MATERNAL FACTORS ASSOCIATED WITH PRETERM BIRTHS AT THIKA LEVEL 5, KIAMBU COUNTY, KENYA.

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Declaration

I declare that this is my original work and has not been submitted in any other institution of higher learning for academic qualification.

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Signature:……Date…….

Dedication

I dedicate this work to my adorable sons Justin, to my loving parents for their patience, continuous support and love and to my whole family for all the support.

Acknowledgement

I would love to acknowledge;

God Almighty for the grace and continuous peace throughout the learning process and to my family for encouragement.

My dedicated supervisors (Dr Tabitha Gitau and Dr Jane Karonjo) for the support and direction towards this work thank you.

Thika Level V staff and all the post-natal women who agreed to participate in this study, thank you.

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List of Acronyms and Abbreviations

ANC- Antenatal Care

APH-antepartum Haemorrhage

ART-Anti-retroviral Therapy

BMI-Body Mass Index

CS- Caesarean Section

FANC-Focussed Antenatal Care

FP- Family Planning

HPV- Human papilloma virus

IFAS-Iron Folic Acid Supplements

LBW-Low Birth Weight

MDG - Millennium Development Goals.

MOH-Ministry of Health

NBU-New-born Unit

NICU-New-born Intensive Care Unit

NSAIDS-Non steroidal anti-inflammatory drugs

PTB-Preterm Babies

SDG-Sustainable Development Goals

SVD-Spontaneous Vaginal Delivery

WHO- World Health Organisation

Definition of terms

1. Term Baby; A baby born after 37 weeks of gestation
2. Preterm Baby; Babies born alive before 37 weeks of pregnancy are completed
3. Low Birth weight; A weight at birth of less than 2500grams (5.5 pounds); It could be caused by prematurity or intrauterine growth restrictions. It contributes to a range of poor health outcomes.
4. Very Low Birth Weight; Births delivered who are below 1500grams.
5. New-born ; A child under 28 days of age
6. Neonatal intensive care unit- A department equipped and staffed to provide intensive care to dangerously ill and premature new-born babies.
7. Still birth- When a foetus dies after the mothers 28th week of pregnancy before or during birth.
8. Maternal Mortality- Deaths of women during and following pregnancy and birth.
9. Neonatal Mortality deaths that occur in the 1st 28 days of life. Early neonatal mortality refers to death before 7 days and late neonatal mortality to death on days 7-28days.
10. Neonatal mortality rate- the number of children under 28 days of age who die divided by the number of live births in that year.

Abstract

A preterm birth is defined as those that occur before 37 weeks of gestation, common symptoms of babies born prematurely include immature lungs, difficulty regulating body temperature, poor feeding and slow weight gain. Premature babies ay need intense nursery care, medication and sometimes surgery. Preterm birth is one of the leading causes of neonatal mortality it contributes to 60-80 per cent of all neonatal deaths. The causes of preterm birth are unknown in over 50% of spontaneous preterm labor, and mechanisms of preterm labor remain poorly understood .Child birth outcomes have become the focus of achieving MDG 4 that aims to reduce child mortality and reduce the less than 5 mortality rate by two thirds. The main objective of the study was to determine the factors associated with birth outcomes among post-natal mothers at Thika Level V Hospital, Kiambu County. The specific objectives aligned with the main objective included: to investigate the maternal socio demographic factors associated with preterm births at Thika Level V Hospital; to assess the health seeking behaviours associated with preterm births at Thika Level V Hospital; to establish the maternal health obstetric factors associated with preterm births at Thika Level V Hospital.This was a descriptive cross-sectional study. Quantitative approach was used in collection of data using structured interviewer administered questionnaire. Simple random sampling technique was used to sample the participants; and analysis performed using STATA. Chi square test of independence was used to determine significance of the variables; it revealed that the iron and folic acid supplementation (IFAS) in pregnancy (p=0.035) and number of antenatal visits (p=0.001) were the significant factors associated with preterm births. Bivariate logistic regression was used to determine the factors independently associated with preterm births. This confirmed the outcome of the prior findings; Antenatal visits odds ratio p=.459, OR=.1.359 (95% CI; .385, .1.537). And the odds of IFAS supplements are p=.103, OR= 1.694(95% CI: .899, .3.192). IFAS supplements and antenatal visits are significant factors associated with preterm births.

Chapter One: Introduction

Neonatal mortality, morbidity and long-term health condition is entirely dependent on the birth outcomes. Birth weight is a crucial predictor of this factor; low birth weight in return is mostly affected by premature deliveries. The new global estimates according to World Health Organisation (WHO) in 2020 show that an approximated 10.6% of all live births are preterm(Walani, 2020). According to WHO, all babies born before 37 weeks of gestation are preterm and those with weights below 2.5kgs are considered low birth weights regardless of the gestational age. While most of these babies survive in high income countries due to high medical technologies used in intensive management and cure of complications arising from preterm births, in low and middle income countries these babies are at risk.

Curbing Neonatal mortality and morbidity goes a long way; preventing preterm births begin with ensuring positive pregnancy experience among women of child bearing age. WHO therefore recommends key interventions and guidelines towards ensuring that a healthy mother and baby before pregnancy, during pregnancy and post-delivery: this includes diet, antenatal visits, contraceptive use and child health care among the consolidated package(Barreix et al., 2020).The true burden of preterm births especially in developing countries is unknown due to lack of sufficient data. In many African countries, regional estimates are used as a proxy; vital statistics and civil registrations are missing, therefore there are no reports of this data. The reported data may also be inaccurate as there is no standard measure for the pregnancy age. Most studies recommend antenatal ultrasound done on or before 24 weeks of gestation as this gives a more accurate measure of the baby and predefines the conditions of the baby early enough in pregnancy as well as the gestational age(Buyukbayrak et al., 2020; Horn et al., 2021; Robertson et al., 2017).

Maternal factors that have been associated with birth outcomes are education levels, residence, parity, number of ANC visits and gestational age at birth.(Ayebare et al., 2018; Santana et al., 2020). This results are however is not conclusive on the maternal obstetric factors and those from resource constrained setups. In a separate study done in Japan noted that the main factors associated with the condition of the baby at birth includes; pre-gestational Body Mass Index(BMI), weight gain during pregnancy, mode of delivery, use of ART, and induction of labour, and use of assisted reproductive technologies(Rahman et al., 2016).In Taiwan, a separate study showed that the strongest determinants of low birth weight was antepartum haemorrhage(APH) and hypertension(Li & Chang, 2005).These studies did not however elicit the factors that contribute to declines in foetal growth and chronological changes that occur in pregnancy. It is therefore not conclusive on the maternal factors that contribute to the birth outcomes, although the prediction trends have proved effective in curbing negative birth outcomes.

A separate pilot study in Kenya found that maternal factors and differences in maternal background are the main factors that contribute to differences in birth weight(Wagura et al., 2018a).More effort is needed to identify women at risk during pregnancy and delivery and link them to health services that can enable them to access the care and services such as breast feeding; kangaroo mother care, skin to skin contact, antibiotics and antenatal corticosteroids. In Kenya, neonatal mortality is not represented in the millennium development goals (MDGs), but the MDGs goal 4 targeted a reduction in the under five deaths between 2005 and 2015(Lund et al., 2010).Therefore, achievement of MDG4 is entirely reliant on the reduction of the neonatal deaths, and since the main cause is prematurity, the success is dependent on the evidence based interventions towards improving survival of pre-term babies.

1.2 Problem Statement

Preterm birth is one of the leading causes of neonatal mortality(Harrison & Goldenberg, 2016; Torchin & Ancel, 2016); the contribution of neonatal mortality to child mortality nationally cannot be ignored. It is the most direct cause of neonatal mortality, which contributes to 60-80 per cent of all neonatal deaths(Glass et al., 2015). Neonatal deaths are mostly affiliated to infections at 35 per cent, preterm births at 28percent, and birth asphyxia at 23 per cent(Dwomoh, 2021). In Africa however, infections leads by 39 per cent, prematurity by 25 per cent and asphyxia by 24 per cent(Olack et al., 2021). Similarly in Kenya, infections at 25 per cent, asphyxia at 29 per cent and prematurity at 34 per cent are the leading causes of neonatal deaths(Kaguthi et al., 2018). According to WHO, 2010, estimated numbers of more than 1 in 10 neonates die annually due to pre-term births and the survivors develop fatal disabilities like hearing, visual impairments and learning disabilities throughout their lifetime. Neonatal mortality is not represented in the millennium development goals (MDGs), however, the MDGs goal 4 targets a two-thirds reduction in the under five deaths between 2005 and 2015.

Globally preterm birth is the leading cause of deaths among children under five years of age; therefore, achievement of MDG4 is entirely reliant on the reduction of the neonatal deaths, and since the main cause is prematurity, the success is dependent on the evidence based interventions towards reduction of preterm births. In a study done in Kenya in 2015, two main factors associated with pre term births are quality of antenatal care and maternal factors (Sanders et al., 2013).The prevalence of pre-term births and low birth weights in Central region of Kenya including Kiambu County is estimated at 5.5% according to 2008-09 KDHS. There has been a national decline in neonatal mortality from 2003 to 2009; Central region of Kenya however, showed an incline in neonatal mortality by approximately 15% as 27-31 per 1000 live births The increment cause remained unknown. A report on performance on annual operation plan analysis showed that Kiambu County and Nyandarua had the highest proportions.

1.3 Justification

The outcome of pregnancy is determined by the health of the baby and the mother postnatally. Provision of quality maternal and infant health in pregnancy during delivery and post-delivery has ensured preventable maternal and new-born deaths. Child birth outcomes have become the focus of achieving MDG 4 that aims to reduce child mortality and reduce the less than 5 mortality rate by two thirds. Most neonatal mortalities and complications are caused by preterm births and complications arising from labour and pregnancy at 24%.Causes of preterm birth are unknown in over 50% of spontaneous preterm labor, while mechanisms of preterm labor remain poorly understood(Kaguthi et al., 2018; Olack et al., 2021; Wu et al., 2016).Generally, previous authors have mainly concentrated on the prevalence of preterm births and the significance of neonatal mortality but not the causes of the preterm births such as maternal related factors.

Although there are no studies that have been done to define the prevalence of preterm births in Kiambu County, there is need for cost effective, sustainable and simple interventions to reduce the prevalence of preterm births especially those due to maternal factors. These interventions include providing solutions to public health problems that could be more acceptable to the public and those that are more likely to be implemented as to prevent pre-term births. Nevertheless, identification of the problem overrules.

This study describes the maternal socio demographic factors, health seeking behaviours and maternal health factors of postnatal women at Thika level 5 Hospital in Kiambu County, Kenya.

1.4 General objective.

To determine the maternal factors associated with preterm births among post-natal mothers at Thika Level V Hospital, Kiambu County.

1.4.1 Specific Objectives

1. To investigate the maternal socio demographic factors associated with preterm births at Thika Level V Hospital.
2. To assess the health seeking behaviours associated with preterm births at Thika Level V Hospital.
3. To establish the maternal health obstetric factors associated with preterm births at Thika Level V Hospital.

1.5 Research Questions

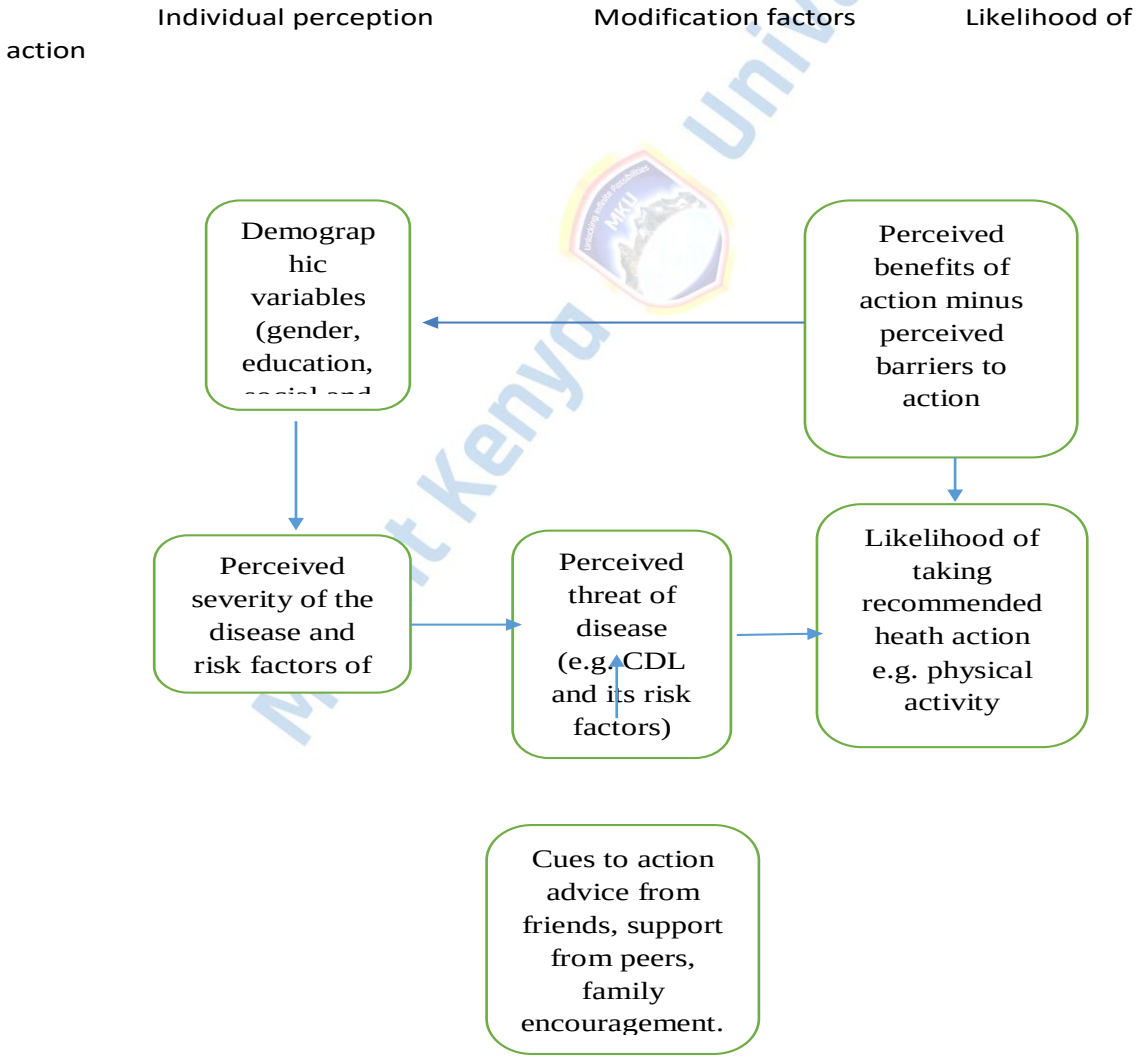
1. Which socio demographic factors are associated with preterm births at Thika level V Hospital?
2. What is the health seeking behaviours associated with preterm births at Thika level V hospital?

3. What are the maternal health obstetric factors associated with preterm births at Thika Level V Hospital?

1.6 Theoretical Framework

Figure 1.1

The figure below shows a diagrammatic presentation of theoretical framework of the health belief model(Mekonnen et al., 2021)

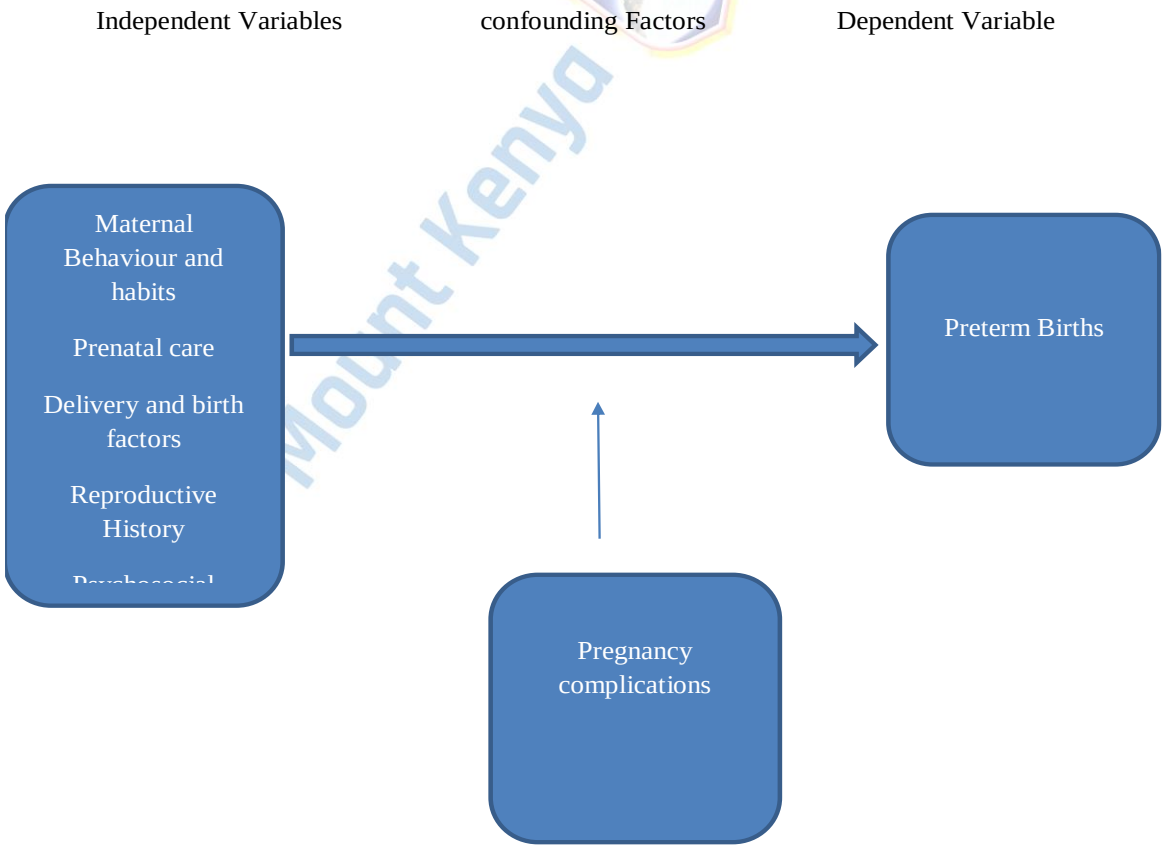


The health belief model focuses on the attitudes and beliefs of individuals. This model assumes that a negative undesired health condition can be successfully avoided through a positive expectation. For example, woman beliefs that going for antenatal clinics will ensure safe delivery for herself and her baby.

The belief model is also based on the basic understanding that an individual can successfully consider taking a recommended health action for their own good, for example pregnant women will avoid smoking in pregnancy because her nurse advised her against it for its hazardous effects in pregnancy.

Conceptual Framework

This was formed based on the literature review; the cause and effect relationship are described graphically as independent and dependent variables respectively. The confounder or moderator (pregnancy complications) alters the effects the independent variables have on preterm births but it can also have an effect on the dependent variable. Additionally pregnancy complications could increase the effect of the independent variables on the preterm birth. It is however not affected by the independent variable.



Chapter Two: Literature Review

This chapter entails previous literature on how socio demographic factors, obstetric characteristics and health seeking behaviors factors affect preterm births

2.1 Socio Demographic Factors

Globally, maternal socio-demographic factors relation with the birth outcome is unknown; however, formal education and level of education has often been associated with positive birth outcomes. This is linked to the idea that education enlightens, and promotes healthier clinical practices and provides adequate information to avoid poor habits and enhance positive behavior and practices in pregnancy. A recent study reveals that lack of formal education is 4 times most likely to be a risk factor; this study also shown that the education levels of the spouse significantly affects the occurrences of preterm births and low birth weight(Mboya et al., 2021). The education levels of the partners is likely to influence the judgments made in pregnancy, spacing of pregnancies, importance of attending the antenatal clinics , importance of taking mineral supplements in pregnancy and the danger signs in pregnancy. Even though the partner might not know the details of these measures, the literacy levels will enhance unde4rstanding and influence decisions made; this could avert most risky behaviors that can predispose the babies to ill health. In Africa and low and middle income countries (LMIC), the formal education levels are low and even worse; the people still rely on native doctors and traditional birth attendants and healers for advice when it comes to pregnancy and child birth. Well, the traditional ways of pregnancy and child birth is not to be shunned away, but the modern woman has evolved and the ways of living have evolved as well, therefore some practices may not be healthy or acceptable and they might put both the mother and the baby at risk. Recent studies have illustrated that babies who have obstructed labor, prolonged labor have a better prognosis when the mothers deliver through caesarean sections(Barros et al., 2018; Williams et al., 2021), however the traditional methods would employ different maneuvers to counter the indication and in turn loose either the baby or the mother in the process. This among others is the many habits that have been practiced before that can be erased by formal education. In Kenya, the literacy levels are upto 82% among women above 15 years of age; and about 76% of girls complete their primary education(Sitati et al., 2020). With as low as primary level of education, the literacy levels are heightened and the perception and understanding of most simple advice and instruction can be understood and incorporated. These women can therefore perceive measures to avoid risky behaviors that can lead to preterm births, low birth weights, still births, and other negative birth outcomes. Marital status has been cited as a risk factor for preterm births with most studies citing unmarried women having more preterm births as compared to married women. In European and high income countries (HIC) unmarried women i.e. cohabiting and single married have a

significantly elevated risk of preterm births. These parameters were associated with marital practices, psychological and psychosocial behaviors in pregnancy. Unmarried women are more likely to lack a support system that will ensure healthy habits in pregnancy therefore they are more likely to engage in unhealthy practices such as smoking, alcohol and drug abuse, more likely to miss antenatal checkups and less likely to adhere to supplements intake in pregnancy. Whilst married women will have a support system that will ensure they adhere to most healthy practices during pregnancy thus ensuring a healthy pregnancy. In African and low and middle income countries, the rates of unmarried women including teenage pregnancies are alarming, and yet these are risk factors for preterm births. The prevalence of adolescent teenage pregnancy in Africa is 18.8% while in Kenya, 1 in 5 teenage girls is either pregnant or has given birth(Kassa et al., 2018). These teenage pregnancies are a risk factor for preterm births and low birth weight as well as child mortality. According to a recent study, teenage mothers are at increased risk of preterm births compared to adult mothers and this risk INS increased further in second time teen pregnancies(R & E, 2012).

Some conditions and diseases have also been associated with preterm deliveries. Those women who were HIV positive had more preterm births and low birth weights compared to those who were HIV negative, it concurs with a separate study done in North West Ethiopia which showed that women who were HIV positive were three times most likely to have preterm and low birth weights.

During pregnancy, diseases and complications such as preeclampsia, eclampsia, bleeding, placenta previa, premature rupture of membranes, anemia, malaria and TB were most likely associated with preterm babies and low birth weights ((Sanders et al., 2013). In addition, mothers who've lost weight during pregnancies due to illnesses and those who had not increased their dietary intakes in pregnancy got a much higher chance of having low birth weight and Preterm births(Agarwal et al., 2011).

Mothers leaving in urban areas have a higher likelihood of having preterm births compared to rural based mothers this could be linked to extravagant lifestyle such as smoking of tobacco and high alcohol intake. According to a different study done in Utah Paresh, India, Muslim mothers, those who did severe physical work in pregnancy, those with tobacco chewing habits and hemoglobin levels less than 10mg/dl before pregnancy were all predisposed to premature babies and low birth weight babies(Adibi Jennifer J et al., 2003).

2.2 Maternal Obstetric Factors

Socioeconomic and the general health of the mother and other maternal factors could have a direct influence on the newborn health. Advanced childbearing age of a mother is a predisposing factor for negative pregnancy outcomes like preterm births and very low birth weights. Preterm birth rates have reduced from 2007 to 2014 due to fewer teens and young women giving birth globally(Azevedo et al.,

2015). However this trend has reversed since then and there has then been a rise for three years in a row and 1 in 10 babies are born prematurely in the USA. This is however not influenced by racial or ethnic influences declares a study which shows that non-Hispanic black women have higher chances of Preterm births than non-Hispanic white women (Reddy et al., 2009).Obstetric history of PTB (Preterm births) and cervical length measurement are the most common and accurate predictors of PTB. There has been a rise in pregnancies affected by PTB at 7.4 % with 68% of the PTB occurring spontaneously. Despite improvements in neonatal health care, PTB is the largest single cause of death and long term disability globally..

Concurrently the earlier the poor birth outcomes occur the more severe the outcomes. Preterm born late at 35-36 weeks of gestation will have a considerably higher morbidity and mortality rates in comparison to term babies. The main triggers being genetic and environmental factors. In Nigeria, infant mortality rates are very high and were ranked 74 worldwide in 2013; these rates are primarily due to PTB, preeclampsia and eclampsia, HIV and malnutrition. Currently Nigeria got the highest number of newborn deaths in Africa and the 2nd after India worldwide(English et al., 2009).

In a study done in Brazil, poor birth outcomes occurred more frequently in adolescent women, those with low education levels and those with history of prematurity(Almeida et al., 2020). The study further illustrates that maternal ages of 35 and above and those with private health care providers were associated with provider initiated preterm births. This can relate to characteristics of higher levels of formal employment and higher levels of education having background information on health issues and implementing them.

Advanced child bearing age is a risk factor to poor birth outcomes(Gasim, 2012).This is partly explained by likelihood of onset of conditions like diabetes, hypertension and aging maternal reproductive tissues resulting into reduced fetal intake of necessary nutrients and oxygen therefore resulting into intrauterine growth retardation.

Older women are therefore predisposed to having low birth weight babies, emergency Cesarean sections, and maternal and/or fetal distress. This could be as a result of lifestyle complications such as onset of hypertension and diabetes that could pose as a risk to both the mother and baby.

Among Cypriot women, manual laborers and those with long working shifts were more predisposed to having PTB, this concurs with previous studies which revealed a positive influence of physical exertion due to long extended working shifts with poor pregnancy outcomes(Wadhwa et al., 2011).This is attributes to physical muscles strain and catecholamine release which leads to constriction of arterioles causing reduced flow of blood into the fetal placenta ,maternal and fetal hormonal imbalances and nutritional deficits to the baby. It is therefore a common knowledge that hard and long working shifts is a risk factor to PTB and related conditions such as LBW.

Stress in pregnancy is statistically significant in the occurrence of PTB and LBW despite the differences in approaches to measuring stress. Regarding the heterogeneity of the studies done previously, there's evidence that links stress in pregnancy to PTB and LBW. In a separate Swedish study,50% of women who reported having had stress in pregnancy experienced premature labor and others had low birth weight babies with a significant small head circumference(Neufeld-Cohen et al., 2016).Generally gestational diabetes mellitus is associated with premature labor and low gestational age, however good and regulated glycemic controls through glucose monitoring , a well-balanced diet and regular insulin injection treatment results into better pregnancy outcomes and reduced incidences of gestational diabetes as reported by the study done in Cyprus.

Cervical length is an accurate determinant in the prediction of PTB (preterm births) in mostly singleton pregnancies. PTB risk is defined by 25mm threshold cervical length in 24 weeks gestation. In addition, knowledge of cervical length contributes to risk reduction for preterm births before 37 weeks of gestation for the effect of reduction of anxiety to the mother. A similar study shows that mid trimester sonogram universal cervical screening in women without Preterm births history was negatively associated PTB. The cervical length has four patterns: stable, early rapid shortening, late shortening, and early shortening, a plateau. Each stage of the pattern has a different risk of PTB but the highest risk being early rapid shortening(Wright et al., 2013).However, measurement of cervical length especially in mid trimester asymptomatic twin pregnancies is not a predictor of PTB less than 32 weeks gestation.

Preterm births are closely influenced by vaginal bleeding during the first two trimesters of the index pregnancies(Parrott et al., 2009).This is in agreement with a study done in Saudi Arabia that found that vaginal bleeding is a risk factor for preterm births and low birth weights regardless of the stage in pregnancy: and could be an early predictor of premature rupture of membranes. Chronic abruption placenta could be as a result of vaginal bleeding, uterine irritability and pressure. Previous history of Preterm births is one of the most important predictors of preterm births. More than one history of preterm births increases the risk of another preterm birth occurrence substantially. This should prompt further medical investigations and it could predict incompetent cervix or abortions. Abortions however is not a determinant factor of prterm births(Magro Malosso et al., 2018; Rk et al., 2021).

2.2 Health Seeking Behavior

Prenatal care has been recognized as essential in the reduction of adverse pregnancy outcomes. Previous studies have reported that good prenatal care is associated with fetal weight gain with gestational age. Lack of antenatal care could simply mean that no medical intervention was sought even when needed. Like Abram et al, a similar study in Saudi Arabia has shown increased risk of

Preterm births for intervals of conception and births of less than 12months, this study determined association in births to conception intervals as pregnancy spacing and outcome of pregnancy for preterm that could also be influenced by family planning use(Morón-Duarte et al., 2019). Older women are less likely to seek prenatal care during pregnancies compared to their counterparts the younger women who have no experience and need guidance on the pregnancy expectation. Older women are most likely to be multiparous and therefore have had good or bad experiences would not prefer to have regular prenatal checkups. Previous studies have shown that indicators of the quality of antenatal care such as frequency of ANC visits, and anti-tetanus injections were significantly associated with birth outcomes. Poor birth outcomes especially low birth weights in the study were associated with lack of antenatal care and lack of tetanus and anti-malarial medications during pregnancies(Carter Ramirez et al., 2020).

Certain socio-cultural behaviors such as consanguineous marriages which are believed to ensure family stability has shown to have significant decrease in birth weights and higher chances of PTB. Consanguineous marriages (first cousins and nieces and uncles marriages) have shown to have effect on fetal growth though not on gestational length and age. Autosomal recessive genes and intrauterine growth retardation is thought to be affecting preterm births this is considered the most convincing theory(Pol et al., 2012).

Recent studies have also shown maternal BMI (body mass index) and preterm pregnancy outcome are interconnected. Maternal BMI less than 23 is a significant risk factor for Preterm births owing to their low body weight suggestive of malnutrition or/and under nutrition. Of the total premature births documented in a study, males have a higher chance of being born premature and have lower chances of survival compared to females(Muchemi et al., 2015). Frequent medical evaluation and checkup could eliminate some infections which could pose a risk to the mother and fetus in utero. A study in Egypt shows a positive correlation between Human Papilloma virus especially high risk genotypes such as HPV16 AND 18) and spontaneous Preterm labor. The study illustrates that the HPV viral load has a positive correlation with MMP2 gene expression rates and both significantly affect the fetal gestational age. In addition urogenital infections also have an increased risk to Preterm births(Leal et al., 2016).

Chapter 3: Research Methodology/Materials and Methods

3.0 Introduction

This chapter describes the study design, sampling technique, targeted population, sample size, data collection, storage and analysis methods and ethical considerations. It gives details on the selection criteria, tools used during data collection, validity and reliability of these tools and an accurate and generalizable interpretation of these data findings.

3.1 Research design

The study adopted a cross sectional descriptive study design in which data was collected at one point in time. It involved a quantitative approach in collection of data for the advantage of availability of large number of participants. All the data needed was collected from the participants.

3.1 Study Area

Thika town in Kiambu County has a population size of 279,429 with an elevation of approximately 1,631 meters. Generally, the main cause of mortality in Thika region are diseases of the respiratory system(Iliya et al., 2020)**.** The reproductive health wing of the Thika Level V hospital has a bed capacity of 400 beds and 275 bed capacity in the maternity unit. The NBU is meant to cater for 40 babies at a time but can hold up to 66 babies due to congestion. Averages of 16 premature babies are taken care of at the Newborn Intensive Care Unit (NICU) which has 8 incubators holding 2 babies each. The NBU receives neonates who present with sicknesses, low birth weight, pre term and underweight babies it receives neonates as young as 24 weeks with an average weight of one kilogram.

Babies often have complications which can only be best managed at the New-born Intensive Care. The Neonatal intensive care which is readily available in Kiambu County largest hospital, Thika level 5 has a very low capacity of only 40 babies. The local sub county and lower level hospitals are poorly equipped to provide essential care to new-borns and most especially pre-terms who develop conditions therefore all the referrals from these hospitals are channelled to this hospital.

3.2 Target population

The study consisted of postnatal mothers with babies admitted at the Thika level V hospital, data was collected within August in duration of one month. The target population consisted of mothers

who have given birth within the hospital to both well and unwell babies (babies admitted in the NBU and NICU for various reasons). It also involved mothers whose babies have been referred to the facility within 28 days post-delivery for which they will be admitted within the NBU for management.

3.2.1 Inclusion criteria

Eligibility of the study was based on the inclusion criteria that qualify a post-partum mother who has been admitted to the hospital post-natal ward with or without a baby. Screening was not done for any other conditions.

3.2.3Exclusion Criteria

Mothers admitted due to other conditions. For example mothers who were admitted due to lack of finances to clear medical bills. Mothers who had caesarean sections were not interviewed until 6 hours following the procedure.

3.3 Sampling technique

Kiambu County was purposively selected for this study mainly because of the high prevalence of preterm births at 13.1% compared to the national prevalence of 11.1%. Thika level V hospital was purposively selected because of its central locality relatively on the high way connecting four counties (Nairobi, Muranga, Kirinyaga, Machakos and Embu); it therefore receives patients not only from Thika town but also from neighboring counties thus enabling generalizability of data. However, there is no reliable literature indicating the general turnover of patients at the facility. Purposive sampling method was used to select the participants; the technique was employed where the participants were enrolled as they were admitted into the post-natal unit. Each individual was chosen randomly and by chance.

3.3.1 Sample size determination

The study had a sample size made of 384 participants. The sample size was determined using the

$$SS = \frac{Z^2 * (p) * (1-p)}{c^2}$$

formulae:

When ss is the sample size, then z value (1.96 for 95% confidence level) and p is the estimated proportion of respondents. Then c is the precision (permitted error of margin).P value of 0.5 will be used to estimate the sample size so as to give the maximum variability for the study.

z=1.96.

p= 0.5.

c= 5 %(0.05 for 95% confidence level) the degree of accuracy expressed as a proportion.

In order to estimate the proportion of babies who have a negative outcome with 95% confidence interval with a level of precision of (+-5%) assuming the proportion of negative outcomes is 50%. The 50% prevalence was used because there is no reliable study that has been done on prevalence of negative birth outcomes in Kenya and the region.

3.4 Data collection instruments

The researcher used an elaborate semi structured interviewer administered questionnaire to collect data. The questionnaire form was divided into 3 sections according to the study objectives:

Part 1: Socio demographic factors e.g. Are you married?

Part 2: Health seeking behaviours e.g. How many antenatal clinics did you attend?

Part 3: Maternal Obstetric factors e.g. Have you ever had a preterm birth?

3.4.2 Administration of data collection instrument

The researcher collected the data with no help of the research assistants this was mainly to ascertain the information needed. Participants were recruited daily for thirty days as they were admitted in to the post-natal ward. They were interviewed in a separate room far away from traffic and other procedures. Since most of the participants could read and write, they were given the consent form to read, understand, the researcher talked them through the consent form to make sure they understand before they could sign. Those who couldn't read or chose not to read for themselves were read for loudly and explained to what the exercise was about and why they were being requested to participate before they were requested to sign the consent form. This data was then entered into the data cleaning, analysis and presentation tool.

3.4.3 Reliability and Validity

The pilot study consisted of 40 post-natal mothers from Kiambu level 4 Hospital. This sample size used in the pilot study was calculated based on the 10% of the sample projected for the larger parent study. This is according to Connelly, who stated that extant literature suggests that a pilot study sample should be 10% of the sample projected for the larger parent study(Becker, 2008).Internal validity was achieved given the representativeness of the study sample, methods and instrument. Subsequently the study findings can be extrapolated to all other pregnant women to other regions of similar setting.

The data entry and coding were done by the researcher herself, the analysis procedures were however aided by an analyst in the presence of the researcher. Data was verified as it was documented to have the correct number of cases against the questionnaires, correct variables and a right coding scheme throughout the data set.

3.5 Data Analysis Procedure

Data was entered into Microsoft excel sheet, cleaned and stored in a password protected external storage device. Data was analyzed using Stata 11.0. The researcher used descriptive statistics to measure the amount of spread of variability within the mean.This was done using proportions with 95% confidence intervals. Quantitative numerical variables for normal distribution e.g. age which is symmetrical, bell shaped, centred and unimodal were presented in means.

For categorical variables such as marital status and gender were analysed using multi nominal distribution which counts the frequency of each possible variable presented in frequencies and percentages.

Chi square test of independence was used to determine significance between two nominal (categorical) variables in a data set. The frequency of each category for one nominal variable was compared across the categories of the second nominal variable e.g. antenatal factors to birth outcomes.

Bivariate logistic regression was used to determine the factors independently associated with preterm births. This was used to model two binary dependent variables; it was used to model the odds ratio describing the pairwise association between two responses in relation to several covariates e.g. age groups odds ratio to preterm births.

3.6 Ethical Consideration

3.6.1 Data confidentiality

All the patient data handling process remained confidential, no names or anything that could identify the participants were used throughout the whole process.

Participants were requested to sign the consent forms without using names or initials against the consent documents, for the participants who were younger than 18 years assent forms were offered. After which unique identifiers were applied to the signed forms.

These data were only handled by the researcher. These data were kept in secure database and the hard copy safely in a sealed box. The filled questionnaire will be kept for the period of study (one year) and then destroyed (burnt).

3.6.2 Ethics Approval from relevant bodies

The researcher got a permit letter from the National Commission for Science, Technology and Innovation (NACOSTI), an approval letter from ethics review committee Mount Kenya University (MKU), and, data collection authorization from Thika Teaching and Referral Hospital Research and Ethics Committee. The researcher presented this to the matron in charge of the maternity and postnatal wards for further approval before proceeding with data collection exercise.

The documents are scanned and attached below as Appendix IV and V.

Chapter 4: Research Findings/Results and Discussions

4.1 Background characteristics of Participants

The participants in this study were aged between 16 and 45 years. Most of the participants (49.1%) were aged between 21 and 26 years. The mean age was 25.5(SD 5.7).Most of the participants had attained secondary school education (45.3%), were married (77%), were unemployed (56.6%), and resided in urban areas(62.8%).This is presented in table 1.

Table 1: Descriptive statistics of Socio-demographic Characteristics

Variable	Number	%
Mothers Age, Mean (SD)	25.5	5.7
Level of Education of Mother		
Primary and below	100	31.3
Secondary education	145	45.5
Tertiary education	74	23.2
Marital status		
Single	70	21.9
Married	247	77.2
Divorced	3	0.9
Occupation		
Employed	39	12.2
Unemployed	181	56.6
casual laborer	100	31.3
Residence		

Rural	119	37.2
Urban	201	62.8

4.1.1. Descriptive characteristics of health seeking behavior.

Most of the participants reported to have attended the antenatal clinic 3 times or less (49%), majority had received IFAS supplements and tetanus toxoid vaccine during the antenatal visits at 81% and 74% respectively, and the majority reported to have attended private or faith based health facilities for antenatal care (85%).

Table 2: Descriptive characteristics of health seeking behaviour.

Variable	**Number**	**%**
Number of antenatal visits		
Less than 4	157	49.2
4 or 5	117	36.7
6 plus	45	14.1
IFAS Supplements		
Yes	258	80.9
No	61	19.1
Tetanus Toxoid Vaccine		
Yes	235	73.7
No	84	26.3
Hospital attended –ANC		
No Hospital	6	1.9

Public hospital	41	12.9
Private/Faith based	272	85.3

4.3 Descriptive statistics of obstetric factors.

The inter pregnancy interval for majority of the participants was 2-5 years at 60%, most of which admitted to have used family planning (67%).The most popular mode of delivery was spontaneous vaginal delivery (70%). Majority of the respondents confirmed that in pregnancy they had no malaria (95%), no diseases (83%), and no allergies (98%), used no medication (95%) and had no alcohol and substance abuse (96%). This is presented in the table below;

Table 3.Descriptive statistics of obstetric factors.

Variable	**Number**	**%**
Spacing (inter pregnancy interval)		
1	17	11.8
2-5`	86	59.7
6-9`	33	22.9
10 plus	8	5.6
Mode of delivery		
Vaginal	222	69.6
CS	97	30.4
Family Planning Use		
Yes	215	67.4
No	100	31.4

Not Disclosed	4	1.3
Malaria in Pregnancy		
Yes	17	5.3
No	302	94.7
Disease in pregnancy		
Yes	53	16.6
No	266	83.4
Allergies		
Yes	8	2.5
No	311	97.5
Medication Use		
Yes	17	5.3
No	302	94.7
Drug and Substance use		
Yes	14	4.4
No	304	95.6

4.2 Sociodemographic Characteristics

4.2.1 Bivariate analysis of sociodemographic characteristics and birth outcome

Chi square was used to test the association between sociodemographic factors and birth outcome. Descriptively, arithmetic mean was used to present the mean age of the participants. The mean age of women with preterm births were25.5 (SD 58.7) vs. those with term births 25.6 (SD 5.6). There was no statistical significance (p value=0.889).

Most of the participants had attained secondary school level of education (46%).Those who had attained secondary school level of education had more preterm(40%) and more term babies(60%) compared to the number of preterm and term babies of those who had attained primary level of education(47%;53%)or those who had tertiary education (41%;60%). However, there was no statistical significance in level of education to birth outcome (p value= 0.519).

Majority of the participants were married (77%). Married women had more term babies (59%) compared to single and divorced women. More divorced women had preterm births (68%) compared to married and single women at 42% and 44% respectively. The marital status was however not statistically significant to birth outcome (p value=0.652).

Most of the participants were unemployed (58%), 60% of these women had term babies. While 40% of employed participants had preterm births, 47% of casual labourers had preterm births. This however was not statistically significant to birth outcome (p value= 0.518).

With most of the participants staying in urban areas (63%), most of the participants in the urban areas (45%) had preterm births. Majority of the participants in rural areas (62%) had term babies. Respondents' residence was not statistically significant to birth outcome with p value of 0.246.

Table 4: Chi square analysis of socio-demographic characteristics

Characteristics	Total	Term vs. Pre-Term		p-value
		Preterm	Term	
	N (%)	n (%)	n (%)	
Mothers Age, Mean (SD)	25.5(5.7)	25.5(5.9)	25.6(5.6)	0.8889

Level of Education of Mother				
Primary and below	100(31.3)	47(47)	53(53)	
Secondary education	145(45.5)	58(40)	87(60)	
Tertiary education	74(23.2)	30(40.5)	44(59.5)	0.519
Marital Status				
Single	70(21.9)	31(44.3)	39(55.7)	
Married	246(77.1)	102(41.5)	144(58.5)	
Divorced	3(0.9)	2(66.7)	1(33.3)	0.652
Occupation of Mother				
Employed	38(11.9)	15(39.5)	23(60.5)	
Unemployed	181(56.7)	73(40.3)	108(59.7)	
Casual labourer	100(31.3)	47(47)	53(53)	0.518
Residence				
Rural	118(37)	45(38.1)	73(61.9)	0.246
Urban	201(63)	90(44.8)	111(55.2)	

4.2 Health seeking behaviours

Chi square test for independence was used to analyse the antenatal factors associated with birth outcomes.

Most of the participants attended antenatal clinic (96%). Of the women who attended antenatal clinic, 51% of those who had 3 or less ANC visits had preterm births, while 71% of those who went to the clinic 4 or 5 times had term births. While 47% of those who attended the ANC clinic 6 times or more had preterm births. The number of antenatal visits was statistically significant to birth outcomes ($p = 0.001^{*}$).

Most women(85%) attended private or faith based facilities for ANC services, 57% of these had term deliveries, compared to 63% term deliveries among those who went to public facilities this number was low. Only 33% of the participants who didn't have antenatal services had preterm births. The type of hospital attended for antenatal services was not statistically significant to birth outcomes ($p = 0.645$).

About 81% of the participants received IFAS supplements in pregnancy. More than half of those who received IFAS supplements (61%) had term births. Majority of those who didn't receive the IFAS supplement (54%) had preterm births. IFAS supplementation in pregnancy was statistically significant to birth outcomes (p= 0.038).

Half of those who did not have the tetanus toxoid vaccine (50%) had preterm births, and half had term deliveries. In relation to birth outcomes this was not statistically significant (p=0.097).This is presented in table 5

Table 5: Chi square tests for health seeking behaviour characteristics and birth outcomes

Health Seeking Behaviour	Total	Term vs. Pre-Term		p-value
		Preterm	Term	
	n (%)	n (%)	n (%)	
Number of antenatal visits				0.001*
Less than 4	157(49.2)	80(51)	77(49)	
4 or 5	117(36.7)	34(29.1)	83(70.9)	
6 plus	45(14.1)	21(46.7)	24(53.3)	
IFAS Supplements				
Yes	258(80.9)	102(39.5)	156(60.5)	
No	61(19.1)	33(54.1)	28(45.9)	0.038*
Tetanus Toxoid Vaccine				
Yes	235(73.7)	93(39.6)	142(60.4)	
No	84(26.3)	42(50.0)	42(50.0)	0.097
Attendance of Public/private				

Hospitals				
No hospital	6(1.9)	2(33.3)	4(66.7)	
Public Hospital	41(12.9)	15(36.6)	26(63.4)	
Private/Faith based	272(85.3)	118(43.4)	154(56.6)	0.645

Asterisk* = significance

4.3 Obstetric factors associated with birth outcome

Chi square tests for independence was used to analyse the obstetric factors associated with birth outcome as shown in table 6.

4.3.1 Delivery Factors

Majority of the participants (70%) had spontaneous vaginal deliveries, 43% of them had preterm births. Out of the women who had caesarean section deliveries, 69% of them had term births, while 56% of those who had vaginal deliveries had term deliveries. The mode of delivery in this study was not statistically significant to birth outcome (p=0.452).

4.3.2Obstetric Factors

Most of the Para gravid women had inter-pregnancy interval of 2-5 years (60%), out of this, 61% had term births. For those who had only one year inter-pregnancy interval, 65% had term deliveries. Majority of the women with longer inter-pregnancy intervals of 6 years or more had more preterm births (51%) although this was borderline compared to the ratio to term births (49%). The inter-pregnancy interval was not statistically significant to birth outcomes (p=0.488).

Most of the participants (67%) had used a family planning method, of this, 40% had pre-term births. More than half of the women who did not use any family planning method (55%) had term deliveries while 75% of those who did not disclose whether they used a method of

family planning had preterm births. Use of Family planning was not however statistically significant (p=0.319) to birth outcomes.

62% of the participants who reported allergies in pregnancy had term deliveries.40% of those who used medication in pregnancy had preterm deliveries and 57% of those who used drug and substance abuse in pregnancy had preterm deliveries. In relation to birth outcomes, allergies (p=0.434), Malaria in pregnancy (p=0.88) and other diseases (p=0.434), use of drugs and substance abuse (p=0.245) and other medication in pregnancy (p=0.157) were all not statistically significant. This is summarized in table 6.

Table 6: Chi Square tests for Obstetric factors associated with birth outcomes.

Maternal and Obstetrics	Total	Term vs. Pre-Term		p-value
		Preterm	Term	
	n (%)	n (%)	n(%)	
Spacing(inter pregnancy interval)				
1	17(11.8)	6(35.3)	11(64.7)	
2-5`	86(59.7)	34(39.5)	52(60.5)	
6-9`	33(22.9)	17(51.5)	16(48.5)	
10 plus	8(5.6)	2(25)	6(75)	0.488
Mode of delivery				
Vaginal	222(69.6)	97(43.7)	125(56.3)	
CS	97(30.4)	38(39.2)	59(60.8)	
				0.452
Family Planning Used				
Yes	215(67.4)	87(40.5)	128(59.5)	
No	100(31.4)	45(45.0)	55(55.0)	
Not Disclosed	4(1.3)	3(75.0)	1(25.0)	0.319
Malaria in Pregnancy				
Yes	17(5.3)	10(58.8)	7(41.2)	
No	302(94.7)	125(41.4)	177(58.6)	0.88

Disease in pregnancy				
Yes	53(16.6)	25(47.2)	28(52.8)	
No	266(83.4)	110(41.4)	156(58.7)	0.434
Allergies				
Yes	8(2.5)	3(37.5)	5(62.5)	
No	311(97.5)	132(42.4)	179(57.6)	0.435
Medication Use				
Yes	17(5.3)	7(41.2)	10(58.8)	
No	302(94.7)	125(41.4)	177(58.6)	0.157
Drug and Substance use				
Yes	14(4.4)	8(57.1)	6(42.9)	
No	304(95.6)	126(41.5)	178(58.6)	0.245

4.3.3Independent determinants of preterm births

Logistic regression was used to predict associations of birth outcomes on3variables found to be statistically significant. The odd of preterm births is 2 times greater in the age group30-48p= .025, OR = 2.799 (95% CI 1.136, 6.899) as compared to ages 20-29 p= .005, OR 3.132(95% CI 1.405, 6.984) .The participants aged above 30 years old had a greater risk of having preterm births compared to those below 30.Age is an important determinant of preterm births with older people having a higher risk of having preterm births as compared to the younger age set. Age is statistically significant in this study (p=.05; .0025).

Logistic regression on antenatal visits and IFAS supplementation showed no significance to birth outcomes. Antenatal visits attendance 4 or5 times had higher odds compared to 6 antenatal visits=.459, OR=.770 (95% CI; .385, .1.537).The participants who attended ANC more than 6 times were less likely to have preterm births. The number of antenatal visits was not statistically significant to birth outcomes (p = .455; .459) for 4 or 5 visits and 6 plus antenatal visits respectively. The odds of IFAS supplements during antenatal p=.103, OR= 1.694(95% CI: .899, .3.192).IFAS supplements in pregnancy were not statistically significant to birth outcomes (p=0.103).

According to this study only age was a significant determinant of birth outcome (p value=0.025; 0.005).This is shown in Table 7 below.

Table 7: Unadjusted Bivariate Logistic Regression of Significant Factors Reporting Odds at 95% CI

Term	Odds Ratio	P>|z|	[95% Conf. Interval]	
Age Groups				
20-29 years	3.132665	**0.005***	1.40514	6.984064
30-48 years	2.799304	0.025	1.136747	6.893445
Antenatal Visits				
4 or 5	1.358661	0.455	.6075597	3.03832
6 plus	.7701511	0.459	.3859943	1.536636
IFAS Supplementation				
Yes	1.694387	0.103	.8994595	3.191857

Asterisk* = significance

Chapter 5: Summary, Conclusions and Recommendations

This study hypothesised three factors including socio-demographic, obstetric factors and antenatal factors as determinants of birth outcome. This model however could not account for the specific causative factors of poor birth outcomes. This agrees with the common knowledge that the causative factors for preterm deliveries is unknown(Harlow et al., 1996).

Apart from maternal age, other sociodemographic factors (education levels, occupation, and residence) were not associated with preterm births. This finding differs with a similar study done in Malawi that showed no association between age and preterm births(Broek et al., 2014), but compared to a study on preterm births among Kenyan women done in Kenyatta National Hospital ,age among other sociodemographic factors was significantly associated

with preterm births. However, according to an American based study, sociodemographic factors independently have no association with preterm births but they are closely intertwined with behavioural risk factors, psychological and psychosocial processes(Behrman et al., 2007). Other sociodemographic factors such education level, partners and mothers occupation, marital status or residences are not significant factors of birth outcome in this study.

On obstetric factors, mode of delivery was insignificant to birth outcome, this finding is similar to other studies done in Nigeria and Kenya(Wagura et al., 2018b),(Mokuolu et al., 2010). This suggests that operative deliveries or vaginal assisted deliveries do not have a huge impact on the outcome of the pregnancy. This could also predict high efficacy of the procedures hence low infection and complications resulting to poor birth outcomes. Inter pregnancy interval which is often effected by family planning use is not associated with birth outcome. This finding was similar to J Etui's findings that states that the inter-pregnancy interval does not seem to influence birth outcome since women recover from the effect of previous pregnancy fast and may also be influenced by the cultural practice of intensive nutritional support after delivery(*(PDF) Factors Influencing the Incidence of Pre-Term Birth in Calabar, Nigeria*, n.d.). Family planning use in this study was not associated with birth outcomes, this contradicts a recent quasi study that revealed that the women in the intervention arm who were exposed to an integrated package of post-partum family planning had significantly lower rates of short birth intervals and preterm births(Baqui et al., n.d.). Malaria and UTI has often been associated with preterm births in other studies, in fact, screening and management of UTI and malaria in pregnancy has been recommended as a component of WHO essentials for prenatal care. In this study though, these factors were not associated with birth outcomes, it could be because the cases were effectively managed and therefore had no impact on pregnancy. Although a study done in Malawi strongly agree that maternal anaemia in pregnancy is a risk factor for preterm deliveries, malaria is a predisposing factor to anaemia(Broek et al., 2014).Obstetric complications resulting from malaria or other diseases, in whatever gestational stage are generally accepted to be a risk factor for preterm births.

On health seeking behaviour in pregnancy, the number of antenatal visits is significantly associated with birth outcome. This finding agrees with a study done in Zimbabwe that found that lack of prenatal care was associated with preterm births (Feresu et al., 2004).In a similar study done in Kenyatta National Hospital suggests that women at risk (those with

hypertension, eclampsia, previous preterm births, and obstetric complications) should have increased antenatal visits than the usual 4 FANC (Focused Antenatal Care) recommended by the WHO through the Ministry of Health. Focused antenatal Care is an initiative of WHO to optimize the minimum antenatal visits with an aim to achieve GDG. Although this is only applicable to the healthy and normal woman, variation of emotional and psychosocial needs of vulnerable groups (sex workers, displaced groups, ethnic and racial minorities, mentally disable, those living with HIV, adolescents, those with disabilities, and underlying illnesses) can be greater, therefore this number is adaptable to context. This finding is similar to Feresu et al report in Zimbabwe(Feresu et al., 2004) but different to a Kenyan study that found that mothers who attending ANC and number of times they attended ANC was not significantly associated with preterm births(Wagura et al., 2018b).

IFAS (Iron and Folic Supplements) has a significant association to birth outcome. It is estimated that 40% of pregnant women worldwide are anaemic; half of this burden is due to iron deficiency. This intervention was introduced into the antenatal visit cascade to counter anaemia and iron deficiency in pregnancy- a life threatening complication to both mother and baby. A study conducted in Pakistan reveals an adjusted risk reduction in smaller than average birth size infants with maternal antenatal IFAS supplementation(Nisar & Dibley, 2016). This further agrees with the WHO recommendations on IFAS supplements to all pregnant women to start as early as possible during pregnancy(Fite et al., 2021).

Tetanus injection in pregnancy is not significantly associated with birth outcomes. Tetanus toxoid vaccination according to WHO is recommended for all pregnant women depending on previous tetanus vaccination exposure to prevent neonatal mortality from tetanus(Sornlom et al., 2021).This finding differs with studies that have been done on the efficacy of the vaccine, with the available studies noting that the vaccine received 27-36 weeks gestation is more protective (85%)compared to earlier in pregnancy or post-delivery injections[16].

Conclusions

- Objective 1: Apart from maternal age, other socio-demographic factors such as education levels, occupation, and residence, partner's educational level were not associated with preterm births.

- Objective 2: Obstetric factors were not significantly associated with preterm births.
- Objective 3: Health seeking behaviors: the number of antenatal visits, and IFAS supplementation was significantly associated with preterm births.

Only IFAS supplementation, number of antenatal visits and maternal age are significant determinant of preterm births.

Limitations of the study

- There was no laboratory confirmations on the cases of illnesses of the mother and the baby, these data were solely based on the mothers' self-report and clinical records. This might have resulted to over or under reporting.
- Those mothers who had still births or miscarriages were not interviewed, and therefore the causative factors were not addressed.

Recommendations

Preterm birth is an obstetric complication that is significant towards achievement of the 3rd sustainable development goals (SDG). Therefore;

- In this study maternal age was significantly associated with preterm births. Therefore, sexually active young women of reproductive age are more predisposed to preterm births, family planning and use of modern contraceptives use should be encouraged. Other studies have depicted lack of knowledge and awareness among youths in regards to access to family planning(Ochako et al., 2015); programs and interventional ventures should therefore strive towards this course.
- Antenatal health seeking behaviours were significantly associated with preterm births i.e. the number of antenatal visits and IFAS supplementation. The 4 FANC (Focused Antenatal Care) recommended by the WHO through the Ministry of Health. Focused antenatal Care is an initiative of WHO to optimize the minimum antenatal visits with an aim to achieve GDG. Through these visits, integration of services is emphasized with all the essentials offered through the visits i.e. Vitamin K, IFAS, health education, tetanus toxoid injections, malaria IPT prophylaxis. More education and awareness on the benefits of ANC should be prioritised.

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APPENDIX 1: QUESTIONNAIRE

CONSENT FORM

Hello, my name is Melanie, a master's student from Mount Kenya University. I am doing a study on maternal factors associated with birth outcomes among neonates at Thika Level 5 hospital. This study aims to find out the maternal factors that affect preterm births, low birth weights, sick babies and term babies.

This study will involve you as the mother of the baby who has been admitted to this facility; you will be asked some questions and will be expected to answer them correctly. The study does not involve any invasive procedure or any other medical related procedures to either you as the mother or the baby. During this process there is no special attention that will be accorded to you or your baby or any form of incentive thereof. The decision to take part in the study is entirely voluntary and you can seek clarification at any point of the process, in extension, you are free to withdraw at any level of the process when you feel uncomfortable.

The data collected will only be used for educational purposes and will only be handled with confidentiality. The data derived from the questionnaires will be handled professionally and with autonomy in regards to participants rights. For any clarification, feel free to contact the MKU (IREC) chairman at: MKU IREC P.O Box 342-01000, Thika

Thank you for choosing to take part in the study.

Participant signature: Date:

Researcher signature: Date:

.

Questionnaire

SOCIO DEMOGRAPHIC DATA

1. How old are you?

   State: …….yrs.

2. What is your education level?

   1. Primary
   2. Secondary
   3. College
   4. University
   5. No education

3. What is your marital status?

   1. Single
   2. Married
   3. Divorced
   4. Deceased/widow

4. How many children do you have?

   Specify……

5. What's your occupation?

   1. Employed:
   2. Unemployed
   3. Casual labourer

6. For how long do you work?

   Specify:

7. If married or in a relationship, what is your partners occupation?

   1. Government
   2. Unemployed
   3. Casual labourer
   4. Any other……..

8. How much is your monthly income?

   1. Below 10,000
   2. 10000-30000
   3. 30000-50000
   4. 50000-100000

5. Above 100000

9. Where do you live?

1. Rural
2. Urban
3. Peri-urban

10. Do you have a universal health insurance cover (NHIF)?

1. Yes
2. No

11. Do you have any other private health insurance cover?

1. Yes
2. No

12. What is the sex of the baby?

1. Male
2. Female

13. What was the Apgar score of the baby?

State…….

14. Which mode of feeding does the baby have?

State……

MATERNAL FACTORS

1. What was your age in your first pregnancy?

State:

2. How many pregnancies have you ever had (plus abortions and miscarriages)?

State:…….

3. Have you ever had any abortions (specify if spontaneous or induced)?

1. Yes
2. No

4. How many abortions have you ever had?

State……

4. Have you ever had any miscarriages?

1. Yes
2. No

6. How many miscarriages have you had?

State:

7. Have you ever had any still births?

1. Yes
2. No

8. If yes, how many?

State:

9. Have you ever lost a baby after birth?

1. Yes
2. No

10. If yes:

    1. How old?

       State.....

    2. What was the cause

       State……..

11. How long is your preceding birth interval?

Specify:……..months

12. What is the baby birth weight of your previous pregnancy?

Specify:……kgs

13. Have you ever had a preterm baby before?

1. Yes
2. No

14. If yes:

    1. At what gestational age (in weeks) did you deliver?
        1. Below 24 wks.
        2. Below 28wks
        3. 28-32wks
        4. 32- 37weeks
    2. What was the cause of preterm delivery?

       State:……

15. Have you ever had a low birth weight baby before?

1. Yes
2. No

16.If yes:

    1. What was the weight?

       State:……kgs

    2. At what gestation was the baby born?

State:……..wks.

17. Do you have any communicable or non-communicable diseases?
    1. Yes
    2. No

18. If yes, which one/s?.....

19. What was your haemoglobin level during pregnancy?

State……

20. What was your BMI during pregnancy at the last antenatal visit?
    1. Below 18.5
    2. 18.5-24.9
    3. 25.0-29.9
    4. Above 30.0

21. Did you ever have malaria during the pregnancy?
    1. yes
    2. no

22. Do you have a history of alcohol, tobacco, bhang or any illicit drug use?
    1. Yes
    2. no

23. Did you ever use alcohol, tobacco, bhang or nay other drug during the pregnancy?
    1. Yes
    2. No

24. If yes, which one?

State……..

HEALTH SEEKING BEHAVIOURS

1. Did you ever attend antenatal clinics?
    1. Yes
    2. No

1b. if yes, how many times?

State……

2. Which kind of hospital did you go to for antenatal visits?

1. Private
2. Mission
3. Public/dispensary

3. Do you have a personal health care provider e.g. family doctor?

1. Yes
2. No

4. Did you ever get treated for any illness during the pregnancy?

1. Yes
2. No

4b.If yes, which one,

State……..

5. Did you receive the tetanus immunization in pregnancy?

1. Yes
2. No

5. Did you receive iron and folate supplementation?

1. Yes
2. No

6. Which family planning method were you on before you got pregnant?

State……

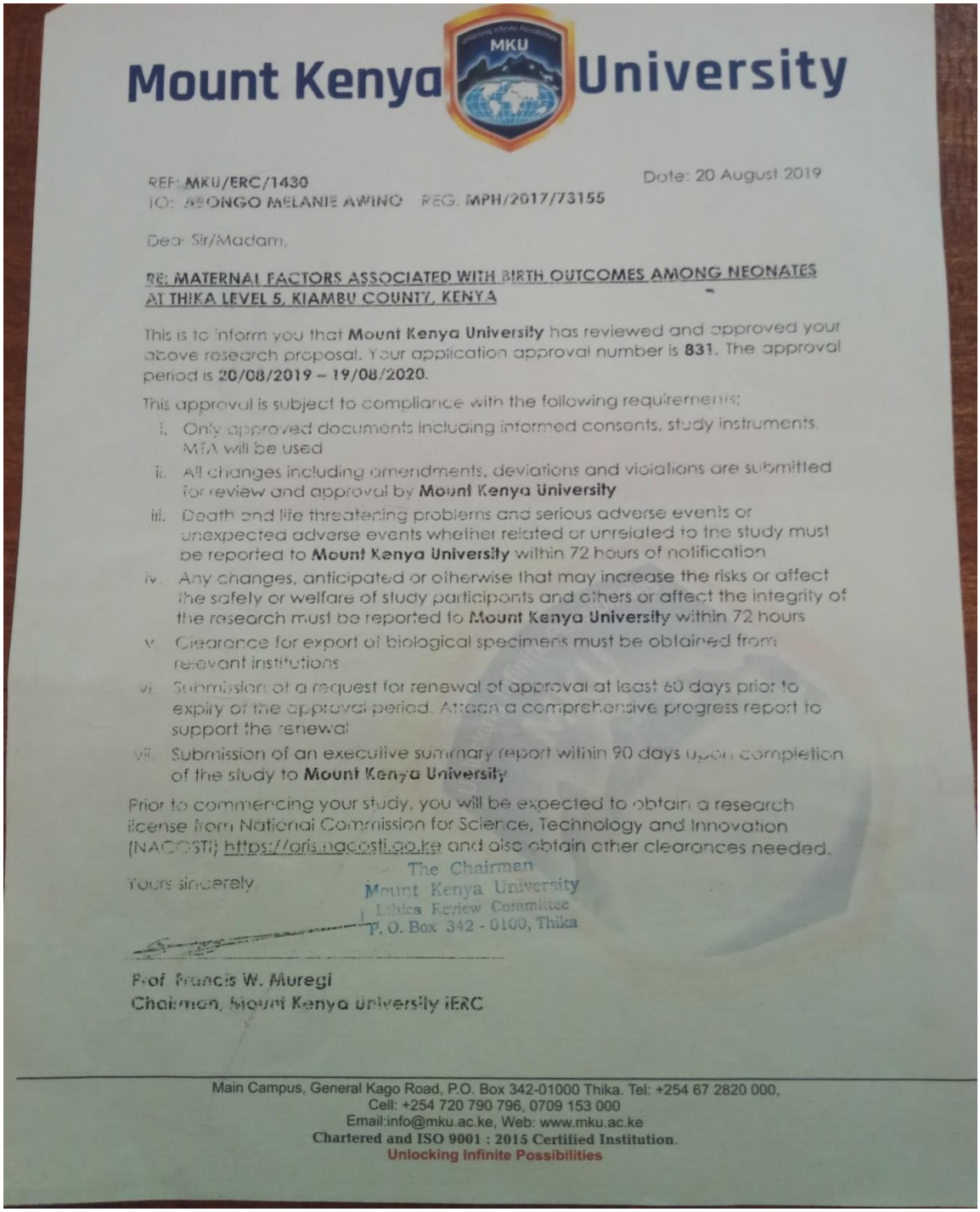
Appendix II: Budget

ITEM	AMOUNT	COST OF EACH(Kshs)	TOTAL COST(Kshs)
1. STATIONARY.			
Foolscaps	3 reams	300	900.00
Pens	20staedler/	20	400.00
Pencils	20staedler	10	200.00
Folders	5pieces	60	300.00
Flash disk	3	500	1500.00
SUBTOTAL			5000
2.SERVICES (a)SECRETARIAL Typing &Printing proposal Binding proposal Photocopying proposal Photocopy questionnaires Typing & printing report Photocopying report Binding report PRETESTING	N/A	N/A	10000
			10000
		30000	30000
SUBTOTAL			30000
3.ALLOWANCES			
Research assistants	5	5x1000	5000
Statistician	1	10000	10000
report writing	1	10000	10000
			25000
Miscellaneous		10000	10000
Professional fee		50000	50000
GRAND TOTALS			**Ksh.130,000**

Appendix III: Ghant Chart

	2017	2018	2019	2020	2021
Concept paper					
Proposal presentation					
Data collection					
Data analysis					
Report presentation					
Thesis presentation and finalising					

APPENDIX 1V: MKU ERC



Mount Kenya University

REF: MKU/ERC/1430 Date: 20 August 2019
TO: ABONGO MELANIE AWINO REG. MPH/2017/73155

Dear Sir/Madam,

RE: MATERNAL FACTORS ASSOCIATED WITH BIRTH OUTCOMES AMONG NEONATES AT THIKA LEVEL 5, KIAMBU COUNTY, KENYA

This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **831**. The approval period is **20/08/2019 – 19/08/2020**.

This approval is subject to compliance with the following requirements;

i. Only approved documents including informed consents, study instruments, MTA will be used
ii. All changes including amendments, deviations and violations are submitted for review and approval by **Mount Kenya University**
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions
vi. 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
vii. Submission of an executive summary report within 90 days upon completion of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely

The Chairman
Mount Kenya University
Ethics Review Committee
P. O. Box 342 - 0100, Thika

Prof. Francis W. Muregi
Chairman, Mount Kenya University IERC

Main Campus, General Kago Road, P.O. Box 342-01000 Thika. Tel: +254 67 2820 000,
Cell: +254 720 790 796, 0709 153 000
Email:info@mku.ac.ke, Web: www.mku.ac.ke
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Appendix V: NACOSTI LICENCE

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 715339

Date of Issue: 18/September/2019

RESEARCH LICENSE

This is to Certify that Miss.. Melanie Abonge of Mount Kenya University, has been licensed to conduct research in Kiambu on the topic: MATERNAL FACTORS ASSOCIATED WITH BIRTH OUTCOMES AMONG NEONATES AT THIKA LEVEL 5, KIAMBU COUNTY, KENYA for the period ending : 18/September/2020.

License No: NACOSTI/P/19/1084

715339

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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