Time of first ANC Initiation

4.6 Perceived right time for ANC first visit

Majority of the respondents 32.6 % (n=75) were not aware of the recommended time to initiate ANC, only 23% (n=53) perceived that first ANC should be in the first trimester.

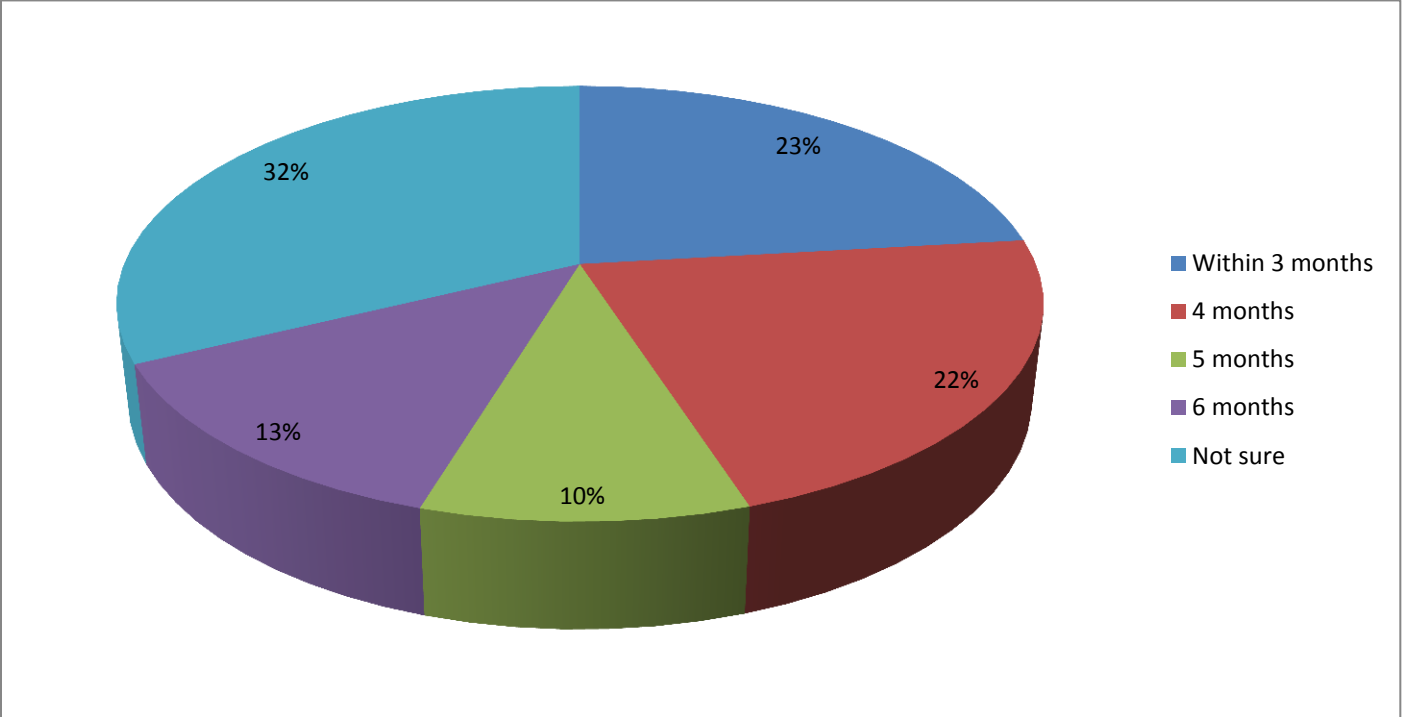


Figure 4. 3 Perceived right time for ANC first visit

4.7 Number of ANC visits

Majority of respondent 92.6% (n=214) attended antenatal clinic and only a small number 7.3% (n=16) who missed antenatal care .Most 41 % (n=95) respondents attended ANC once.

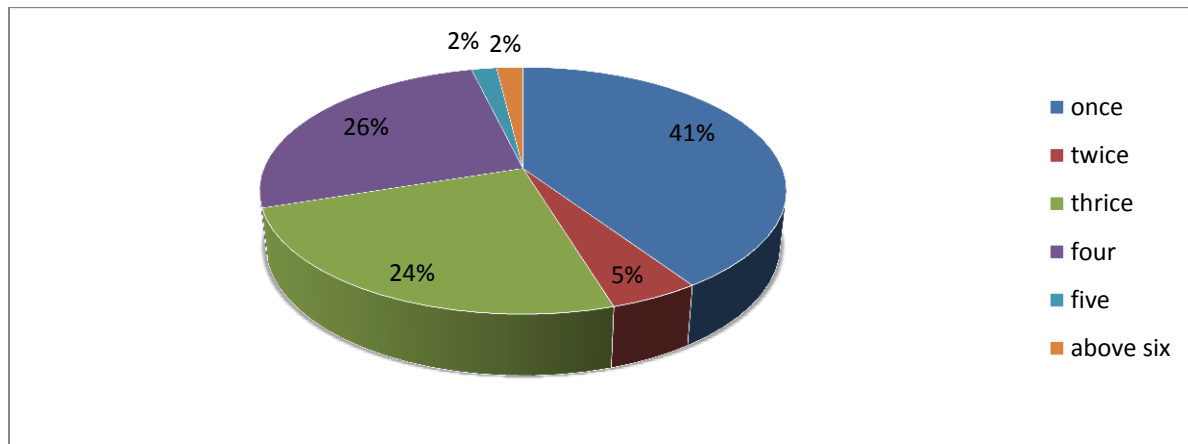


Figure 4. 4 Number of ANC visits

4.8 Reason for late ANC attendance

Most of respondents 38.3 % (n=88) reported that they had no complication during pregnancy as shown in the table 4.4.

Table4. 4Reason for late attendance

	Frequency (n)	Percent (%)
Late awareness of pregnancy status	37	16.1
Had no complications	88	38.3
Uncustomary to make pregnancy public	14	6.1
Lack of time	25	10.9
ANC services are far	7	3.0
Not aware when to start ANC	59	25.6
Total	230	100

4.9 Pregnancy Outcome

The study focused on antenatal complications, delivery outcome and neonatal outcomes for mothers who had timely initiation of ANC visit and those who had late initiation based on gestation at first visit.

4.9.1 Antenatal Complications

The findings indicated that 60.4 % (n=139) of the respondents had no complications during their most recent pregnancy and during labor. However, 39.6 % (n=91) reported that they experienced complication during their most recent pregnancy some leading to Caesarian Sections delivery. Majority of the mothers had high blood pressure 21.9 % (n=20) as a complication followed by preterm labor at 18.6 % (n=17). This distribution is similarly observed in mothers who had late initiation of ANC visits. Table 4.5 shows the distribution of antenatal complications.

Table4. 5Antenatal Complications

Complication			Timely Visit		Late Visit	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
APH	6	6.6	2	4.9	4	8
PPROM	9	9.9	4	9.8	5	10
High Blood Pressure	20	21.9	7	17.1	13	26
Pre-mature labor	17	18.7	12	29.3	5	10
Anemia	11	12.1	4	9.8	7	14
UTI	14	15.4	3	7.3	11	22
Reduced fetal movements	11	12.1	7	17.1	4	8
Others	3	3.3	2	4.9	1	2
Total	91	100	41	100	50	100

4.9.2 Gestation at Delivery

Most of the respondents delivered at term 67.4% (n=155), while 12.6% (n=29) had post-term pregnancies by expected dates of delivery with a few confirmed by a first trimester obstetric scan. A total of 19.9% (n=46) had pre term births. A majority of the pre-term births were drawn from the sub-group that had late initiation of ANC visits. Figure 4.7 shows the results.

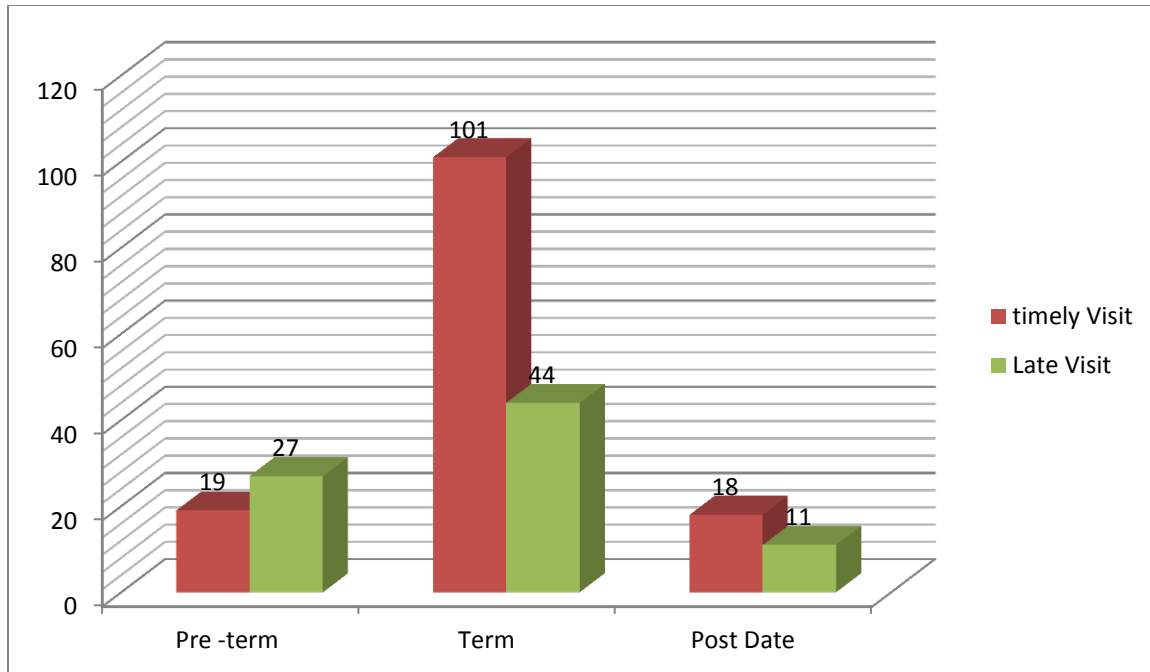


Figure4. 5 Gestation at delivery

4.10 Association of ANC initiation and delivery outcome

Most of the respondents, 71.3% (n= 164) had vaginal delivery while 27.8 % (n=64) had Cesarean Section. Majority of the respondents 87.4% (n=201) had spontaneous onset of labor while 17 % (n=39) had labor induced. Association of first ANC initiation and post-delivery complication yielded a statistical significance P-value 0.022.

Table4. 6 Association of ANC initiation and maternal outcome

Variables	Non-ANC Attendance(n)	Timely Attendance(n)	Late Attendance(n)	P-value
Mode of delivery				
Vaginal delivery	11	62	91	0.820
Cesarean Section	5	30	29	
Others	0	1	1	
Mode of labor onset				
Spontaneous	12	94	95	0.611
Induced	4	7	18	
Complications at delivery				
Yes	1	7	16	0.129
None	1	79	126	
Type of complication				
PPH	1	4	8	
Retained Placenta	0	1	4	
Cervical/ perinatal tear	0	2	4	
Complication within 24hrs of delivery				
Yes	11	6	15	0.022
None	1	76	121	
Type of complication				
PPH	6	2	6	
Anemia	3	1	5	
Fever	0	0	0	
Eclampsia	3	3	4	

4.11 ANC initiation and perinatal Outcome

Most of the babies were born live 96.5 % (n=222) while 3.5% were born dead. Majority of babies 73.5% (n=191) had birth weight of between 2500-3999g. Majority of the babies 82.9% (n=184) (APGAR Score-State of the baby at birth. Appearance, Pulse, Grimace, Activity, Respiration) had APGAR score above 7 at 5 minutes. Majority of the babies 84% (n=188) were stable and were with their mothers 24 hours after delivery while 14% (n=31) were admitted in newborn unit with birth asphyxia, respiratory syndrome and congenital abnormalities. The distribution of perinatal outcome among mothers who had early initiation of ANC visits and those who had late initiation of first ANC is shown in table 4.7.

Table4. 7 Antenatal initiation and perinatal outcome

Non-ANC attendance			Timely		Late	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Perinatal outcome						
State of the baby at Birth						
Live Birth	11	4.8	92	40	114	49.6
Still Birth	3	1.3	2	0.9	3	1.3
Live/Congenital	2	0.9	1	0.4	2	0.9
Birth weight						
≥4000g	1	0.4	8	3.5	6	2.6
2500-3999	8	3.5	70	30.4	91	39.6
1500-2499g	1	0.4	9	3.9	9	3.9
1000-1499g	5	2.2	10	4.3	5	2.2
≤1000g	1	0.4	2	0.9	4	0.8
APGAR Score at 5 minutes						
3 or less	1	0.5	0	0	2	0.9
4 to 7	3	1.4	11	5	19	8.6
Above 7	12	5.4	70	31.5	102	46.0
State of baby after 24 hours						
Baby with mother	11	5	71	32	106	47.7
Admitted in NBU	4	1.8	8	3.6	19	8.6
Fetal death	1	0.6	0	0	0	0

CHAPTER 5: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents discussions, conclusion and recommendation reached following the objectives of the study. Antenatal care is an important preventive service for all pregnant women. Early timing is essential to allow women time for quality and adequate care. World Health Organization (WHO) recommends initiation of antenatal care in the first trimester for safe pregnancy.

5.2 Social demographic characteristic of the respondents

Maternal age is an important factor in obstetric outcome. The findings of this study indicate that all the respondents were within the reproductive age with majority been young. There was no significance association of age and first ANC initiation as the proportions of respondents were similar in the two groups (early and late). Other studies suggested that women's age was not significant factor in early ANC initiation. (Gross *et al.*, 2012) conducted a study in South-Eastern Tanzania and found no evidence of late initiation of ANC when comparisons were made between adolescents and adults. A study from Tanzania concluded that older women who experienced no problems in previous pregnancies had a tendency to initiate ANC late and had less ANC visits. The young delivery age could be contributed to the number of school dropouts in the study area. The results revealed that most respondents in this study were married and they had support from their partners which may explain why they initiated their ANC earlier as compared to the single respondents. (Gross *et al.*, 2012) in their study on timing of antenatal care for adolescent and adult pregnant women established no significant association between marital status and early or late timing of ANC.

Education has been associated with attainment of knowledge and more information. Level of education puts a person at a better position to have more information on services availability and their positive impact on health. In this study there was a significance association between level of education and initiation of first ANC visit. Those respondents who had attained secondary and tertiary education initiated first ANC visit early as compared to those who were not educated. The results are in agreement with a study done in Ethiopia by (Ewunetie, A.A.et al), delay on first antenatal care visit and associated factors among pregnant women in public health facilities documented association of education and initiation of early ANC. This could be attributed to the fact that women who are education may be more informed on importance of antenatal care and may also be in employment and as such have money to book antenatal services.

5.3 Knowledge on importance of ANC attendance

Knowledge on importance of antenatal care is necessary as those women who do not see the importance of care may delay in initiating or miss the care all together. In this study the respondents had knowledge on importance of ANC attendance. Majority were well informed on danger signs of pregnancy and health education provided in antenatal clinics. This findings disagreed with those of an Ethiopian study which documented that utilization of early ANC services depended on women's knowledge of benefits and complications associated with pregnancy (Gudayu, Woldeyohannes and Abdo, 2014). It was noted that despite the knowledge that women in this study had on importance of ANC the majority initiated their first visit late and others had only one ANC visit. This may be attributed to the fact that majority of respondent do casual jobs to earn a living, they may lack time to attend ANC as they struggle to put food on the table.

5.4 Perceptions on timing of first ANC visit

There is need to have the right information on health services available for pregnant women. The findings of this study revealed that majority of respondents were not aware of the recommended time of ANC initiation. Right perception of the first ANC visit contributed for an early or late ANC visit. Women who perceive initiation of first ANC visit to be in the first trimester may be more likely to initiate ANC early and attend more visits than those who perceive right time for ANC initiation to be in second or third trimester. A study in Niger Delta documented misconception about timing of first ANC as the major reason why women initiated ANC late (Ebeigbe *et al.*, 2010). The findings in this study may be attributed to the observation that most respondents were first time mothers and they may have not had the right information on ANC timing.

5.5 Timing on ANC visits

Timely attendance of ANC services is important in ensuring that expectant women are provided with quality care. Early detection of problems in pregnancy leads to early interventions and or referrals. The current recommendation by WHO is the first ANC visit to be within the first trimester (WHO 2016). From the study, majority of respondents began first ANC after first trimester this findings agree with those by Gitonga 2017 which documented fewer respondents beginning ANC in first trimester. The results are also in agreement with current first ANC timing in developing countries. In Sub-Saharan Africa early antenatal coverage is low with less than 50% of women attending clinic in the first trimester, this is according to (Moller *et al.*, 2017). In this study the number of visits made to ANC by respondents were few with majority attending one visit. The single ANC visit may be a cover up which can be attributed to the current requirement for registration of “Linda Mama” health cover, all expectant mothers must have

booked ANC for them to benefit. Linda Mama is a public funded health scheme in Kenya which was launched by the government in October 2016. Both outpatients and inpatient services for mother and the newborn are included in the free health package for a period of one year.

5.6 Reason for late timing

The respondent gave various reasons on why ANC was initiated late, majority reported that the pregnancy had no complications and so there was no need of attending ANC early. A number of respondents reported that they were not aware of the appropriate time to begin ANC, while a small number reported they noticed they were pregnant late. The time the women realized they were pregnancy contributed to some extent on timing of ANC. This finding compares to a study done in United Kingdom on understanding delayed access to antenatal care where a number of women were found to be lacking knowledge on the appropriate time to begin ANC and knowledge on early diagnosis of pregnancy (Haddrill *et al.*, 2014). Findings from another study in Ethiopia documented the number of women starting ANC late was noted to be significant and was related to lack of information on when to begin clinic (Ewunetie *et al.*, 2018). The findings are also in agreement with a study done in Uganda which concluded that women started ANC late due to lack of awareness on time to initiate ANC. Other reasons the respondents gave for late attendance were lack of time to attend ANC. Distance to health facility did not seem to contribute to late ANC attendance since most of the respondents resided within few kilometers from the health facilities where they either walked or used public transport. The various reasons given by the respondents for late first ANC attendance could be due to the fact that many women may view antenatal care as curative rather than preventive.

5.7 Antenatal complications

Complications during pregnancy are usually associated with poor birth outcome example patient with recurrent urinary tract infections may end up with premature rupture of membranes resulting to premature birth. From the study high blood pressure was the commonest complication during pregnancy followed by preterm labor. The occurrence of antenatal complications was similarly observed in mothers who had early and late initiation of ANC visits. Other complications during pregnancy were anemia and urinary tract infection. A study done by (Perumal *et al.*, 2013) found high blood pressure, premature births, urinary tract infection and intrauterine growth restriction as common complications during antenatal period. This could be associated to ANC timing in the second trimester when preeclampsia manifest.

5.8 Gestation at delivery

Pregnancy outcomes such as preterm births, low birth weight, certain morbidities and infant mortality have being associated with gestation age. Decreased gestation age is associated with increased disability, mortality, and often increased cost of neonatal care (Ebeigbe *et al.*, 2010). From the study majority of women delivered after 37 weeks of gestation and a small number delivered before 37 completed weeks of gestation. Even though there was no significant association of first ANC initiation and gestation at delivery, most of the pre-term births were drawn from non ANC attendance and the sub-group that had late initiation of ANC visits. The findings may be attributed to a probability that women who had complications presented to the clinic when it was too late for interventions to be done.

5.9 Delivery Outcome

All pregnant women are at risk of obstetric complications which may occur in pregnancy, labor, delivery or post-delivery. During the study period in the month of May, 766 deliveries were recorded and no maternal death was reported in the institution. However, there were three cases of severe maternal complication which required referral for critical care. Out of the three severe maternal complications, one respondent was a non-clinic attendance, who had eclampsia leading to Hemolysis, Elevated Liver enzyme levels and a Low Platelet count (HELLP) syndrome. The second respondent had initiated her first ANC early and developed PPH associated with atonic uterus. The third respondent booked her first ANC in third trimester, she had anemia and developed PPH post-delivery. Preeclampsia has been associated with increase perinatal morbidity and mortality as labor may be induced despite the gestation, resulting to prematurity. This study found no significant association between initiation of first ANC and maternal outcomes (mode of labor onset, delivery, and post-delivery) in the two groups of mothers, early and late. However, there was a significant association of ANC timing and post-delivery complication on Chi square test at P value 0.002. PPH and eclampsia have been reported as common obstetric complications associated with late antenatal attendance. Some respondents had anemia during pregnancy and they ended up having post-partum hemorrhage, this can be attributed to late ANC booking hence minimal interventions with iron supplementation.

5.10 Perinatal Outcome

Inadequate antenatal care has been associated with perinatal morbidity and mortality. Most of the respondents had positive outcomes while a small number delivered babies who were stillbirths, premature, birth asphyxia, congenital abnormalities who ended up been admitted in NBU. An Apgar score of 7 or more at 5 minutes after birth indicates the baby is adapting well to the

environment, while a score of less than 7 indicates complications for the baby (AIHW 2018). This study found no association between first ANC initiation and perinatal outcome; APGAR score, birth weight in grams and condition of baby in 24 hours). A study done in Ethiopia on complete adherence and non-adherence of ANC concluded that neonate of mothers with incomplete adherence of ANC had a higher incidence of neonatal death (Haftu *et al.*, 2018).

For the country to achieve Sustainable Development Goals in reduction of maternal and infant mortality, the care provided in ANC ought to be adequate and timely. This can only be achieved if there is strengthened effort by all stakeholders.

5.11 Summary of the findings

Majority of respondents had knowledge on importance of ANC attendance. Less than half of respondents in this study initiated first antenatal care visit in the first trimester as recommended, while majority of the respondents initiated ANC in the second and third trimester. Most mothers attended ANC once. Perinatal outcome are comparable in early and late ANC attendance, while maternal complications were significantly associated with late ANC initiation.

5.12 Conclusion

From the study findings, the following conclusions were made; Antenatal mothers book ANC late and they do not make adequate number of visits during pregnancy.

Majority of respondents in the study had knowledge on importance of ANC attendance. However, despite the knowledge on importance of ANC attendance, most mothers initiated first ANC late after first trimester.

Knowledge gap was noted on the appropriate time to initiate first antenatal clinic visit.

Late ANC timing of ANC initiation was significantly associated with post-delivery complications.

5.13 Recommendations

To improve on timing of initiation of first ANC visit the following are therefore recommended based on the findings.

Continued health education about the importance of attending antenatal services could greatly benefit the women and help them start the process of changing their reproductive health-seeking behavior.

Community sensitization programs should be increased and be implemented through the local administration, youth and women's organizations, and extension services on ANC services.

As the government prepares to provide guidelines on the recommended World Health Organization 8 contact visits, it should be considered that the country has not achieved the Four Focused Ante Natal Care Visits. More efforts should be put in place to ensure all pregnant women attend ANC and receive adequate antenatal care to improve delivery outcome.

5.14 Suggestion for further study

Further studies should apply qualitative study design to involve respondents in discussions in order to generate detailed information which would help improve delivery of ANC services.

It would also be beneficial to carry out the study across many other counties, cultural backgrounds and demographics so as to come up with relevant measures to conclusively address late ANC initiation.

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Appendix 1: Ethics approval letter



UNIVERSITY OF NAIROBI
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Ref: KNH-ERC/A/150

24th April, 2019

Lucy Ruguru Ng'ang'a
Reg.No.H56/7068/2017
School of Nursing Sciences
College of Health Sciences
University of Nairobi

Dear Lucy

RESEARCH PROPOSAL: EVALUATION OF ANTENATAL CARE VISITS' TIMING AND DELIVERY OUTCOME AMONG WOMEN SEEKING DELIVERY SERVICES AT KIAMBU LEVEL FIVE HOSPITAL, KENYA (P137/02/2019)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 24th April 2019 – 23rd April 2020.

This approval is subject to compliance with the following requirements:

- a. Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
- b. All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN ERC before implementation.
- c. Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
- d. Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
- e. Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
- f. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
- g. Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

For more details consult the KNH- UoN ERC website <http://www.erc.uonbi.ac.ke>

Yours sincerely,



PROF. M. L. CHINDIA
SECRETARY, KNH-UoN ERC

c.c. The Principal, College of Health Sciences, UoN
The Director, CS, KNH
The Chairperson, KNH- UoN ERC
The Assistant Director, Health Information, KNH
The Director, School of Nursing Sciences, UoN
Supervisors: Dr. Abednego Ongeso, Dr. Joyce Jebet

Appendix 2: Request to carry out research at Kiambu level five hospital

Lucy Ruguru Ng'ang'a,
Reg No: H56/7068/2017,
College of Health Sciences,
School of Nursing,
University of Nairobi
Mobile No: 0733 939 905
Email address: rugurulucia@gmail.com
29th April 2019

Chief Officer of Health Services,
Kiambu County,
Attn: In-charge Research and Development
P.O Box 2344-00900,
Kiambu.

Dear Sir/Madam,


RE: REQUEST FOR APPROVAL TO CARRY OUT RESEARCH

I am a Bachelor of Science Nurse stationed at Kiambu Level 5 Hospital, currently undertaking Masters of Science in Nursing (Obstetric/Midwifery) at University of Nairobi.

I am writing to request your office for permission to conduct research on evaluation of antenatal clinic attendance timing and delivery outcomes at post-natal ward of Kiambu Level Five Hospital.

Your kind consideration to allow me to conduct research at the institution will be highly appreciated.

Yours faithfully,



Lucy Ruguru Ng'ang'a.

P/N-2004016061

Appendix 3: Kiambu County Research Clearance.

COUNTY GOVERNMENT OF KIAMBU
DEPARTMENT OF HEALTH SERVICES

All correspondence should be addressed to
HEAD HRDU - HEALTH DEPARTMENT
Email address: mdiritu@gmail.com
mkwasa@live.com
Mobile: 0721641516
0721974633



HEALTH RESEARCH AND DEVELOPMENT
UNIT
P. O. BOX 2344 - 00900
KIAMBU

Ref. No: KIAMBU/HRDU/AUTHO/2019/05/02/Ng'ang'a" LR

Date: 02 May 2019

TO WHOM IT MAY CONCERN,

RE: CLEARANCE TO CONDUCT RESEARCH IN KIAMBU COUNTY

Kindly note that we have received a request by Ms. Lucy Ruguru "Ng'Ang'A" of University Of Nairobi to carry out research in Kiambu County, the research topic being on *"Evaluation Of Antenatal Care Vists Timing And Delivery Outcome Among Women Seeking Delivery Services At Kiambu Level Five Hospital, Kenya"*.

We have duly inspected her documents and found that she has been cleared by Kenyatta National Hospital-University Of Nairobi until 23 Apr 2020. She thus does not need any further clearance with another regulatory body in order to conduct research within the county of Kiambu.

However, it is incumbent upon the facility in which the research is being carried out to ensure that they are conversant with the remit of the study and operate in line with their institutional norms on conducting research. This note also accords her the duty to provide feedback on her research to the county at the conclusion of her research.

A handwritten signature in black ink, appearing to read 'M. Ndiritu Ndirangu'.

DR. M. NDIRITU NDIRANGU
COUNTY HEALTH RESEARCH DEVELOPMENT UNIT
KIAMBU COUNTY

Appendix 4: Informed consent form

I am Lucy Ruguru Ng'ang'a. I am carrying out this thesis for award of Master Degree in University of Nairobi in Midwifery and obstetric nursing. The topic is determinant of late antenatal attendance and delivery outcome among women seeking delivery services in Kiambu level five hospital.

Your participation is on voluntary basis. You can choose to participate or not without necessarily giving reasons for your actions. You are also free to pull out of the study at any point. The information you give will be anonymous, the researcher conducting this study cannot identify you by name in any reports using information obtained from this study your confidentiality as a participant will remain secure. There are no direct individual benefits of participation but after analysis the community may benefit through implementation of the recommendations. This study will be through questionnaire and researcher administered questionnaire which will take 20 to 30 minutes.

In case you need more clarification feel free to contact me (principal investigator) on 0733939905 or rugurulucia@gmail.com. Dr. Ongeso (supervisor) on email aongeso2015@gmail.com. You can also contact University of Nairobi ethics committee telephone +254-020-2726300 extension 44355 or email uonknh_erc@uonbi.ac.ke.

If you understand and agree to take part in this study please sign in the space below.

Appendix 5: Questionnaire

SECTION A: Demographic data (Circle one appropriate response)

Q1. How old are you?

Q2. What is your marital status?

- | | |
|-------------|------------------|
| a) Married | d) Single |
| b) Divorced | e) Separated |
| c) Widowed | f) Never married |

Q3. What is your education level?

- | | |
|-----------------|---------------|
| a) No education | d) College |
| b) Secondary | e) University |
| c) Primary | |

Q4. What religion do you belong to?

- | | |
|--------------|--------------------------|
| a) Christian | c) Muslim |
| b) Hindu | d) Others (Specify)----- |

Q5.Occupation of the respondent	Q6.Occupationof the spouse/husband
House wife	Subsistence farmer
Subsistence farmer	Unemployed
Salaried employment	Salaried employment
Unemployed	Business
Business lady	Casual laborer
Others (Specify)-----	Others(Specify)-----

Q7. How far is your home in kilometers from the health facility that provides ANC services?

Section B: Obstetric history

Q8. How many times have you delivered previously?

Q9. How many pregnancies have you lost?

Q10. (a) Have you ever developed any complication after delivery?

a) Yes

(b) No

b) If yes in (a) above (specify)-----

Q11. (a)Have you had a C/S in previous deliveries?

a) Yes

b) No

(b) If yes in (a) above how many times? -----

Timing of Ante-natal

Q12.At what gestation did you find out you were pregnant in your most recent pregnancy?

Q13.Did you attend ANC in your last pregnancy?

(a)Yes

b) No -----Move to Q15

Q14. (a) At what gestation in months did you start attending ANC?

(Confirm date of first visit from the mother and child clinic booklet and convert to weeks).

During the 1 st month of pregnancy (4 weeks and below)	1
During the 2 nd month of pregnancy (5-8 weeks)	2
During the 3 rd month of pregnancy (9-12weeks)	3
During the 4 th month of pregnancy (13-16weeks)	4
During the 5 th month of pregnancy (17-20weeks)	5
After 5 th month of pregnancy (21 weeks)	6

If you started clinic after the 3rd month in Q12 above please skip to Q16

Q15.If you did not seek antenatal care during the first 3 months into your pregnancy, what was the main reason?

	Yes	No
Was not aware that I was pregnant		
Not necessary		
It is not customary to make pregnancy public too early		
Could not get time off work		
ANC services too far/no transport		
Poor quality of service care		
Family did not allow		
Was not aware of when I should start		
Shortage of health workers at the clinic		
Others (specify)		

Q16.How many ANC visits did you attend?

Q17.If your answer is No in Q11 above, why did you not attend ANC?

	Yes	No

I did not see the need for ANC		
I had no complications in the pregnancy		
The pregnancy was unintended		
No money for ANC		
Health facility too far(Approximate distance in Km) -----		
Poor attitude of health workers		
Others (specify)		

Please indicate if the following statements on antenatal care are true or false

Q18.In your own understanding at what gestation of pregnancy should a woman start ANC?

Knowledge on importance of ANC utilization

Q19.In your own understanding which service is offered during ANC by indicating which of the following statements are true or false?

Statement	True	False
Antenatal care is important as it ensures the well-being of mother and baby		
Antenatal care informs the mother on how to identify danger signs of pregnancy		
The best time to begin antenatal care is before three		

months		
Antenatal provides mothers chances for immunization		
It is not important to do follow-up visits as advised by health care workers		
Antenatal provides mothers chances for health education		

Q20.Knowledge on screening tests during ANC

Indicate if the following statements are True or False?

Statement	True	False
Following tests are done in ANC		
HIV test		
Syphilis		
Urine		
Haemoglobin level		

Q21.Indicate which of the following is a danger sign of pregnancy?

Indicate which statement is true or false?

Statement	Yes	No
Vaginal bleeding is one of the danger signs of pregnancy		

High blood pressure may result as a complication of pregnancy		
Severe abdominal pains is normal during pregnancy		
Draining of liquor from the vagina during pregnancy is normal		
Absent or reduced fetal movements is normal during pregnancy		
Others (Specify)		

Social determinants

Q22. Who provides you with primary support?

- a) Husband/Spouse
- b) Parent
- c) Friend
- d) Relative
- e) Significant others

Q23. (a) How many times did your husband accompany you to antenatal clinic?

Q24. (b) Who-else has ever accompanied you to ANC? -----

Economic determinants

Q25. What is your estimated income per month?

Where do you get food for the family? -----

Cultural determinants

Q26. (a) Does your culture dictate when to attend antenatal services?

(a) Yes

(b) No

Q27. (b) If yes in (a) above in what way? -----

Q28. What are the cultural beliefs related to ANC attendance in your community?

Q29. What taboos are in your community related to ANC attendance?

Delivery outcome

Q30. (a) Did you experience any complication during your most recent pregnancy?

a)Yes

b) No

(b) If Yes indicate which one?

a) Bleeding before labor began

b) Pre-mature rupture of membranes

c) High blood pressure

d) Pre-term labor

e) Others (Specify)-----

Q31. (a) At what age was your baby born in months?

Q32. Did you experience any complication during labor?

If yes indicate which one-----

Q33. Did you experience any complication during delivery?

If yes which one-----

Q34. Did you experience any complications after delivery?

If yes which one-----

Q35. What was the mode of delivery for your baby?

- a) Normal
- b) C/S
- c) Others(Specify)-----

Q36. What was the weight of your baby in grams?

- a) Below 1000g
- b) Between 1100-2000
- c) Between 2100-3000 g
- d) Between 3100-4000g
- e) Above 4100g

Q37. Did your baby cry immediately after birth?

- a) Yes
- b) No

Indicate the Apgar score-----

Q38. (a) Did your baby develop any complication after birth?

- a) Yes
- (b) No
- (b) If **YES** in (b) above specify-----

Appendix 6: Map of the area



Kiambu level five hospital map (Courtesy of Google)