IMPLEMENTATION OF PRETERM BIRTH INTERVENTIONS AMONG HEALTH CARE PROVIDERS DURING PROVISION OF INTRAPARTUM AND PERINATAL CARE IN EMBU COUNTY, 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 research thesis is dedicated to my beloved family, friends and Kenyatta University fraternity for their tireless support, prayers and encouragement.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

ANC	Antenatal Care
ACS	Antenatal Corticosteroids
CO	Clinical Officer
EmOC	Emergency Obstetric Care
HCP	Health Care Providers
HFF	Health Facility Factors
HHIS	Hospital Health Information System
MCH	Maternal and Child Health
MO	Medical Officer of Health
NND	Neonatal Death
NICHD	National Institute of Child Health and Human Development
PTL	Preterm Labour
PTB	Preterm Birth
PTBO	Preterm Birth Outcome
RHMCAH	Reproductive Maternal Neonatal Child and Adolescent Health
SPSS	Statistical Package for Social Sciences
SDGs	Sustainable Development Goals
USAID	United States Agency for International Development.
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Health care providers are designated officers providing intrapartum and perinatal care to pregnant women and neonates respectively.

Intrapartum this is the period from onset of labour to completion of third stage of labour in women.

Perinatal pertains to the period immediately before and after birth. It is defined in diverse ways. For example, according to the World Health Organization the period commences at 22 completed weeks of gestation and ends after completion of seven days after birth. Other definition it is the period commencing from 20^{th} to 28^{th} weeks of pregnancy and ends at 1 week to four weeks after delivery.

Preterm Birth (babies born 23 < 37 weeks of gestation) is a syndrome with a variety of causes and underlying factors classified into spontaneous and provider initiated.

Preterm Birth interventions are basic and specialized health care packages offered to pregnant women and neonates during intrapartum and Perinatal periods to improve preterm birth outcome examples Tocolytics, antenatal corticosteroids, resuscitation and antibiotics prophylaxis.

Preterm birth outcome refers to complications arising from preterm birth for example breathing and feeding problems, neurological problems and long term disability.

Implementation process by which health care providers administer preterm birth interventions during provision of intrapartum and perinatal care to improve preterm birth outcome, consequently increasing survival rates of preterm babies.

ABSTRACT

Preterm birth interventions (PTBI) are basic and specialized care packages designed to improve Preterm birth outcome (PTBO) hence increase the survival rates of babies born preterm. Without PTBI, the survivors of PTB are at risk of facing lifelong disability and poor quality of life affecting the individual and family leading to productivity loss and socio-economic constraints. Globally PTB leads in causing neonatal and child mortality rate (CMR). Accounts for one million deaths yearly, a risk factor to over 50% of all global neonatal death (NND). Despite the PTBI put in place in SSA and in Kenya neonates and children continue to die annually due to complications arising from PTB. Specifically in Embu County the rate of PTB increased by (24.6%) exposing survivors to life threatening health problems, social economic constrains and death. Efforts to reduce these deaths remain futile since, decline of childhood deaths related to prematurity remains low at 2.1% as compared to overall childhood deaths reduction of 4.1% annually. Moreover, Embu County has scanty information on PTBI. The main objective of this study was to asses implementation of preterm birth interventions among health care providers (HCP) in Embu County, Kenya. Specific objectives were; to determine level of implementation of PTBI, to establish social- demographic characteristics, to establish training related to PTBI and to determine health facility factors (HFF) that influence implementation of PTBI among health care providers during provision of intrapartum and perinatal care in Embu County. The study used cross-sectional design. Random sampling technique was used to determine the sample size of 94 HCP, while Purposive sampling technique was used to sample study hospitals and 5 Key informants. The study was conducted in three hospitals in Embu County. Questionnaires and Key informant interview (KII) guides were used to collect quantitative and qualitative data respectively. Data analysis, was done using SPSS version 21, descriptive statistics; Chi squires, Fisher's test and binary logistic model to test the association between independent and dependent variables, to generate odds ratio (OR), confidence limits and variation between variables represented by Nagelkerke R Squared. Qualitative data was categorized in themes. Data findings were presented using tables and charts. The study results revealed that highest number (83%) of the respondents were female while the least (17%) were male. Highest number (48%) were aged above 35 years while the least (13%) were aged between 26-30 years. The results revealed statistically significant association between HCP level of education, experience, training related to PTBI and health facility with a p-value of (0.033, 0.024, 0.037 and 0.009) respectively. Highest implementation of PTBI was found among the HCP trained on EmOC (57%), of whom (69.2%) were associated with high implementation as compared to those who had low (32.8 %) implementation. The study concluded that implementation of PTBI is influenced by socio-demographic characteristics; education (OR=0.947, p= 0.157, FET=0. 871), experience (OR= 0.275, p= 0.0.024, FET=5.482), training related to PTBI (OR= 3.15; 95% CI, p= 0.023, FET=1.629) and adequacy of health facility factors (OR= 2.538, p= 0.007, FET= 2.371,). However, the study concluded that implementation of PTBI among health care providers during provision of intrapartum and perinatal care in Embu County was low at (52.7%) as compared to those who had high implementation at (47.3%).

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Preventive birth interventions (PTBI) are basic and specialized package designed to improve preterm birth outcome (PTBO) hence increase the survival of babies born preterm. Survival rates of preterm birth (PTB) increases with advancement of gestational age. According to World Health Organization WHO (2015), the chance of survival at less than 23 weeks is close to zero, 23 weeks (19%), 24 weeks (40 %), 25 weeks (66%), 26 weeks (77 %), 27 weeks (87%), 28 weeks (92%) and at 29 weeks (95%).

Globally PTB leads in causing neonatal and child mortality rates. It accounts for one million deaths yearly and a risk factor to over 50% of all global neonatal deaths (Blencowe *et. al.*, 2013). In 2015, neonatal death accounted for 45% of under-fives deaths with prematurity contributing 16% of which 70% of these deaths occurs in Africa, particularly in South and East Africa (WHO, 2015).

In Sub- Saharan Africa (SSA), 25% of neonates die yearly due to complications arising from PTB. A baby born preterm in SSA is 13 times at risk of dying than a full term baby (Afolabi, 2017). In Kenya, 12.5% are born preterm and 7.4% of children die annually due to complications arising from PTBO. Embu County registered, a total of 280 (2.5%) of PTB out of 11345 live births and 1.6% of neonatal deaths of which almost 50% of these deaths were attributed to prematurity (MOH, 2015).

Study hospitals, Embu Teaching and Referral Hospital (ETRH), Ishiara Sub-county and Mbeere Sub-county hospitals contributed a proportion of 68.2% (193 out of 280

PTB), higher than Kitui (54.9%) and (54.6%) of neonatal deaths of which almost (50%) was attributed to PTBO (MOH, 2015). However, 80% of these deaths are preventable through low cost interventions that are scientifically proven effective (MOH, 2014).

The outcome of PTB poses serious health problems to the survivors. Survivors experiences difficult breathing, feeding difficulties, cerebral palsy, vision problems, hearing impairment ,cognitive and learning disabilities, behavioral, developmental delays, social- emotional health problems as well as brings about economic costs to the family and have implications such as health insurance, educational, and other support systems (CDC, 2013) hence leads to productivity loss. In US medical, educational and loss of productivity associated with PTB outcome were more than 26.2 billion US dollars (WHO, 2013).

Globally implementation of PTBI will reduce over 1 million out of 6 million child deaths occurring globally, due to complications of PTBO hence achieve Sustainable Development Goals (SDGs) 3 which calls for ‘’an end’’ to avert child and neonatal deaths by vision 2030 (Yarney, 2016). The WHO recommends 10 elements in PTBI namely; antenatal care (ANC) corticosteroids, tocolytics, magnesium sulphate; Kangaroo mother care (KMC), and surfactant antibiotic prophylaxis, mode of preterm birth and, plastic wraps, continuous positive airway pressure therapy, and oxygen therapy for the newborn (USAID 2015).

However, the researcher intends to study implementation of PTBI during intrapartum and perinatal care periods namely; ANC corticosteroids, tocolytics, resuscitation

(oxygen therapy), provision of warmth through Kangaroo mother care (KMC) incubator and antibiotic prophylaxis.

Despite the interventions put in place the implementation of PTBI is low in middle and low income countries (Yarney, 2016), this is reaffirmed in an evidence based clinical uptake of PTBI during intrapartum period in a multicounty study in 18 WHO priority countries with Kenya included.

Implementation of PTBI will help Kenya to achieve its target of reducing neonatal mortality rate to 18 percent by 2020, realization of vision 2030, the constitution of Kenya 2010, Health Strategic Investment Plan 2014- 18 and Sustainable Development Goals (SDGs) 3 Reproductive Maternal Neonatal Child and Adolescent Health (RMNCAH) Investment Framework (2016).

Health care providers (HCP) play a key role in the implementation of PTBI since they are wholly involved in provision of PTBI to women at primary level (preconception period) secondary (antenatal period) and in tertiary (intrapartum and Perinatal periods). They are also key people in implementing policies, protocols and following the set standards in uptake of PTBI while the leadership/ management is involved in providing an enabling environment for the implementation of the same, monitoring and evaluation to ensure effective implementation of PTBI. Therefore the study is worth undertaking. The aim of the study was to assess implementation of preterm birth interventions among health care providers (nurse midwives) during provision of intrapartum and perinatal care in Embu County.

1.2 Statement of the problem

Globally, neonatal deaths accounts for 45% of under-fives deaths, with prematurity contributing 16% (WHO, 2015). According to WHO (2015) 70% of these deaths occur in Africa in South and East Africa. However, 80% of these deaths are preventable through scientifically proven low cost effective methods (PTBI). But efforts to reduce these deaths remain futile since, decline of childhood deaths related to prematurity remains low at 2.1% as compared to overall childhood deaths reduction of 4.1% annually (WHO 2015). Similarly in Kenya despite the PTBI, strategies and policies put in place, the country continues to experience worrying figures on rising of PTB (MOH, 2014). Specifically Embu county PTB increased by (24.6%) in 2016 (CHIS 2016) consequently, risking survivors to life threatening health problems, social - economic implications and limiting chances of their survival. Study hospitals (ETRH, Ishiara Sub-County and Mbeere Sub-County hospitals) contributed (54.6 %) of neonatal deaths in the county of which 50% was attributed to prematurity. Similarly in Kenya and specifically Embu County there is scanty information and literature on implementation of PTBI among health care providers. Therefore it is through this information that the study sought to assess implementation of PTBI among health care providers during intrapartum and perinatal care in Embu County.

1.3 Justification of the study

Globally, PTB accounts for 35% of the world's NND and second leading cause of death among children under five years, after pneumonia (WHO, 2015). Implementation of PTBI would reduce over 1 million out of 6 million child deaths occurring globally, due to complications arising from PTBO (Yarney *et al.* 2016.).

According to WHO (2015), studies shows that of the interventions, antenatal corticosteroids prevents 400,000 deaths, Kangaroo Mother Care prevents 450,000 deaths annually and antibiotic prophylaxis prevents PTBO following preterm premature rupture of membranes (PPROM.) while resuscitation saves 4 out of 5 babies who need basic resuscitation (WHO 2014) Without an intense focus on reducing PTB and resulting deaths, the world would struggle to achieve the Every Newborn Action Plan goal of driving newborn deaths to 12 per 1,000 live births by 2030 (March of Dimes, 2015). Kenya may as well fail to achieve its target of decreasing neonatal mortality rate to 18 percent by 2020, realization of vision 2030, the constitution of Kenya 2010, Health Strategic Investment Plan 2014-18 and SDGs. 3 (RMNCAH, 2016).

Choice of the study hospitals in Embu County was guided by the rate of increase of PTB and neonatal deaths related to prematurity. Subsequently, preventing PTB and improving PTBO consequently, increasing chances of survival of premature babies' lies entirely on care provided by the HCP to women with imminent PTB during intrapartum period and immediate care to premature babies. Intrapartum and perinatal periods are critical periods in which the HCP thinks critically through assessing the health problem, makes a diagnosis, prioritizes the care needed, implements promptly and evaluates the progress in order to save life. Despite various studies carried out on PTB worldwide, there are limited studies on the implementation of PTBI among the HCP during provision of intrapartum and perinatal care. Specifically in Embu County there no studies on implementation of PTBI among health care providers. Therefore study findings will help bridge knowledge gaps in implementation of PTBI and easy

future programmes and policy formulation at national and county levels. The study will as well generate baseline data for future reference in the field of reproductive health specifically PTBI, thus enhancing implementation of PTBI in Embu County.

1.4 Research questions

1. What is the level of implementation of preterm birth interventions during provision of intrapartum and perinatal care in Embu County?
2. What are the social- demographic characteristics that influence implementation of preterm birth interventions among health care providers during provision of intrapartum and perinatal care in Embu County?
3. What are the training related to PTBI that influence implementation of preterm birth interventions among health care providers during provision of intrapartum and perinatal care in Embu County?
4. What are the Health facility factors that influence implementation of preterm birth interventions among health care providers during provision of intrapartum and perinatal care among the health care providers in Embu County?

1.5 Objectives of the study

1.5.1 General Objective

To assess implementation of preterm birth interventions among health care providers during provision of intrapartum and perinatal care in Embu County.

1.5.2 Specific objectives

1. To determine level of implementation of preterm birth interventions among health care providers during provision of intrapartum and prenatal care in Embu County.
2. To establish social- demographic characteristics that influence implementation of preterm birth interventions among health care providers during provision of intrapartum and perinatal care in Embu County.
3. To establish training related to PTBI that influence implementation of preterm birth interventions among health care providers during provision of intrapartum and perinatal care in Embu County.
4. To determine health facility factors that influence implementation of preterm birth interventions among health care provider's during provision of intrapartum and perinatal care in Embu County.

1.6 Significance of the study

The study sought to identify existing gaps, fill knowledge gaps in implementation of PTBI in order to improve outcome of PTB and subsequently enhance survival rates among preterm babies. Embu County government, Ministry of health and Non-Governmental Organizations dealing with maternal and child health programmes may use the findings to invent ways / programmes to promote implementation of PTBI. Future researchers, students and health providers venturing in the field of reproductive health (RH) and specifically PTBI may use the findings as reference material. Embu Community would as well benefit from the study in that some of the gaps identified, once addressed would improve child's survival hence reduce child morbidity, mortality rates, improve quality of life and increase productivity.

1.7 Delimitations and Limitations

The study sought to investigate implementation of PTBI among health care providers during provision of intrapartum and perinatal care in Embu County. The study focused on level of implementation of PTBI, social-demographic characteristics of HCP influencing implementation of PTBI, training related to PTBI influencing implementation of PTBI and health facility factors influencing implementation of PTBI. Client based factors would be the intervening variables. Cross sectional study design adopted by the researcher was the most appropriate since it yielded information and provided results within a short duration of time. The research was expected to yield both qualitative and quantitative data. The method adopted would help to establish the relationship between variables under investigation. Geographically the study is limited to Embu county hospitals (ERTH, Ishiara Sub-County and Mbeere Sub-County), hence only HCP working in maternity unit in those facilities were recruited for the study.

1.8 Conceptual /Theoretical framework

Theoretical frameworks and conceptual models, define conceptual and operational definitions, and discuss how theoretical frameworks and conceptual models guide research design (Cathy, 2014).Theoretical framework provides the structure of the study, theory describes, explain, and predict phenomena of interest (Cathy, 2014) while Conceptual framework shows the variables in the study. Therefore in this study the researcher focuses on implementation of PTBI among health care providers (HCP) during provision of intrapartum and perinatal care. Intrapartum and perinatal care is

critical in that it determines the outcome of PTB and subsequent survival of the premature baby. It is a period in which HCP thinks critically, prioritizes the care, acts promptly and consistently to save life. Study variables are independent and dependent. An independent variable is what is varied during the research; it is what the investigator predicts will affect the dependent variable (Berkeley, 2005) namely; level of implementation of PTBI, social-demographic characteristics, training related to PTBI and health facility factors (HFF). A dependent variable is what was measured; it was the outcome and it was what the investigator predicted would affected during the research by the independent variable (Silverman, 2004). In this study implementation of PTBI was the dependent variable namely; level of implementation of PTBI among HCP which was either high or low. The study adopted health believe model (HBM) which was a psychological model first developed in 1950 by social psychologists Hochbaum, Rosenstock and Kegels in the US public health services. The HBM was based on the understanding that a person will take a health-related action in this case (the HCP enhanced implementation of PTBI to improve PTBO consequently reducing complications arising from PTB and if that person: feels that a negative health condition (PTBO) can be avoided, has a positive expectation that by taking a recommended action (i.e. tocolytics, corticosteroid, resuscitation and antibiotic prophylaxis), she/he avoided a negative health condition (PTBO) and that the action was effective at improving PTBO, and believes that she/he could successfully implement the recommended health action and use it comfortably and consistently to increase the survival rates of premature babies. Conceptual framework below illustrated the independent and dependent variables of the study.

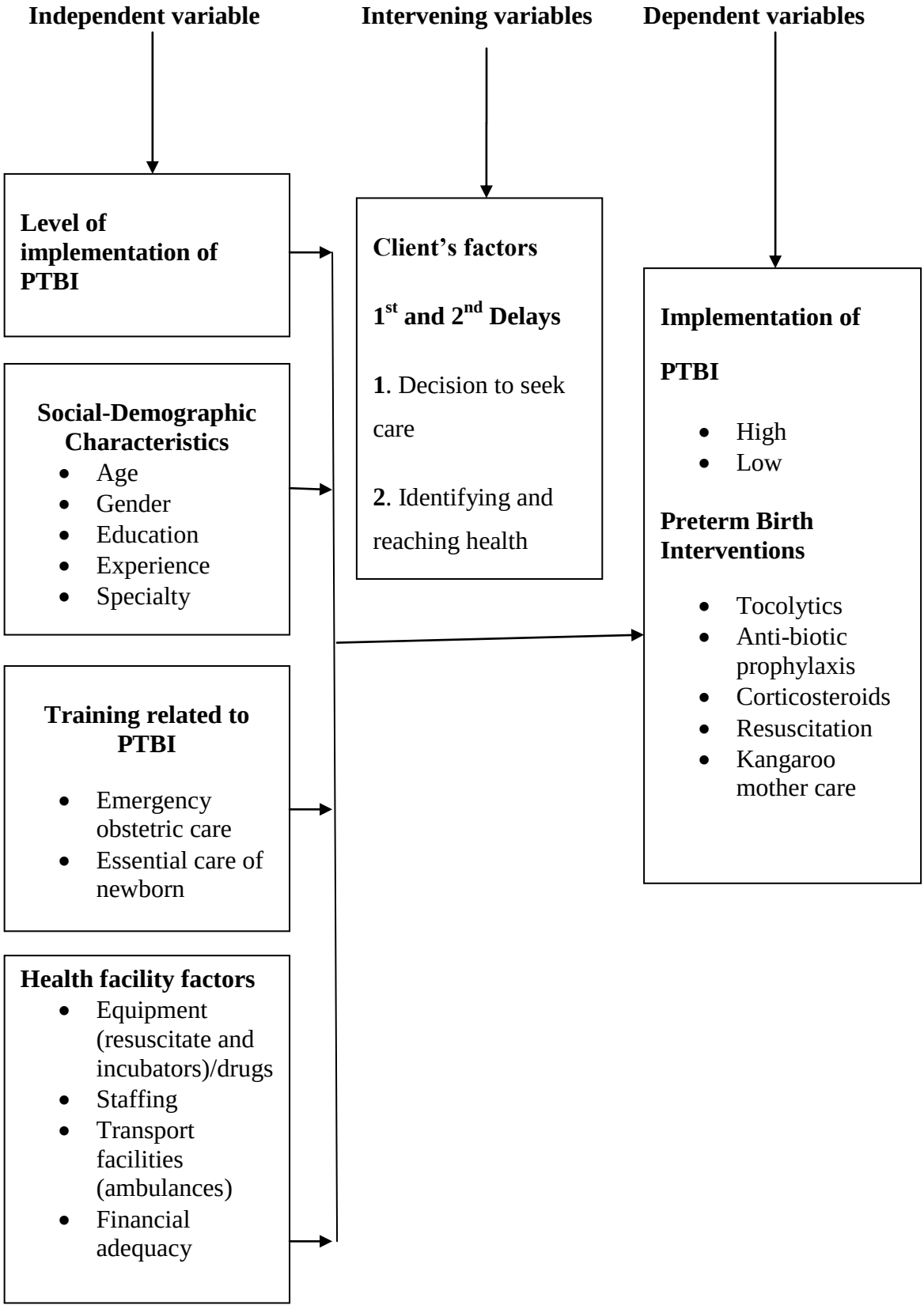


Figure 1.1: Conceptual Framework

CHAPTER TWO

LITERATURE REVIEW

2.0 Implementation of Preterm Birth Interventions

Implementation of PTBI is the process by which the HCP executes prescribed interventions to women with imminent PTB and immediate care to neonates during intrapartum and perinatal periods respectively. The burden of PTB is substantial for many developing countries, and scale up of some low- tech, cost-effective interventions can help to reduce newborn deaths from prematurity. Reducing the burden of PTB has two main elements: prevention and care (Lawn *et. al.,* 2012). Interventions to manage preterm labor aim at reducing serious complications arising from PTB. These interventions include medications called tocolytics to slow down labor, antenatal corticosteroids to help the fetus survive PTBO, and antibiotics to prevent infection when preterm pre-labour rupture of membranes (pPROM) occurs while care involves neonatal resuscitation and Kangaroo mother care (Lawn *et. al.,* 2012). Lawn further stipulates that if interventions with proven benefits were universally available to women and their babies (i.e., 95% coverage), almost 1 million premature babies could be saved each year thus increasing survival rates. This is echoed by Lipi *et. al.* (2013) who reports that at some intuitions with uptake of PTBI the fetal survival rate approaches 90% at 24-27 weeks of gestation and 98% at 28-31 weeks of gestation. According to March of Dimes (2012), global efforts to reduce child mortality demand urgent action to address PTB and plans are underway to expand uptake of PTBI in 24 United States Agency for International Development (USAID) priority countries in Africa and Asia (March of Dimes 2015). Kenya is among the priority countries. However various studies report low uptake of PTBI.

Preterm birth interventions are provided to the mother shortly before or during the birth process (intrapartum and perinatal periods) with the aim of overcoming immediate and future health challenges of the preterm infant (WHO, 2015). To enhance implementation of PTBI, the HCP (nurses, midwives, obstetrician/gynecologist and Pediatricians) plays a major role. The nurse midwife is the first HCP to come into contact with women with imminent PTB or pregnant women at risk of PTB, hence involved in assessing the health problem including contraindications to specific PTBI, makes a nursing diagnosis, prioritizes the care needed and in collaboration with the obstetrician and the pediatrician implements the care promptly and evaluates the progress in order to save life. The HCP also identifies need for referral depending on level of the facility and refers PTB promptly thus avoiding third delay.

2.1 Preterm Birth Interventions

2.1.1 Tocolytics

Tocolytics are drugs that inhibit uterine contractions and suppress pre-term labor (PTL) (pregnant women in labor with cervical dilatation). They are effective for up to 48 hours and may prolong pregnancy for up to 7 days. Tocolytics agents are an important intervention in obstetrics, though they have not been shown to improve neonatal outcomes (WHO, 2015), the drugs are administered to symptomatic women when PTB is inevitable, to maintain the pregnancy for at least 48 hours to enable administration of antenatal corticosteroids, or provides an opportunity for the mother to be transported to a tertiary care facility with specialized neonatal facilities. Without interventions PTL ends up to PTB.

Lipi *et al.* (2013) reports that, PTL with its complications is the leading cause of perinatal mortality and morbidity, specifically respiratory distress syndrome, intra-ventricular hemorrhage, broncho-pulmonary dysplasia and necrotizing enter colitis. It is related to socioeconomic status, disease pattern, genetic consultation and geographic location. In his prospective study at Mitford hospital in Dhaka on magnesium sulphate use as a tocolytic agent, Lipi stipulates that with administration of tocolytics to women with PTL, in some intuitions the fetal survival rate approaches 90% at 24-27 weeks of gestation and 98% at 28-31 weeks of gestation.

A study in India by Singh *et al.* (2015) 200 women with PTL at mean gestational age of 30 weeks were administered tocolytics and labor was delayed between 4-5 weeks. Yet in a retrospective study carried out in labor ward at Srinagarind hospital in Thailand by Kiatsuda *et. al.* (2016), among 103 singleton pregnancy in gestation of 24^{th} to 33^{rd} weeks, with no contraindication to tocolytics and presenting with threatened PTL (pregnant women in labor with no cervical dilatation) and PTL, only 22.3% of the women with PTL were prescribed tocolytics with a success rate of labor inhibition of 60.9%, while those with threatened labor (77.7%), success rate of labor inhibition was 86.6%. This gave an opportunity for the pregnant women to receive and complete the dose of ANC corticosteroids in order to improve PTBO. Hence increase the survival rates of PTB.

Though the studies do not indicate the survival rates, the studies reports minimization of PTBO such as asphyxia, thus reducing episodes of respiratory distress syndrome. The studies also reported increase in birth weight. However, Kiatsuda *et al.* (2016) noted that despite the modalities to prevent PTB and its consequences, the proportions

of PTB are not reduced. Thus there is need for PTB surveillance at the community level in order to intensify timely uptake of PTBI.

2.1.2 Antenatal Corticosteroids (ACS)

Antenatal Corticosteroids is a drug given to pregnant women presenting with PTL or at risk for PTB. It triggers production of surfactant (a protein substance that enhances lung maturation) hence prevents respiratory distress (RDS), thus improving PTBO. When given to mothers in PTL, ACS (dexamethasone) helps speed up the development of the baby's lungs. At a cost of about US $1, two shots can stop premature babies from going into respiratory distress when they are born (Lawn *et al* 2012). Antenatal corticosteroids therapy is recommended for women at risk of PTB from 24 weeks to 34 weeks of gestation when the following conditions are met: gestational age assessment can be accurately undertaken; PTB is considered imminent; there is no clinical evidence of maternal infection and adequate childbirth care is available (WHO, 2011). According to WHO (2015) studies indicate that ACS prevents nearly 400, 000 neonatal deaths annually. A report from a retrospective study by Kiatsuda *et al.* (2016) among 103 singleton pregnant women administered tocolytics to prevent PTB, more than 80% of the included women received complete course of ACS thus minimizing complications arising from PTB.

Despite their effectiveness in preventing complications arising from PTBO and deaths, various studies report low implementation of PTBI. This is reaffirmed in a study which indicated that ACS for women at high risk of PTB is an effective intervention to reduce neonatal mortality among preterm babies delivered in hospital

settings, but has not been widely used in low-and middle income settings (Berrueta *et al.,* 2016).

World Health Organization multicounty survey (WHOMCS) reported that in 359 facilities in 29 countries, uptake of corticosteroids was: 52% (3900 of 7547) women who gave birth at 26–34 weeks' gestation, 19% (94 of 497) women who gave birth at 22–25 weeks' gestation, and 24% (2276 of 9661) women who gave birth at 35–36 weeks' gestation. However the study reports that the rates of ACS use varied between countries (median 54%, range 16–91). Out of 4677 women who were potentially eligible for tocolytics drugs, it's only 18% (848) who received both tocolytics and ACS drugs (Vogel *et.al* 2014).

Another study in Malawi, one of the African counties with high levels of PTB (18.1%), found that neither of the hospitals routinely used tocolytics to prevent preterm delivery (Vogel *et al*., 2013). Melisa *et al*. (2015) in a WHO multi-country study in 18 priority countries Kenya included also reports low uptake of tocolytics and ACS at a rate of 1.2% and 56.4% respectively. World Health Organization study on use of ACS in low and middle income countries (LMICS) 52% of women with PTB received ACS (Griffin *et. al,* 2017). This is reaffirmed in a study by Yarney *et al.* (2016). Yarney stipulates that coverage rates of PTBI in low and middle income countries remain very low, while Berrueta *et al.* (2016) reported low utilization of ACS in 7 sites (Argentina, Guatemala, Kenya, Zambia, Pakistan and 2 sites in India). Berrueta further reported that despite the burden of preterm-related morbidity and mortality, as well as the effectiveness of ACS, global implementation of the intervention has been relatively low.

According to WHO (2015) guidelines, evidence on the use of ACS for reducing adverse neonatal outcomes associated with prematurity was extracted from a Cochrane systematic review of 26 trials (4469 women and 4853 babies) (27). This review included trials that compared ACS treatment with placebo or no treatment in women expected to deliver between 24 and 37 weeks of gestation as a result of either spontaneous PTL, PPROM or elective PTB, the results indicated that the rate of RDS was reduced by 35% in the ACS group. The reviews also report reduction in long-term childhood morbidity such as; cerebral palsy in 904 children in 5 studies, as well as a reduction in developmental delay in 2 studies with 518 children. Differences between groups for visual and hearing impairment, neurodevelopmental delay, intellectual impairment and behavioural or learning difficulties were not statistically significant in children or adults, although the relative risks were all in favour of a reduction.

Same study reported on survival rates and indicated that after 18–22 months follow-up, intact survival in the entire cohort was 36%, of which high survival rates was among those who received ACS (35.8%) versus 18.5% of the control group. Reduction in death or neurodevelopmental impairment was also noted among preterm babies born at 23–25 weeks of gestation.

2.1.3 Antibiotics prophylaxis

Antibiotics prophylaxis in PTB are prescribed and administered to pregnant women with preterm premature rupture of membranes (PPROM) to help in prevention of infections hence reduce complications arising from pre-term delivery and post-natal infections in high income settings. In low-income settings, where access to other

interventions namely; antenatal steroids, surfactant therapy, ventilation and antibiotic therapy may be low, there is moderate quality evidence that, antibiotics for pPROM could prevent 4% of neonatal deaths arising from complications of prematurity and 8% of those occurring due to infection (Mensal *et al.*, 2017). According to Abouda *et al.* (2009) antibiotic prophylaxis given during the second and third trimesters of pregnancy may prevent or treat infections occurring due to pathogenic bacteria that are common inhabitants of the vagina likely to cause infections such as cervicitis, chorioamnionitis, and intra-amniotic infection during pregnancy and hence reduce the risk of premature labour or premature rupture of membranes when given routinely to pregnant women.

Preterm premature rupture of membranes occurs in 3 percent of all pregnancies and is responsible for, or associated with, approximately one-third of PTB causing significant perinatal morbidity and fetal death. This is affirmed in RMNCAH investment framework (2016) which stipulates that PTB occurs in 40% of PPROM and Larsson *et al.* (2016) in his retrospective study in Skaraborg region of Västra Gotland in Sweden. Larsson reported that while iatrogenic PTB contributes (20.2%) of PTB, spontaneous PTB and PPROM contributes (55.2%).

According to Tersbøl *et al*. (2015), preterm infants are very vulnerable to respiratory distress syndrome, intra-ventricular hemorrhage (IVH), periventricular leucomalacia (PVL), other neurological sequelae, infection such as necrotizing enterocolitis (NEC) while chorioamnionitis based on clinical criteria occurs in approximately 3-30% of all PPROM pregnancies. This is also reaffirmed by Lipi *et al.* (2013) and Larson *et al*. (2016). The latter two also points out that the survivors may also suffer cerebral palsy.

However, despite the benefits of use of antibiotics in PPROM there are very few studies on antibiotic use especially in Sub-Saharan Africa. According to Tersbøl *et. al*. (2015) in a randomized control study (RCTs) in Ghana, out of 324 cases of PTB, health care providers administered antibiotics to only 190 clients. Mensal *et al.* (2017) also stipulates that out 65% clients administered antibiotics in ANC, only 42.4% received during intrapartum period and majority of those who received were for caesarean section. However the study remains silent on those who received due to PTB or PPROM.

According to Larsson *et al.* (2016) in his distribution of PTB by the cause, he reported that out of 1378 PTB which presented (6.4%) of the deliveries, 294 (21.3%) were due to PPROM. However, the study does not indicate whether those women were put on antibiotics.

2.2.4 Newborn resuscitation

Newborn resuscitation is a procedure implemented by the HCP in an emergency where the life of an infant is at risk of death. The infant presents with signs of inability to establish breathing, cyanosis, poor or non-response and floppiness. Health care providers ensures ABC (clear airway, breathing and circulation) by applying basic resuscitation through suctioning; chest compression to stimulate heart beats, use of a bag-and-mask (ventilation) and administration of oxygen. World Health Organization (2014) stipulated that through use of a bag-and-mask or mouth-to-mask will save 4 out of every 5 babies who need basic resuscitation. The purpose of neonatal resuscitation is to help the newborn to establish spontaneous breathing and

facilitate oxygen delivery to its organs and tissues especially the brain, which is very quickly damaged by oxygen shortage.

Lawn *et al.* (2014) stipulates that immediate cause of many of the world's 2.8 million annual neonatal deaths is an illness presenting as an emergency, either soon after birth (such as complications of PTB and intrapartum hypoxia) leading to birth asphyxia. Birth asphyxia contributes to 19% of the 4 million neonatal deaths worldwide every year and approximately 280,000 babies die of birth asphyxia soon after birth. In addition to its contribution to mortality, birth asphyxia can result in cognitive impairment, epilepsy, cerebral palsy, and chronic diseases in later life (Bansal *et al.* 2014). Thus, World Health Organization recommends newborn resuscitation and treatment of asphyxiated infants.

A study carried out in Zanzibar Tanzania on resuscitation (help the baby breath) by Wilson *et.al*. (2017) reported that of the 62 birth observations, 19% of the babies born needed PTBI of resuscitation. They were all appropriately resuscitated and survived. Yet in another study in Gujarat, India out of 126 pediatricians, 84 (66.7%) performed more than 20 resuscitation in 4 months (Bansal *et. al*, 2014).

2.1.5 Kangaroo Mother Care (KMC)

Kangaroo Mother Care is an example of innovative and cost-effective PTBI to reduce premature mortality. Kangaroo mother care was developed in Colombia and it is of two types; continuous and intermittent. Continuous KMC is defined as the practice of skin- to-skin care continuously throughout the day without breaking the contact between mother and baby, while intermittent KMC is the practice of skin-to- skin care

alternated with the use of either a radiant warmer or an incubator care for the baby (WHO, 2015). The preterm baby is put in early, prolonged, and continuous direct skin-to-skin contact with her mother or another family member.

Kangaroo mother care is associated with significant reductions in neonatal mortality, infections and hypothermia for stable babies weighing less than 2 kg if started in the first week. Kangaroo mother care enhances increased breastfeeding, weight gain, and mother - baby bonding. It is parent- baby- and health system- friendly, as it reduces hospital stay. In addition, Lawn *et al*. (2012) stipulates that KMC helps regulate the body temperature, facilitates breastfeeding, helps brain growth and development and can prevent 450,000 deaths annually. Regretfully, it is underutilized, despite the sound evidence for its effectiveness (WHO, 2014). The Cochrane review summarized data on effectiveness by subgroups of studies on use of either continuous or intermittent KMC (WHO, 2015) reported that continuous KMC was associated with a 40% lower risk of mortality at the time of discharge or at 40–41 weeks postmenstrual age and 33% reduction in the risk of mortality at the latest follow-up contact. However the studies do not indicate the number of times KMC was utilized.

2.2 Social –Demographic Characteristics that influence implementation of PTBI

Social-demographic characteristics is an essential variable that may influence development of caring perceptions, approach to clients and decision making process thus enhancing quality care, competency, creativity, innovation and horizontal and vertical communications to enhance implementation of PTBI. Blencowe *et al.* (2015) had it that context specific innovative solution to prevent PTB hence reduce PTB rates all round the world are urgently needed. This can be achieved through social-

demographic characteristics influence on the uptake of PTBI. Age, education, experience and specialty among health care providers are factors that may influence focused goal setting and targeted actions to promote uptake of PTBI. Target actions and behaviors are context specific and range from clinical work to general management of health care resources (Campbell, 2010). Thus with proper management of health resources would prevent stock outs of PTBI and control factors that would hinder the uptake of PTBI. For example save the children booklet reporting on implementation of KMC in Bungoma county (2014) had it that lack of practical experience on caring for a small baby in the KMC position hinders health workers from promoting KMC within their facilities.

Inadequate education, experience and specialty can as well lead to misuse of resources of which despite creating shortage of the resources can lead to mismanagement of a patient thus increasing infant/child morbidity and mortality rates. This is echoed by a group of researchers (Braun *et al.,* 2013; Moisiadis & Matthews, 2014) who stipulates that difficulty in predicting preterm delivery results in unnecessary steroid exposure to babies who eventually deliver at term. It also leads to uncertainty regarding the best course of management if delivery does not occurs within 7 days, but high risk of preterm delivery persists. They also had it that administration of multiple courses of ACS remains a matter of contention. On the one hand, a number of clinical and experimental studies have reported fetal growth restriction and alterations in organ (notably brain) development and childhood behaviour in association with repeated ACS administration (Braun *et al.,* 2013; Moisiadis & Matthews, 2014). Thus social demographic characteristics are such an important variable in the uptake of PTBI.

2.3 Training related to PTBI that influence implementation of PTBI

Training related to PTBI is an important component in the implementation of PTBI. The trainings empower HCP and helps build confidence in actions undertaken to enhance uptake of PTBI and consequently improve survival of PTB. According to Bansal *et al.* (2014) there is a need to follow up the process of knowledge and skills gained by the trainees into clinical practice, by periodical refresher courses and evaluations. This helps to improve the performance of the HCP thus increasing survival rates of PTB. HCP inability to effectively diagnose and prevent PTB places increased importance on treatments to maximize survival and optimize short-and long-term outcomes for preterm infants hence this can be enhanced by training of HCP. Every Preemie Scale organization recommends Family led Preterm and low birth weight babies model. The model enhances provider skills and quality of care and empowers families to directly participate in the care of PTB and low birth weight babies while in the facility and in the community with access to a trained service provider.

2.3.1 Emergency obstetric care and newborn care (EmOC & NC)

Emergency obstetric care and newborn care is a course designed to include the essential knowledge and skills required by skilled birth attendants to recognize and manage the major causes of maternal and newborn death in low and middle income countries (LMIC) and includes all EmOC signal functions. Topics covered in the training are: maternal and newborn resuscitation, early newborn care (recognition and management of prematurity hypoglycaemia and hypothermia), communication triage and referral, management of shock and the unconscious patient, recognition and

management of women at risk of PTB (severe pre-eclampsia and eclampsia) (Ameh *et.al* 2016). According to Ameh *et.al* (2016), EmOC & NC is a component of 65% of intervention programs aimed at reducing maternal and newborn mortality and morbidity. Studies between October 2012 and June 2014, in nine countries (Bangladesh, Ghana, Kenya, Malawi, Nigeria, Pakistan, Sierra Leone, Tanzania and Zimbabwe) had EmOC training of 5,939 HCP. The training was basically on knowledge and skills of EmOC & NC (Ameh *et.al* 2016). The report further indicated that the highest number of those trained were working in maternity unit and the highest number of participants were from Kenya of whom majority of them were nurses or midwives. Over 80% of participants primarily provided maternity care. The participants demonstrated improvement in provision of care after the EmOC which ultimately would lead to motivation in implementing PTBI, consequently improving PTBO and increasing survival rates of PTB. This is evidenced by a study conducted in Uganda by Gertrude *et.al* (2015) which reported that of the 72% eligible HCP trained in newborn care, their skills and competencies in care of high risk babies improved hence increasing survival rate of PTB.

Neonatal resuscitation as part of EmOC training plays a key role in reducing morbidity and mortality rates. Studies by Wall *et al.* (2009) in 6 African countries stipulates that training HCP in neonatal resuscitation may prevent 30% of deaths of full-term babies with intrapartum-related events, as well as 5%–10% of deaths due to PTB. Training courses in neonatal resuscitation can effectively increase competency and proficiency of HCP in conducting neonatal resuscitation and reduce potentially harmful practices (Wall *et al.*, 2009). However, only 2%–12% of personnel conducting births in facilities had been trained in neonatal resuscitation.

A study by Bansal *et al* (2014) reported that there were a total of 5 neonatal resuscitation program trainings conducted in the years 2011 to July 2012 in the state of Gujarat, India involving 40 participants in each training program. From the 200 trained HCP participants, only 28 were pediatricians and the rest were resident doctors, in paediatrics, MBBS doctors and nurses. India is one of resource-limited country and leading with high infant mortality rates resulting from PTB.

A study in Malawi reported that fourteen of 26 birth attendants trained at St. Gabriel's Hospital Namitete, Malawi Africa in September 2008. The HCP trainees consisted of two physicians, eight clinical officers, and four midwives. No trainees had previous neonatal resuscitation training and all trainees worked in the labor ward, antenatal unit, and female ward from October 2008 to December 2009.

2.3.2 Essential Care of the newborn (ENC)

Essential Care of the newborn is a set of measures every newborn baby requires regardless of where it is born or its size. It is designed to protect the newborn in adverse environmental condition and is a framework that should be applied immediately after birth and continued at least for the first seven days. Components of ENC and neonatal resuscitation are proven interventions for reducing neonatal mortality rate and stillbirth rate (Sheban *et.al*. 2015)**.**

A study carried out in Ethiopia by Abadi *et.al*. (2016) on knowledge and practice of immediate newborn care among health care providers indicated that out of 215 health care providers who participated in the study, 74.65% had adequate knowledge on newborn care and overall 72.77% of the participants were having good newborn care

practice. However, only 99 (46%) of the HCP had been trained in newborn care. Furthermore, the study reported that different studies conducted in Ethiopia indicated that the prevalence of essential newborn care practice was low and that various studies failed in assessing the health workers that implemented essential care of newborn. Yet in another study by Gertrude *et al.* (2015) in Uganda, majority of health workers lacked knowledge and skills to care for vulnerable neonates.

Kangaroo mother care (KMC) training is a component of essential care of the newborn. It is an important aspect in improving PTBO thus promoting survival rates of preterm babies. This is evidenced by a study conducted in Uganda by Gertrude *et.al* (2015) which reported that of the 72% eligible HCP trained in newborn care, their skills and competencies in care of high risk babies improved since of 547 preterm babies admitted in Kangaroo mother care unit, 80% were discharged alive to continue KMC at home. Save the children booklet on implementation of KMC in Bungoma County, Kenya (2014) indicated that 95 health care workers have been trained on KMC including health managers whose support is crucial in rolling out KMC services, hence promoting its implementation.

2.4 Health Facility Factors that influence implementation of PTBI

Health Facility Factors **(**equipment, resuscitare and incubators)/drugs, staffing, transport facilities (ambulances) and financial adequacy) may hinder or promote implementation of PTBI consequently, leading to poor or good outcome of PTB. This is affirmed by USAID (2015) whose report stipulates that world health systems including those lacking leadership or having inadequate staff and supplies, underlie poor health, can also contribute to poor health outcomes. The report further indicated

that inadequate financing and budgetary allocation as well as poor infrastructure, poor or disjointed information and lack of data for improved policy formulation and implementation, ensure weak systems remain weak. Weak systems can be a great barrier in implementation of preterm birth interventions among health care providers. This is affirmed in a study carried out in Uganda by Gertrude et.al. (2015). Gertrude stipulates that integration of the targeted interventions into a health system is difficult and complex, especially in a weak health system. Yet, strengthening health systems to deliver services equitably and efficiently is crucial for achieving improved maternal and newborn care. Study by Gertrude further stipulates that Ameh *et al.* (2016) further reported that despite availability/adequacy of financing, procurement of equipment is a key challenge in health facilities, where senior HCP who are involved in budgeting and procurement procedures, may be unaware of what specifications to order in terms of a correctly-sized self-inflating bag, valve pressure, and mask size for neonatal resuscitation and other requirements. This may hinder effective implementation of PTBI. Furthermore, Ameh further stipulates that in all countries assessed, major deficiencies exist for essential newborn care, supplies and equipment's, as well as for health care provider's knowledge and performance of key routine newborn care practices, particularly for immediate skin-to-skin contact. This is affirmed in a study carried out in Uganda by Gertrude *et.al* (2015). Gertrude reported that most health facilities lacked infrastructure, equipment, drugs, supplies and protocols for newborn care, and the majority of health workers lacked knowledge and skills to care for vulnerable neonates. Gertrude reported that while equipment levels remained high after initial improvement efforts, maintaining supply of even the most basic

medications was a challenge since less than 40% of health facilities reported no stock outs.

2.5 Summary of gaps

Existing literature reviewed that despite the effectiveness of PTBI, there is low implementation in high and low income countries and in most regions especially in Sub- Saharan Africa. Gaps exist in the uptake of PTBI during intrapartum and perinatal periods. The periods are most critical in implementation of PTBI especially in the first 48 hours in PTB. The researcher noted that most studies of PTB focus on secondary and tertiary prevention of PTB (risk factors, complications, management during labor and delivery and subsequent care of the premature infant) but not on uptake of PTBI. Most studies provide inadequate data on the extent of the uptake of PTBI. This is echoed in some studies of which out of the 21 studies, 17 were from countries in the highest category of human development and only one study was from a country (South Africa) ranked outside the top 100 developed countries (Program, 2014). The studies indicates that although both the United States and Brazil (from which 11 studies included in literature review were drawn) report high rates of PTB there is a lack of efficacy data from low development countries, notably in Southern Asia and Sub- Saharan Africa, which feature strongly in PTB and mortality statistics (March of Dimes, 2012). Few studies found on implementation of PTBI, social-characteristics of HCP, training related to PTBI and HFF. Therefore in this study, it is important to carry out the research to fill in the existing knowledge gaps in the uptake of PTBI among health care providers in Embu County.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Study design

The research adopted cross-sectional study design to investigate implementation of PTBI among health care providers in Embu County. The research design enabled the researcher to collect the required data within a short duration of time. The study was descriptive in nature. According to (Mugenda & Mugenda, 2011), a descriptive study is collection and presentation of data to give a clear picture of a particular situation.

3.1 Study Variables

3.1.1 Dependent variable

Implementation of PTBI-this was the outcome of the study namely: implementation of PTBI among HCP (high or low). Low implementation and high implementation was measured in terms of how many interventions were implemented. Health care providers who implemented 3 and above PTBI were associated with high rate of implementation while those who had implemented below 3 were associated with low implementation.

3.1.2 Independent variable

Independent variables were: proportion of health care providers involved in implementation of PTBI, social demographic characteristics, training related to preterm birth interventions and health facility factors.

3.2 Location of the study

The study was conducted in Embu County. Embu County lies 120 kilometers north east of Nairobi on south and eastern side of Mount Kenya. It covers 2,818 square kilometers and has a population of 516,212 persons comprising of 49% male and 51% female (2009 census). On the Northern side the county borders Tharaka Nithi County, Southern side Machakos County, Kirinyaga County to the West and Kitui County to the East. The county comprises of five Sub- Counties namely; Manyatta with two Sub-Counties, Embu North and Central, Embu East, Mbeere North and Mbeere South in three health facilities namely: ERTH, Ishiara and Mbeere Sub- County hospitals. ERTH is located along Embu- Meru high way in Embu county, Manyatta constituency, Central division, Municipality location in Njukiri Sub- location. It is the main referral hospital within the region and receives patients from across thewhole countyand neighboring counties such as Tharaka Nthi (Chuka) and Kitui County (Mwingi).

Ishiara hospital is situated in Mbeere North Sub- County, Siakago Constituency Evurore Division, Evurore location, Evurore Sub-location. It isa Sub- county referral hospital of the health facilities within its catchments area. Mbeere Sub- county hospital located in Mbeere North Sub- county, Siakago constituency, Siakago division, Nthawa location, Siakago sub-location in Embu County. The hospitals were purposely chosen because they are leading with PTB and neonatal deaths both at the facility levels and in Embu County. The three hospitals are the only Public hospitals admitting premature babies. ERTH has a higher capacity while the other two hospitals have very low capacity of admissions. According to MOH report (2015), Embu

County has 180 health facilities and only 24 with maternity services (16 Public health facilities, 2 faith based facilities and 6 private facilities).Public health facilities conducting deliveries are: Level 5-1, level 4 -4, level 3- 11 and level 2- 5. However level 2 do not have maternity units but they conduct deliveries as an emergency, then they refer the patient to the nearest health facility with maternity services. In public health facilities total number of nurse midwives deployed in maternity unit was 151. Study hospitals have 108 nurses deployed in maternity unit. ETRH was the only hospital with a pediatrician and obstetrician/gynecologist.

3.3 Study population

Table 3.1 illustrates the study population and the workload. Study population are the health care providers (nurse midwives) working in maternity unit. This is the department that provides intrapartum and perinatal care with a total population of 108 nurses. The findings demonstrated a critical nurse midwives shortage since one nurse is serving more patients than the recommended ratio of 1:8. This compromised care due to burn outs and could be attributed to low implementation of PTBI in Embu County and high levels of neonatal deaths.

Table 3.1: Study Population and workload (CHIS 2015)

Hospital	No of Nurses Midwives in Maternity unit.	Number to be sampled	No of deliveries	No of PTB	Neonatal deaths
ETRH	90	78	5413	151	132
Ishiara Hospital	12	11	985	27	9
Mbeere Sub-County	6	5	780	15	12
Total	108	94	7178	193	153

3.3.1 Inclusion criteria

Health care providers working in maternity unit who were willing to give consent.

3.3.2 Exclusion criteria

Health care providers who were on night duty, leave and those who have worked in the maternity unit for less than 3 months.

3.4 Sampling techniques and Sample size

3.4.1 Sampling techniques

The study used two types of sampling techniques namely: Purposive (Judgmental) and random sampling techniques. Purposive (Judgmental) sampling which is non-probability technique was used to select hospitals since they are leading with PTB cases in the county and for the Key informants since they possess the desired characteristics of leadership (obstetrician/gynecologist, pediatrician, MO and nurse in charge). According to Anjum *et al.* (2015), Purposive sampling, also known as judgmental, selective or subjective sampling, reflects a group of sampling techniques that rely on the judgment of the researcher; when it comes to selecting the units that are to be studied. Simple random sampling which is a probability sampling technique was used to select study subjects. Thus all the respondents had an equal opportunity of participating in the study. The desired sample size in hospitals was allocated proportionally as indicated in table 3.2

Table 3.2: Proportionate Allocation of sample size

Hospital	No of Nurses Midwives in Maternity unit.	Number sampled	Percentage
ETRH	90	78	83
Ishiara Hospital	12	11	12
Mbeere Sub-County	6	5	5
Total	108	94	100

3.4.2 Sample size determination

Formula by Fisher *et al.* (1998) formula (Mugenda & Mugenda, 2003). $n=Z^2pq/ d^2$ and corrected for a population less than 10,000.

nf=n/ (1+n/N)

Where: n is the desired sample size when the population is less than 10,000.

Z= 1.96 the standard normal deviation usually set at 1.96 which corresponds to the 95%level of confidence. .

P= is the proportion of the target population estimated to have a particular characteristic which is 50%

q =1.0- p= 1- 0.5=0.5

d= this is the degree of accuracy desired, at the 0.05 level.

nf=n/ (1+n/N)

$n= (1.96)^2(0.5)$ x (0.5) / $(0.05)^2$=384

N= target population =108

nf= 384/ (1+384/ 108) = 83.5= 84

The sample size was 94. This includes 10 % to cater for a possible non- respondents rate.

3.5 Data Collection tool/instruments

Data was collected using self-administered structured questionnaires; Key informant interview guides (KIIs) and document review guide. KIIs collected data from 5 health workers (nurse in charge of study maternity unit, M.O /CO, obstetrician/gynecologist, paediatrician). The questionnaires collected data on implementation of PTBI, socio demographics data, training related to PTBI and institutional based factors. According to (Mugenda & Mugenda, 2011). Structured questionnaire provides comparability of responses and facilitates analysis. Document review guide was used to collect data from client files. Research instruments were constructed based on the study subjects, literature review contents and from the study variables as indicated in the conceptual framework.

3.6 Pretest of the questionnaires

Pretesting helps to identify flaws and correct them before the actual survey. Pre-testing was carried out with 10 health care providers with the same characteristics as the study subjects at Runyenjes Sub- County Hospital in Eastern side of Embu County. The hospital is similar to Mbeere North Sub- County Hospital. Pretesting helped to estimate time that would be taken, identify any problems (omission, ambiguous questions), ascertain validity and reliability and enhance rectification of the questionnaire before commencement of the study.

3.6.1 Validity

This is the degree in which a test measures what it purports to measure. According to Golafshani (2013), validity is the extent to which a data collection instruments

accurately measures what it is intended to measure. There are three categories of validity namely; construct validity, content validity, and criterion-related validity. Content validity is the degree at which the measurement device offers coverage of questions under investigation adequately (Dawson, 2009). The study adopted content validity since it was the most appropriate. The researcher ensured careful development of the research instruments to cover all the questions being investigated and also ensured that the content was not have any ambiguities. Pre-testing was done to ascertain if all the questions set was interpreted in the same way by the respondents. Information obtained from the pretest was used to refine the tools prior to the main study. My supervisor also had an opportunity to ascertain the validity of the instruments.

3.6.2 Reliability

According to Gay *et al*. (2012) reliability is the degree to which a test consistently measures whatever it measures. He further stipulated that errors of measurement that affect reliability are random errors. There are two forms of random errors likely to occur namely: intra- rater and inter-rater. Inter-rater was later reviewed by Donholds (2005) and stated that it is the probability of same clinicians producing the same results on the same patient. In this study to enhance reliability and minimize errors, the researcher ensured selecting and training of research assistants, incorporates them in pre-test and supervise them all through during data collection exercise. Completed questionnaires were checked on dairy basis for any anomalies and errors were corrected in time.

3.7 Data collection technique

Quantitative data was collected using self-administered questionnaire (Appendix II) and document review guide (Appendix III) while qualitative data was collected using Key informant guides (Appendix IV). Three assistants knowledgeable in midwifery participated in the training to equip them with knowledge and skills necessary for data collection. The training covered the purpose of the research, its objectives and the process of administering the study instruments. They were also involved in pre-test so as to familiarize themselves on the study instruments. During the pre-test, the researchers assessed their effectiveness and helped in solving problems that they arose.

3.8 Data Management and Analysis

Data collected was checked on daily basis for completeness and any anomalies rectified. It was then separated and categorized. Before categorization, the data collected was subjected to cleaning, entering and, coding in excel. Quantitative data was analyzed using Statistical Package for Social Sciences (SPSS) version 21 while qualitative data was categorized in themes based on the study objectives. Descriptive statistics analysis was used (frequency distribution, percentages distribution, measures of central tendency and measures of dispersion). Chi- square, Fisher's exact test (computed data where the cells had less than 5 values) and logistic regression analysis (generated odds ratio, confidence limits and proportions of the variables) were used to establish relationship between valuables hence draw conclusion. Statistical significance was set at $p= 0.05$.

The following models were used to establish relationship between variables:

Stage 1: Relationship between variables and implementation of PTBI

$$Prob(Y = 1/X1, X2, X3 \ldots Xn) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \varepsilon$$

$\text{logitz} = \ln \frac{P}{1-P}$, $\text{wherez} = \beta_0 + \beta_1 x_1 + \beta_1 x_2 + \beta_1 x_3 + \beta_1 x_4 + \varepsilon x_i$ and β_1

are, respectively, the dimension of variables influencing the health care provider, in implementation of PTB interventions and the associated coefficient, while p is the probability of implementation of PTB interventions associated with x_i ; ε' is the error term.

α_0 = Constant

Y= 1 or 0 (1= High implementation of PTB interventions and 0 is low implementation of interventions)

Whereby, Less than 3 interventions represented low implementation while 3 or more interventions represented high implementation of the interventions.

X1 = Implementation of PTB interventions

X2 = Social demographic characteristics

X3 = Training related to PTB interventions

X4 = Health facility factors.

ε = error term

Data presentation was in tables and charts for easy interpretation.

3.9 Logistical and Ethical consideration

Clearance was sought from Kenyatta University ethical committee. Authority to conduct the research was granted by the graduate school. Permit to conduct the research was obtained from National Commission of Sciences and Technology.

Additional clearance was sought from Chief Officer of health, County Director of Health in Embu County, Chief executive officer in ETRH and informed consent and cooperation from the participants. Participation was voluntary and clients were ensured of privacy and confidentiality. The questionnaire (Appendix I) did not have markers linked to individual participant nor bear their names. Data was stored in a computer secured in password.

CHAPTER FOUR

RESULTS AND DATA ANALYSIS

4.0 Response Rate

The number of questionnaires that were administered to the Health care providers (nurses) in the maternity unit was 94. A total of 93 questionnaires were properly filled and returned. This represented an overall successful response rate of 98.99% as shown in Table 4.1.

Table 4.1: Response Rate

Response	Frequency	Percentage
Returned	93	98.99%
Unreturned	1	1.01%
Total	**94**	**100%**

4.1 Socio- Demographic Characteristics of Health Care Providers

The results in table 4.2 revealed that n=45 (48%) of the respondents were aged 35 years old while the least n=13 (15%) were aged between 26-30 years. Majority n=77 (83%) were female while n=16 (17%) were male. In education slightly more than half of the respondents n=56 (60.2%) were diploma holders while least n= 3 (3.2%) had master's degree. The results further revealed quarter of the respondents n=24 (25.8%) had nursing experience of less than 5 years while the least n=11 (11.8%) had an experience of 11-15 years.

Table 4.2: Socio-Demographic Characteristics of Health Care Providers (n=93)

Socio- Demographic Characteristics	Frequency	Percent
Age		
Above 35 years	45	48
20-25 years	19	20
31-35 years	16	17
26-30 years	13	15
Gender		
Female	77	83
Male	33	17
Level of Nursing Education		
Diploma	56	60.2
Degree	24	25.8
Certificate	10	10.8
Masters	3	3.2
Experience in Nursing		
Less than 5 years	24	25.8
16-20 years	21	22.6
above 20 years	20	21.5
6-10 years	17	18.3
11-15 years	11	11.8
Area of Specialty		
Midwifery	66	71
Reproductive Health	21	22
Paediatrics	6	7
Neonatal Care	0	0

4.3.1 Health Care Provider's Opinion on Implementation of PTBI

The results in table 4.3 revealed that majority of the respondents agreed with the statement that PTBI are administered to pregnant women and PTB babies accordingly. According to their opinion, highest implemented was antibiotic prophylaxis (91.49%) and resuscitation (90.42%) while least implemented was antenatal corticosteroids (ACS) (64.90%). However the number of those who disagreed with the statement was insignificant as compared to those who agreed and those that remained neutral.

The HCP responses were echoed by the KIIs who were asked to indicate the types of PTBI implemented. Their responses were as follows: Informant 1, 2, and 5 indicated "*tocolytics, resuscitation, and antenatal corticosteroids".* 1n addition informant 1 also indicated "*keeping the baby warm, and bed rest"* while informant 3 and 4 indicated "*Kangaroo mother-care and referrals"* respectively. Contrary to the study participants responses none of the KIIs indicated ANC antibiotic prophylaxis.

On a five-point scale, the average mean of the responses was 4.15 which means that majority of the respondents agreed with the statements; however, the answers were varied from the mean as shown by a standard deviation of 1.03.

Table 4.3: Health Care Provider's opinion on implementation of PTBI (n=93)

Statement	strongly disagree	Disagree	neutral	agree	strongly agree	Mean	Standard Deviation
Tocolytics to women with preterm birth (PTB)	3.19	6.38	8.51	32.98	48.94	4.18	1.05
Anti-biotic prophylaxis to women with PROM in PTB	1.06	3.19	4.26	35.11	56.38	4.43	0.81
ANC corticosteroids to women with PTB within 48 hours prior delivery	3.19	10.64	21.28	35.11	29.79	3.78	1.09
Resuscitation to premature babies	2.13	3.19	4.26	30.85	59.57	4.43	0.89
Kangaroo mother care (KMC)	8.51	7.45	17.02	18.09	48.94	3.91	1.32
Aggregate						**4.15**	**1.03**

4.3.2 Implementation of various types of PTBI in Embu County

The results in table 4.4 revealed that highest number of the respondents n=33 (35.5%) had administered resuscitation, while the lowest administered PTBI was n=3 (3.2%) Kangaroo mother care. However, n=3 (3.2%) of the respondents had not administered

any of the mentioned PTBI. One of the respondents who had not administered KMC gave reasons that NBU "*space is not adequate for KMC room and it is not practiced in the facility."*

Table 4.4: Implementation of various types of PTBI in Embu County (n=93)

Administration of PTBI	Frequency	Percent
Resuscitation	33	35.5
Antibiotic prophylaxis	23	24.7
Tocolytics	16	17.2
ANC Corticosteroids	15	16.1
Kangaroo mother care	3	3.2
None	3	3.2
N	**93**	**100**

4.3.3 Frequency of Administration of PTBI and the number of interventions implemented

The results in table 4.5 revealed that less than half of the respondents n=35 (37.6%) have administered PTBI more than 15 times in the last 1 year, while least number of respondents n=9 (9.6%) administered 11 to 15 times. In addition n=49 (52.7%) of the respondents had implemented less than 3 interventions while n= 44 (47.3%) implemented more than 3 interventions.

Table 4.5: Frequency of Administration of PTBI and the number Implemented (n=93)

Frequency of Administration			No. of Interventions Implemented		
Category	Frequency	Percent	Category	Frequency	Percent
Over 15 times	35	37.6	Less than 3	49	52.7
6-10 times	27	29.0			
Less than 5 times	22	23.7			
11-15 times	9	9.7	3 and above	44	47.3
N	**93**	**100**	**N**	**90**	**100**

4.3.4 Extent at which level of PTBI implementation affects implementation of PTBI

The results in figure 4.1 revealed that slightly less than half of the respondents n=44 (47%) indicated that level of implementation affects the uptake of PTBI to a large extent, while n=12 (13%) indicated that level of administration affects implementation of PTBI to a low extent.

The 5 KIIs gave varied responses on how informed the HCP are on PTBI. Informant 3, 3 and four indicated *"low* extent*"* while informant 1 indicated "*large extent*"and informant 2 *"moderate extent"*. Sources of information of PTBI, informant 3 and 5 reported that "*no available sources*", informant 1 reported that it's "*from books, seminars and internet*", informant 2 "*National guidelines and registers*" while informant 4 reported it's from "*trainings and charts*".

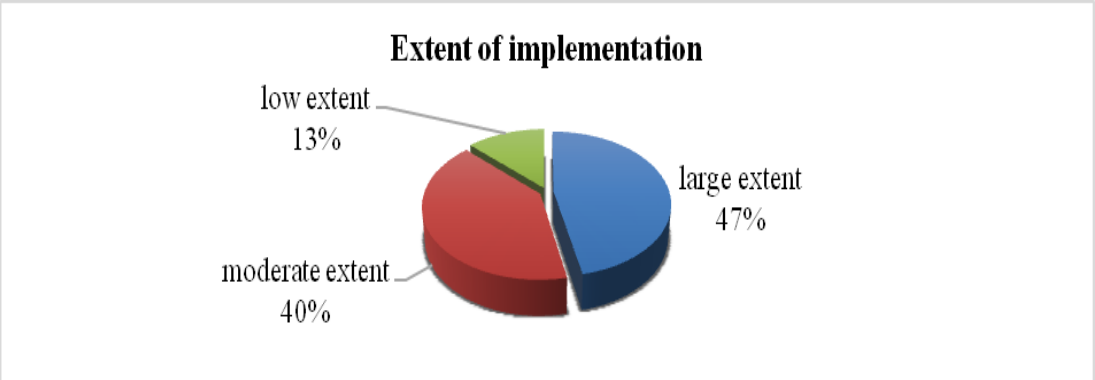


Figure 4.1: Extent of PTBI Implementation (n=93)

4.3.5 Opinion on Survival Rates of Babies exposed to PTBI n=93

The results in figure 4.2 revealed that highest number of the respondents n=53 (57%) rated the survival rates of prematurity babies exposed to PTBI at 40-80% while lowest n=7(7%) rated the survival rates to be less than 20%.

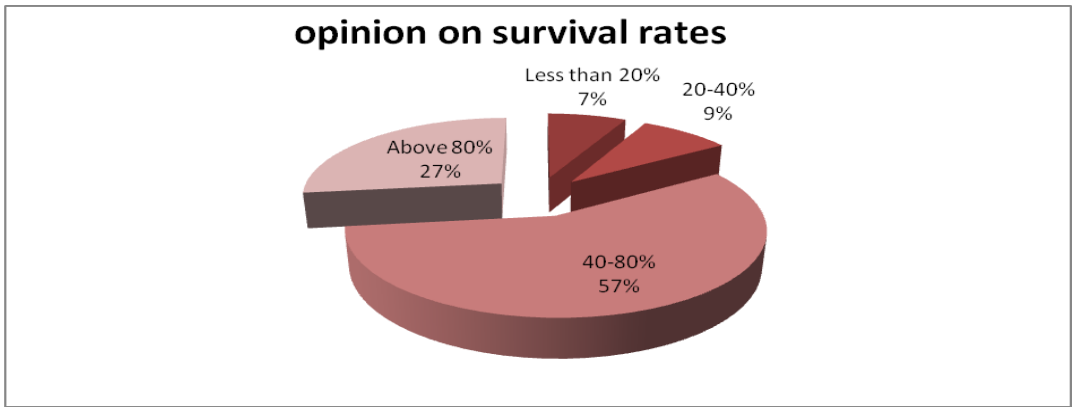


Figure 4.2: Opinion on Survival Rates of Babies exposed to PTBI n=93

4.3.6 Level of implementation of PTBI in Embu County

The first categories of each variable were used as reference point.The results in table 4.7 revealed that majority (98%) of the HCP agreed that PTBI were implemented in Embu County hospitals as compared to (2%) of those who disagreed. This study found a statistically significant association between opinion of HCP on level of implementation of PTBI in hospitals {OR=14.90, (LL=0.733, UL=303.2, FET =2.40, p=0.031)}, level of implementation of PTBI (FET=114.717, p=0.007), type of PTBI implemented (FET=1.51, p=0.001) and survival rates (FET =2.021, p= 0.011). However, this study found statistically insignificant association between extent of implementation of PTBI **(**OR= 1.61, FET =1857, p= 0.657) opinion of HCP on survival rate of babies exposed to PTBI (OR= 1.61, FET =3.147, p= 0.210) and implementation of PTBI.

The key informants (KIIs) were asked to rate the level of implementation of PTBI whether adequate or inadequate. All the 5 KIIs indicated that "*level of implementation of PTBI was inadequate"*.

Table 4.6: Level of implementation PTBI in Embu County (n=93)

Implementation of PTBI		Rate of Implementation PTBI		P value	OR	CI(Lower)	CI(Upper)	Statistical Significance
		Low	High					
Opinion of HCP on level of implementation	Disagree	0	2(6.2%)	1	1	1	1	(FET =2.404, p= 0.031)
	Agree	36(97.3%)	29(90.7%)	0.079	14.903	0.733	303.2	
	Neutral	1(2.7%)	1(3.1%)	0.003	0.625	0.183	2.131	
Level of implementation of PTBI	Implemented equal or more than 3	27(55.1%)	24(54.5%)	0.000	1	1	1	**(FET=114.717, p= 0.007)**
	Implemented less than 3	20(40.8%)	19(43.2%)	0.006	0.936	0.406	2.156	
	None	2(4.1%)	1(2.3%)	0.047	0.526	0.044	6.293	
Type of PTBI implemented	Tocolytics	8(16.3%)	8(18.2%)	1	1	1	1	**(FET=1.509, p= 0.001)**
	Antibiotics	12(24.5%)	11(25%)	0.023	1.892	0.112	31.862	
	Corticosteroids	7(14.3%)	8(18.2%)	0.040	2.356	0.152	36.495	
	Resuscitation	19(38.8%)	14(31.8%)	0.021	2.166	0.125	37.687	
	KMC	1(2%)	2(4.5%)	0.045	1.748	0.118	25.872	
	None	2(4.1%)	1(2.3%)	0.003	4.568	0.13	160.515	
Extent of level of implementation	large extent	19(38.8%)	25(56.8%)	1	1	1	1	**(FET =1857, p= 0.657)**
	low extent	8(16.3%)	4(9.1%)	0.562	1.611	0.322	8.069	
	moderate extent	22(44.9%)	15(34.1%)	0.197	2.956	0.57	15.331	
HCP opinion on surv1ival rates	less than 10%	5(10.2%)	2(4.5%)	1	1	1	1	**(FET =3.147, p= 0.210)**
	11-20%	4(8.2%)	4(9.1%)	0.212	0.200	0.016	2.496	
	40-80%	29(59.2%)	24(54.5%)	0.778	1.299	0.211	8.002	
	above 80%	11(22.4%)	14(31.8%)	0.564	0.726	0.244	2.156	

The variable in this model (level of implementation of PTBI) shows 12.3% of the variation in dependent variable (implementation of PTBI) which is represented by a Nagelkerke R Square of 0.123.

Table 4.7: Model summary of Bivariate Logistic Regression Analysis

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	118.255a	0.092	0.123

4.4 Social Demographic Characteristics influencing Implementation of Preterm Birth Interventions among Health Care Providers during provision of intrapartum and perinatal care in Embu County

4.4.1 Relationship between Socio-Demographic Characteristics of HCP and Implementation of PTBI

The result in table 4.9 shows the association of social-demographic characteristics and the rate of implementation of PTBI (low or high). Implementation of PTBI was low among ages 35 years and above (46%), 31-35 years (22.4%), 26-30 years (16.3%) and 20-25 years (14.3%) as compared to those age groups with high implementation above 35years (50%), 20-25 years (20.5%), 31-35 years ((18.2%) and 26-30 years (20.5%). In gender slightly more than half of the respondents n=-49 (52.7%) were associated with low implementation of PTBI while 44 (47.3%) were associated with high implementation. In education those who had diploma 28(57.1%), 28 (63.65) and degree 14(28.6%), 10 (22.7%) were associated with low and high implementation of PTBI respectively as compared to other levels of education. In experience highest number of respondents n=13 (26.5%) with an experience of 6-10 years were associated with low implementation of PTBI while n=12 (27.3% of respondents with an experience of less than 5 years and above 20 years n=12(27.3%) were associated with high implementation as compared to other levels of experience.

The results also revealed a statistically significant association between HCP level of education {OR=0.947, (LL=0.038, UL=23.581, P=0.033, FET=0.7871)} and experience (FET=0.5482, p= 0.024) and implementation of PTBI. However, age (χ^2=1.173, p= 0.760), gender (χ^2=1.173, p= 0.760) and specialty (χ^2=5.450, p= 0.568) were found to be insignificant. Thus implementation of PTBI, was found to be

influenced by level of nursing education, years of nursing experience while age, gender and area of speciality do not influence implementation of PTBI.

Table 4.8: Relationship between Socio-Demographic Characteristics of HCP and Implementation of PTBI (n=93)

Socio-demographic Factors		Rate of Implementation of PTBI		P value	OR	CI(Lower)	CI(Upper)	Statistics Significance
		Low	High					
Age	20-25 years	7(14.3%)	9(20.5%)	0.433	1	1	1	(χ^2=1.173, p= 0.760)
	26-30 years	8(16.3%)	5(11.4%)	0.107	7.372	0.649	83.671	
	31-35 years	11(22.4%)	8(18.2%)	0.191	4.786	0.457	50.072	
	Above 35 years	23(46.9%)	22(50%)	0.220	2.9485	0.521	16.989	
Gender	Male	11(22.4%)	5(11.4%)	0.000	1	1	1	(χ^2=2.000, p= 0.157)
	Female	38(77.6%)	39(88.6%)	0.226	2.273	0.602	8.589	
Level of Nursing education	Certificate	5(10.2%)	5(11.4%)	0.049	1	1	1	(FET=0.871, p= 0.033)
	Diploma	28(57.1%)	28(63.6%)	0.033	0.947	0.038	23.581	
	Degree	14(28.6%)	10(22.7%)	0.006	1.304	0.074	22.898	
	Masters	2(4.1%)	1(2.3%)	0.040	0.550	0.028	10.812	
Years of Nursing experience	less than 5 years	12(24.5%)	12(27.3%)	0.005	1	1	1	(FET=5.482, p= 0.024)
	6-10 years	13(26.5%)	4(9.1%)	0.007	0.158	0.013	1.91	
	11-15 years	6(12.2%)	5(11.4%)	0.018	0.053	0.005	0.598	
	16-20 years	10(20.4%)	11(25%)	0.017	0.275	0.042	1.79	
	above 20 years	8(16.3%)	12(27.3%)	0.035	0.724	0.177	2.961	
Area of specialty	Midwife	37(75%)	29(65.9%)	0.912	1	1	1	(χ^2=5.450, p= 0.568)
	Reproductive health	9(18.4)	12(27.3%)	0.971	0.966	0.152	6.144	
	Pediatrics	3(6.1%)	3(6.8%)	0.838	1.234	0.165	9.243	

The variable in this model (socio-demographic factors) shows 17.5% of the variation in dependent variable (implementation of PTBI) which is represented by a Nagelkerke R Square of 0.175.

Table 4.9: Model summary of Bivariate Logistic Regression Analysis

Model summary	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	115.562a	0.131	0.175

4.5 Training related to PTBI influencing Implementation of PTBI among Health Care Providers during provision of Intrapartum and Perinatal care in Embu County

4.5.1 Opinion on Training related to PTBI

The results in table 4.12 revealed that highest number of respondents (84.94%) agreed with the statement that training on essential care of newborn is related to implementation of PTBI as compared to (8.51%) and (6.38%) of those who disagreed and remained neutral respectively. For emergency obstetric care training, (83.87%) of the respondents agreed that the training is related to PTBI, (4.26%) disagreed while (11.7 %) remained neutral.

On a five-point scale, the average mean of the responses was 4.30 which means that majority of the respondents agreed with the statements; however, the answers were varied form the mean as shown by a standard deviation of 0.96.

Table 4.10: Opinion on Training related to PTBI (n=93)

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Essential care of newborn	2.13	6.38	6.38	31.91	53.19	**4.3**	0.99
EmOC	2.13	2.13	11.7	28.72	55.32	4.33	0.92
Aggregate							**0.96**

4.5.2 Type of Training undertaken by the HCP and its Influence on implementation of PTBI

The results in table 4.13 revealed that more than half of the respondents n=83 (89.3%) were trained on EmOC while least n= 10 (10.8%) were trained on essential care of

newborn. On the other hand, more than half of the respondents n=59 (63.4%) indicated that training related to PTBI influences the level of implementation of PTBI to a large extent while the least n=4 (4.3%) indicated that training related to PTBI influences the level of implementation to a low extent.

The 5 KIIs gave varied responses on how informed the HCP are on PTBI. Informant 3, 4 and 5 indicated *"low* extent*"* while informant 1and 2 indicated "*large extent*"and *"moderate extent"* respectively. Sources of information of PTBI, informant 3 and 5 reported that "*no available sources*", informant 1 reported that it's "*from books, seminars and internet*", informant 2 "*National guidelines and registers*" while informant 4 reported it's from "*trainings and charts*". They all indicated that the trainings are *rarely* conducted.

Table 4.11: Type of Training undertaken by HCP and its influence on implementation of PTBI (n=93)

Type of Training taken			**Influence of Training on implementation of PTBI**		
Category	**Frequency**	**Percent**	**Category**	**Frequency**	**Percent**
			Large extent	59	63.4
EmOC	83	89.3	Moderate extent	30	32.3
Essential care of newborn	10	10.8	Low extent	4	4.3
N	**93**	**100**	**N**	**93**	**100**

4.5.3 Relationship between Training related to PTBI and implementation of PTBI

The first categories of each variable were used as reference point as shown in the results in the table 4.14. The results revealed a statistically significant association between training related to PTBI and essential care of newborn {FET=1.629, df=92,

OR=2.443: 95% CI: 0.128-46.504, p=0.023< 0.05)}, HCP opinion on training related to PTBI (FET=2.154, df=92, OR=3.15: 95% CI: 0.00-303.2, p= 0.007< 0.05) and level of training (FET=2.012, df=92, OR=1.749: 95% CI: 0.154-19.853, P= 0.037< 0.05) and implementation of PTBI respectively.

Table 4.12: Relationship between Training related to PTBI and implementation of PTBI

Training		**Rate of Implementation of PTBI**		**P value**	**OR**	**CI(Lower)**	**CI(Upper)**	**Statistical Significance**
		Low	**High**					
HCP opinion on Training related to PTBI	disagree	0	2(4.7%)	0.000	1	1	1	(**FET=2.154 p= 0.007**)
	agree	49(100%)	41(95.3%)	0.039	3.15	0	303.2	
Type of training related to PTBI	EmOC	35(68.8%)	48(96.5%)	1	1	1	1	**(FET=1.629, p= 0.023)**
	Essential Care of newborn	9(12.2%)	4(9.0%)	0.055	2.443	0.128	46.504	
Influence of level of training on the implementation of PTBI	large extent	28(57.1%)	31(70.5%)	0.028	1	1	1	**(FET=2.012, p= 0.037)**
	moderate extent	18(36.7%)	12(27.3%)	0.031	3.364	0.316	35.819	
	low extent	3(6.1%)	1(2.3%)	0.052	1.749	0.154	19.853	
HCP opinion on surv1ival rates	less than 10%	5(10.2%)	2(4.5%)	1	1	1	1	**(F=3.147, p= 0.210)**
	11-20%	4(8.2%)	4(9.1%)	0.212	0.200	0.016	2.496	
	40-80%	29(59.2%)	24(54.5%)	0.778	1.299	0.211	8.002	
	above 80%	11(22.4%)	14(31.8%)	0.564	0.726	0.244	2.156	

The variable in this model (Training) shows 10.5% of the variation in dependent variable (Implementation of PTBI) which is represented by a Nagelkerke R Square of 0.105.

Table 4.13: Model summary of Bivariate Logistic Regression Analysis

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	119.618a	0.079	0.105

4.6 Health Facility Factors influencing Implementation of PTBI among Health Care Providers during provision of Intrapartum and Perinatal care in Embu County

4.6.1 Health Care Provider's opinion on (HFF) influencing implementation of PTBI

The results in table 4.15 revealed that on average highest number of the respondents (69.6%) agreed with the statement that HFF influences implementation of PTBI as compared to those who disagreed and those who remained neutral (30.2 %).

On a five-point scale, the average mean of the responses was 3.94 which means that majority of the respondents agreed with the statements; however, the answers were varied form the mean as shown by a standard deviation of 1.24.

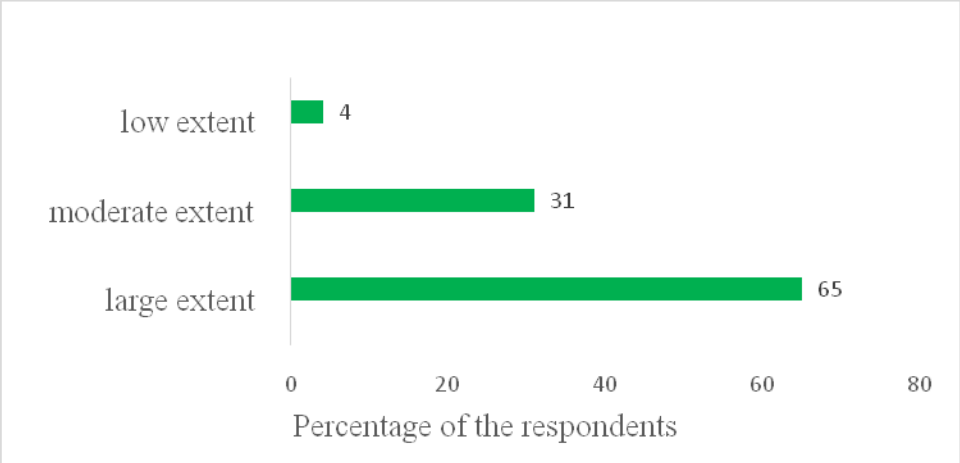
Table 4.14: Health Care Provider's opinion on (HFF) that influence implementation of PTBI (n=93)

Statement	strongly disagree	disagree	neutral	agree	strongly agree	Mean	Std Dev
Equipment (resuscitare and incubators)							
Drugs	2.15	5.38	17.2	25.81	49.46	4.15	1.03
Staffing	7.53	6.45	16.13	22.58	47.31	3.96	1.26
Transport facilities (ambulances)	4.3	13.98	12.9	21.51	47.31	3.94	1.25
Financial adequacy	12.9	9.68	12.9	21.51	43.01	3.72	1.43
Aggregate						3.94	1.24

4.6.2 Extent at which Health Facility Factors affects implementation of PTBI

The results in figure 4.5 revealed that highest n=60 (65%) of the respondents, revealed that HFF affect the level of implementation of PTBI to a large extent while the least n=4 (4%) revealed low extent.

The KIIs gave varied responses on how HFF affect the level of implementation PTBI whether to a large extent, moderate and to a low extent. The KIIs 1 and 2 indicated *moderate extent*, 3rd *low extent* while the 4th and the 5th indicated *large extent.*



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4.6.3 Relationship between Health Facility Factors and Implementation of PTBI

The first categories of each variable were used as reference point as shown in the results in table 4.18. The results revealed a statistically significant association between influence of HFF {FET=3.077, df=92, OR=0.947: 95% CI: 2.538-0.532, P= 0.009< 0.05)}, adequacy of HFF (FET=2.372, p= 0.007) and implementation of PTBI.

However, statistically insignificant association was found in all the categories of extent at which HFF affects implementation of PTBI (FET=1.597, p= 0.468>0.05) and implementation of PTBI.

Table 4.15: Relationship between Health Facility Factors and Implementation of PTBI (n=93)

Health Facility Factors		Rate of Implementation of PTBI		P value	OR	CI (Lower)	CI (Upper)	Statistical Significance
		Low	High					
Influence of HFF on implementation of PTBI	disagree	4(8.2%)	9(20.9%)	0.000	1	1	1	FET=3.077, p= 0.009
	agree	45(91.8%)	34(79.1%)	0.043	2.538	0.532	12.102	
Adequacy	disagree	9(18.4%)	12(27.9%)	0.000	1	1	1	FET=2.372, p= 0.007
	agree	40(81.6%)	31(72.1%)	0.006	1.003	0.289	3.478	
Extent into which HFF affect implementation.	large extent	31(63.3%)	29(65.9%)	0.632	1	1	1	FET=1.597, p= 0.468
	moderate extent	17(34.7%)	12(27.3%)	0.457	0.405	0.037	4.389	
	low extent	1(2%)	3(6.8%)	0.359	0.315	0.027	3.729	

The variable in this model (HFF) shows 15.8% of the variation in dependent variable (implementation of preterm birth interventions) which is represented by a Nagelkerke R Square of 0.158.

Table 4.16: Model summary of Bivariate Logistic Regression Analysis

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	123.041a	0.044	0.158

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Level of implementation of PTBI in Embu County

The findings revealed that majority of the HCP agreed that PTBI were implemented in Embu County hospitals as compared to those who disagreed. The study revealed a statistically significant association between PTBI implemented in the Hospitals, proportion of HCP implementing PTBI and type of PTBI implemented.

However, the findings revealed that despite high number of respondents agreeing that PTBI have been implemented in Embu County and the same supported by KIIs who justified availability of PTBI, level of implementation was low since, slightly less than two thirds of HCP were associated with low implementation of PTBI as compared to those who had high implementation. In addition, high percentage of HCP whose opinion on survival rates of premature babies exposed to PTBI was 40-80% were also associated with low implementation of PTB.

Low implementation of PTBI was as well supported by all the 5 KIIs. They all indicated that the level of implementation was inadequate. Highly implemented PTBI was resuscitation followed by antibiotic prophylaxis as compared to tocolytics, corticosteroids and Kangaroo mother care. The latter three are very crucial in preventing PTBO. However, Kangaroo mother care was highly underutilized despite its scientifically proven benefits of preventing complications arising from PTBO. The findings were consistent with a study in India where out of 126 pediatricians, of

Gujarat, India, 84 (66.7%) performed more than 20 resuscitation in 4 months (Bansal et al. 2014).

These findings were consistent with those of WHO (2016) who weighed on the issue that despite their effectives in preventing complications arising from PTBO, various studies report low implementation of PTBI. The findings were in agreement with Vogel *et al.* (2013) in Malawi who found that neither of the hospitals used tocolytics to prevent PTB. The study further agreed with that of Melisa *et al.* (2015) in Kenya whose findings also reported low implementation of tocolytics and corticosteroids at a rate of 1.2% and 56.4% respectively. The findings also are consistent with those of WHO (2015), Berrueta et.al (2016) and Yarney *et.al* (2016). The report also correlates with that of WHO (2014), which stipulates that despite the sound evidence of KMC effectiveness it is regretfully underutilized.

The results from medical records ascertained implementation of PTBI and evealed high survival rate of preterm babies exposed to PTBI. This implies that evidently, preterm babies exposed to PTBI have increased chances of survival since it improves PTBO, thus reducing neonatal death and child mortality rate. The results were consistent with (Alofi *et. al* 2017) which reports that out of 62 births observed (19 %) of babies required resuscitation which was done leading to (100%) survival rate. The report also agreed with Mensa *et.al*, (2017) and WHO (2014 and 2015).

5.1.2 Socio-demographic Characteristics influencing implementation of PTBI during provision of intrapartum and perinatal care in Embu County

The result revealed that implementation of PTBI was high among HCP above 35 years old, as compared to those aged between 31-35 years and 26-35 years

respectively. The results further revealed that implementation of PTBI was high among female HCP as compared to male, and speciality in midwifery, reproductive health and pediatrics. The study further revealed that implementation of PTBI was high among the HCP with nursing experience of less than 5 years and over 20 years respectively, as compared to those whose nursing experience was 11-15 and 6-10 years respectively. Current study found a statistically significant association between HCP level of education, years of experience and implementation of PTBI. Binary logistic regression also revealed that education and experience were positively and significantly related to implementation of PTBI. According to this study results in Nargelkerke R Square, social -demographic characteristics was the highest in influencing implementation of PTBI as compared to other independent variables. However, age, gender and area of speciality was positively but insignificantly related to implementation of PTBI. This implies that education, professionalism and experience among HCP are factors that may influence focused goal setting and targeted actions to promote implementation of PTBI.

These results were supported by Campbell (2010) who noted that target actions and behaviour are context specific and range from clinical work to general management of health care resources. The findings were consistent with those of save the children booklet in Bungoma County (2014) which reported that lack of practical experience on caring for a small baby in the KMC position hinders health workers from promoting KMC within their facilities.

5.1.3 Training related to PTBI influencing implementation of PTBI during provision of intrapartum and perinatal care in Embu County

Majority of HCP in the maternity unit agreed that emergency obstetric care, and essential care of new born trainings are related to implementation of PTBI hence has an influence on implementation of the interventions as compared to those HCP who disagreed. The study results revealed that percentage of HCP trained on the PTBI recorded high implementation of PTBI on emergency obstetric care where resuscitation training is one of the components as compared to training on essential care of newborn where KMC training is one of the components. Low implementation of the latter was attributed to lack of training opportunities. The study also revealed that updates on PTBI are rarely conducted hence inadequate information on PTBI. This could as well have led to low implementation of PTBI. The study also found a statistically significant association between the type of training undertaken and implementation of PTBI. In binary regression analysis, training was positively significantly related to PTBI. Thus training related to PTBI was found to be a very important aspect in influencing implementation of PTBI.

These findings agreed with that of Wall *et al.* (2009) who stated that training courses in neonatal resuscitation can effectively increase competency and proficiency of HCP in conducting neonatal resuscitation and reduce potentially harmful practices. This study also is consistent with (Sheban *et.al*. 2015) who stipulates that components of ENC and neonatal resuscitation are proven interventions for reducing neonatal mortality rate and stillbirth rate.

In addition, the findings were consistent with other studies such as save the children booklet on implementation of KMC in Bungoma County (2014) which acknowledges

that 95 health care workers have been trained on KMC including health managers whose support is crucial in rolling out KMC services. The study is also consistent with Ameh *et al*. (2016) who stipulates that major deficiencies exist in essential newborn care training as well as HCP knowledge and performance of newborn routine care practices particularly KMC, studies in nine countries, Kenya included had 5,939 HCP trained in EmOC and essential care of newborn. Highest number of those trained were Kenyans (nurse midwives) working in maternity unit.

5.1.4 Health Facility Factors influencing implementation of PTBI during provision of intrapartum and perinatal care in Embu County

The findings in this study revealed that majority of HCP in the maternity unit who agreed with the statement that adequacy of HFF influences implementation of PTBI were associated with low implementation of PTBI as compared to those who disagreed. On the other hand, those HCP who agreed that there was adequate HFF were also associated with low implementation of PTBI as compared to those HCP who disagreed. The findings further revealed there was inadequate staff, transport and finances while drugs and equipments were adequate. The former three are important aspects in implementation of PTBI and their inadequacy may lead to low implementation of PTBI. In addition, this study also revealed that highest number of respondents reported HFF affects implementation of PTBI to a large extent as compared to those who reported moderately and low extent respectively. Respondents' responses were echoed by the 5 KIIs of whom, four reported that level of implementation is affected by HFF in a moderate and large extent respectively.

In establishing the relationship between HFF and implementation of PTBI, the results reviewed a statistically significant association between HFF and implementation of PTBI. In logistic analysis as reported in Nagelkerke R Square, HFF were second to social-demographic characteristics in influencing implementation of PTBI. This implies that HFF is an important aspect in influencing implementation of PTBI.

These results were consistent with those affirmed by USAID (2015) whose report stipulates that world health systems including those lacking leadership or having inadequate staff and supplies, underlie poor health care and contribute to the poor health outcomes. The study by USAID (2015) further reports that inadequate financing and budgetary allocation as well as poor infrastructure, poor or disjointed information and lack of data for improved policy formulation and implementation, ensure weak systems remain weak. Weak systems can be a great barrier in implementation of PTBI among the HCP. This study is also consistent with Gertrude *et.al* (2015) and Ameh *et al*. (2016). While Ameh reported that major deficiencies of supplies and equipments exist in all the health facilities assessed Kenya included, Gertrude reported that health facilities in Uganda lacked infrastructure, equipment, drugs, supplies and protocols for newborn care.

5.1.5 Summary of the Findings

In the first objective of the study, despite the implementation of various PTBI in Embu County, as indicated by the mean of the responses, the results revealed low implementation of PTBI as compared to the respondents who had high implementation. Specifically low implementation of tocolytics, ANC corticosteroids and KMC was revealed as compared to resuscitation and antibiotic prophylaxis. These

findings were consistent with those of studies carried out by Vogel *et al*. (2013), WHO (2014, 2015, 2016), Melisa *et a*l. (2015), Yarney *et al.* (2016) and Berrueta *et al*. (2016). High percentage of health care providers gave opinion that most babies exposed to PTBI have increased rate of survival. The findings were consistent with (Lawn *et al* 2012), Lipi *et al* (2013), WHO (2015), Sigh N *et a*l and Kiatsuda *et al* (2016).

In the second objective of the study, the results revealed a statistically significant association between HCP education and experience. However age, gender and area of speciality were found to be statistically insignificant, hence the variables do not influence implementation of PTBI. The results were consistent with Campbell (2010) and save the children booklet Bungoma County (2014).

In the third objective, the results revealed that training related to PTBI influences implementation of PTBI since it was found to be statistically significantly associated to implementation of PTBI. High number of HCP were trained in emergency obstetric care and were associated with high implementation of PTBI as compared to essential care of newborn. However, the results revealed very low implementation of PTBI in essential care of newborn training. This could be attributed to lack of training opportunities hence leading to underutilization of KMC which is one of the components of essential care of newborn training. This implies that training related to PTBI are very essential in implementation of PTBI. The findings were consistent with that of Wall *et al.* (2009), save the children booklet on implementation of a KMC in Bungoma and Ameh *et al*. (2016) and Sheba *et al.* (2015).

In the fourth objective, results revealed statistically significant association between HFF and implementation of PTBI. Hence HFF influences implementation of PTBI. However, the results revealed inadequate HFF (staffing, finance and transport). Health care provider's responses were echoed by all the 5 KIIs. Inadequacy of the latter may lead to low implementation of PTBI despite availability of drugs and equipments. The results were consistent with those affirmed by USAID (2015) and Ameh *et al.* (2016) and Gertrude *et al.* (2015).

5.2 Conclusion

i. Based on study findings, level of implementation of PTBI was low among HCP during provision of intrapartum and perinatal care. The findings revealed that most implemented PTBI was resuscitation, and ANC antibiotic prophylaxis while there was low implementation of tocolytics, ANC corticosteroids and KMC respectively. Kangaroo mother care was highly underutilized.

ii. Social demographic characteristics: education and experience were found to influence implementation of PTBI while age, gender and speciality do not influence implementation of PTBI among the HCP during provision of intrapartum and perinatal care. However, low implementation of PTBI was revealed as seen in gender where highest number of HCP were associated with low implementation of PTBI. Current found statistically significantly association to between education and experience and implementation of PTBI while age, gender and speciality were found to be positively statistically insignificant.

iii. This study likewise concluded that HCP receive trainings related to PTBI though not evenly distributed and updates are rarely provided with limited source of

information. Despite high number of HCP pointing out that essential care of newborn is related to PTBI, low number of HCP were trained in essential care of newborn as compared to those trained in EmOC. Ultimately training related to PTBI influences implementation of PTBI since, this study found statistically significant association between all the categories in training and implementation of PTBI.

iv. The findings concluded that health facility factors influence implementation of PTBI among HCP during provision of intrapartum and perinatal care. However, the results revealed inadequate staffing, finance and transport while drugs and equipments were found to be adequate. The former three are very essential in implementation of PTBI and their inadequacy could have led to low implementation of PTBI. The results also revealed statistically significant association between HFF and implementation of PTBI.

5.3 Recommendations

5.3.1 Recommendations from the study Directed to Implementing Agencies

i. The study recommends Ccounty government of Embu and the hospital management to come up with strategies geared towards empowering HCP in order to enhance implementation of PTBI. Such strategies could be exchange programs in the best performing facilities implementing PTBI, intensify surveillance of pregnant women with PTB and promote advocacy on importance of PTBI in order to raise the standards of implementation of PTBI.

ii. County government and National governments should consider community based programs that will influence implementation of PTBI. They should also provide avenues or open forums at county and national levels for HCP and stakeholders to share experiences and exchange ideas on best practices in implementation of PTBI. This will ensure a constant supply of experienced human resource to help reduce PTB thus reducing complications arising from PTBO hence increase survival rates of preterm babies.

iii. The government, hospital management, program managers and coordinators should invest in training related to PTBI and induction of more nurses in the field of PTBI. As well more avenues of updates including on job trainings, and provide more source of learning materials to keep HCP more informed. Trainings related to PTBI should be evenly distributed so that HCP are well equipped with adequate knowledge and skills to enhance implementation of PTBI. In addition, the study recommends the county government to consider improving HFF by; providing facilities for KMC, improve transport facility, recruit more skilled staff and increase funding in the field of midwifery/reproductive health to enhance implementation of PTBI. Adequate funding will enhance more staff recruitment, maintenance of transport, timely procurement of drugs and equipments. Consequently promoting implementation of PTBI.

5.3.2 Recommendations for further study

1. A study similar to the current one should be considered in other County hospitals in Kenya for a comparison approach on the findings.

2. A study on strength of health facility systems ability to facilitate implementation of PTBI in Embu County and other counties.
3. Further studies could be carried out to look into the intervening variables (client factors, social factors, and environmental conditions) influencing implementation of PTBI.

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APPENDICES

Appendix I: Informed Consent

Introduction

Dear respondent,

My name is Edith Ndwiga I am a postgraduate student from Kenyatta University, pursuing Master degree in Public Health. I am undertaking research to assess implementation of preterm birth interventions (PTBI) in Embu County. I will highly appreciate if you would spare time and participate in this study. Any information given will be treated with utmost confidentiality and it will only be used for the purpose of this study.

Purpose of the study

The study seeks to assess implementation of preterm birth interventions (PTBI) among health care providers during provision of intrapartum and perinatal care in Embu County. Study findings will help promote implementation of PTBI hence improve preterm birth outcome and subsequently increase survival rates among premature babies.

Procedures to be followed

You will be required to answer questions regarding your social demographic characteristics, implementation of PTBI, training related to PTBI and health facility factors. The interviewer will as well gather information from clients files.

Discomfort and Risks

There are no risks associated with the procedures to be applied in this study.

Benefits

The information obtained may not have direct benefits to you but will help bridge the gaps in the uptake of PTB interventions.

Confidentiality

The information obtained will be for research purposes only. You are not required to write your name in the questionnaire. The questionnaires will be coded so that it will not be accessible to any other person and kept in a locked cabinet. In case you have any questions about this study you are free to ask. Do not hesitate to seek for clarification if any.

Participation

Participation in this study is entirely voluntary, but you may withdraw from participating in any part of the study or from the entire study at any time. However, your honest answers to these questions will be of great benefit for the study. You are free to ask any questions or clarification pertaining to this study which is not clear to you or not well understood after you have had the consent explained to you. I would greatly appreciate your help in responding to the written questions.

Contact information.

If you have any question kindly contact

Edith Wamuyu Ndwiga on 0721-723-116 or

Kenyatta University Ethical Review Committee on kuerc@ku.ac.ke.

Participant's statement

The above information regarding my participation in the study is clear to me. I have been assured of confidentiality of all the information I will give. I understand that my participation in this study will be voluntary and no incentives will be given to me. I will have the opportunity to ask questions, all of which will be answered to my satisfaction.

Signature or thumbprint…….Date……...

Investigator's statement

I, the undersigned, have explained to the participant in a language she/he understands the procedures to be followed, risks and benefits involved.

Name of interviewer…….

Interviewer's signature……Date…….

Appendix II: Questionnaires

PART A: Socio-demographic characteristics of health care provider (HCP)

Please tick your responses in the provided box.

1. What is your age? (years)

20-25 ( ) 26 - 30 ( ) 31- 35 ( ) Above 35 ( )

2. What is your gender?

Male ( ) Female ( )

3. What is your level of education?

Certificate ( ) Diploma ( ) Degree ( )

Masters ( ) PHD ( )

4. What are your years of experience?

Less than 5 ( ) 6-10 ( ) 11- 15 ( ) 16 -20 ( )

Above 20 ( )

5. What is your area of specialty?

Midwifery ( ) Reproductive health ( ) Pediatrics ( )

Neonatal care ( )

Others specify.....

Implementation of Preterm Birth Interventions (PTBI)

Rate the level of implementation of PTBI in this hospital in the given categories. Use a scale of 1-5 where 1=strongly disagree, 2=disagree, 3=neutral, 4= agree, 5=strongly agree

Implementation of PTBI	**1**	**2**	**3**	**4**	**5**
Tocolytics to women with preterm birth (PTB)					
Anti-biotic prophylaxis to women with PROM in PTB					
ANC corticosteroids to women with PTB within 48 hours prior delivery					
Resuscitation to premature babies					
Kangaroo mother care (KMC)					

Of the above mentioned PTBI which ones have you administered in the last one year?

Tocolytics ( ) Anti-biotic Prophylaxis ( ) Corticosteroids ( )

Resuscitation ( ) Kangaroo mother care ( ) None ( )

If none, please give reasons……..

How many times have you administered the above mentioned interventions in the last 1 year?

Less than 5 times ( ) 6-10 times ( ) 11-15 times ( )

Over 15 times ( )

To what extent does level of implementation affect the level implementation of PTB interventions?

A large extent ( ) Moderate extent ( ) Low extent ( )

To your opinion what is the survival rates of prematurity of babies exposed to PTBI?

Less than 20 % ( ) 21- 40% ( ) 40- 80% ( ) Above 80% ( )

Type of training related to PTBI

Rate the level of training related to implementation of PTBI in the given categories. Use a scale of 1-5 where 1=strongly disagree, 2=disagree, 3=neutral, 4= agree, 5=strongly agree

Training related to uptake of PTBI	1	2	3	4	5
Emergency obstetric care					
Essential care of newborn					

Of the fore mentioned training related to implementation of PTBI which one have you been trained on? Specify……

To what extent does level of training related to PTBI influence the level of uptake of PTBI?

A large extent ( ) Moderate extent ( ) Low extent ( )

Health Facility Factors

Rate the level at which Health facility factors influences implementation of PTBI in the given categories. Use a scale of 1-5 where 1=strongly disagree, 2=disagree, 3=neutral, 4= agree, 5=strongly agree.

Health Facility Factors	1	2	3	4	5
Equipment (resuscitate and incubators)/ Drugs					
Staffing					
Transport facilities (ambulances)					
Financial adequacy					

Rate the level of adequacy of Health facility factors on implementation of PTBI in the given categories. Use a scale of 1-5 where 1=strongly disagree, 2=disagree, 3=neutral, 4= agree, 5=strongly agree.

Adequacy of Health Facility Factors	1	2	3	4	5
Equipment (resuscitate and incubators)					
Drugs					
Staffing					
Transport facilities (ambulances)					
Financial adequacy					

To what extent do the above mentioned health facility factors affect the level of implementation of PTBI?

A large extent ( ) Moderate extent ( ) Low extent ( )

Appendix IV: Key Informant Interview Guide

Leadership personnel (Nurse In charge, obstetrician/gynecologist, Pediatrician, MO/CO)

i) What are the implemented preterm birth interventions (PTBI) in this hospital?

……
……
……

ii) What are the levels of implementation of PTBI in this hospital? Are they adequate or inadequate?.....

iii) How informed are health care providers in regard to PTBI? Are they large extent, moderate extent or low extent?…….

iv) What are the sources of information for PTBI?

……
……
……
……

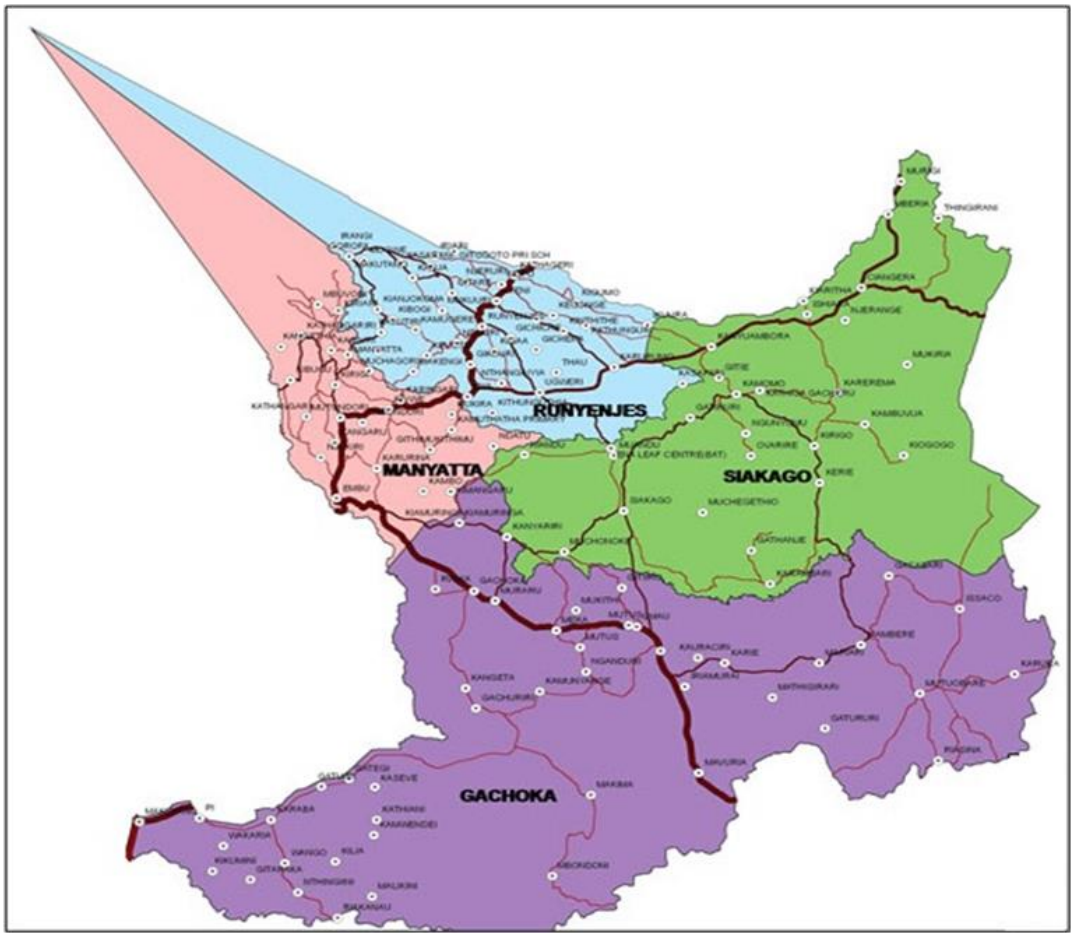
v) How often are the updates on PTBI? Are they monthly, quarterly, yearly or rarely

……

vi) How do health facility factors affect level of implementation of PTBI? Are they large extent, moderate extent, or low extent?……...

……..

Appendix V: Map of Study Area-Embu County



Appendix VI: Approval and Authorization Letters

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 15th February, 2018

TO: Edith Wamuyu Ndwiga
C/o Population and Reproductive Health
Dept.

REF: Q139/CTY/PT/31799/2015

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that Graduate School Board at its meeting of 31st January, 2018 approved your Research Proposal for the M.P.H Degree Entitled, **"Uptake of Preterm Birth Interventions among Health Care Providers during Provision of Intrapartum and Perinatal Care in Embu County, Kenya."**

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

KENYATTA UNIVERSITY
15 FEB 2018
GRADUATE SCHOOL
P.O. Box 43844-00100 NAIROBI

Thank you.

JULIA GITU
FOR: DEAN, GRADUATE SCHOOL

C.c. Chairman, Population and Reproductive Health Department.

Supervisor:

1. Prof. Margaret Keraka
C/o Department of Population and Reproductive Health
Kenyatta University

2. Dr. Maurice Kodhiambo
C/o Department of Pharmacy
Kenyatta University

JG/*rwm*

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P.O. Box 43844, 00100
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Tel. 8710901 Ext. 57530

Our Ref: Q139/CTY/PT/31799/2015 **DATE:** 15th February, 2018

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MS. EDITH WAMUYU NDWIGA – REG. NO. Q139/CTY/PT/31799/2015

I write to introduce Ms. Edith Wamuyu Ndwiga who is a Postgraduate Student of this University. She is registered for M.P.H degree programme in the **Department of Population and Reproductive Health.**

Ms. Ndwiga intends to conduct research for a M.P.H Proposal entitled, **"Uptake of Preterm Birth Interventions among Health Care Providers during Provision of Intrapartum and Perinatal Care in Embu County, Kenya".**

Any assistance given will be highly appreciated.

Yours faithfully,

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

KENYATTA UNIVERSITY * OFFICE OF DEAN * 15 FEB 2018 GRADUATE SCHOOL P.O Box 43844-00100 NAIROBI

JG/rwm

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/18/76201/24373**

Date: **15th September, 2018**

Edith Wamuyu Ndwiga
Kenyatta University
P. O Box 43844-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Uptake of preterm birth interventions among health care providers during provision of intrapartum and perinatal care in Embu County, Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Embu County** for the period ending **14th September, 2019.**

You are advised to report to **the County Commissioner, the County Director of Education and the County Director of Health Services, Embu County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Embu County.

The County Director of Education
Embu County.

Appendix VII: Nacosti Permit

THIS IS TO CERTIFY THAT:
MS. EDITH WAMUYU NDWIGA
of KENYATTA UNIVERSITY, 0-60100
EMBU,has been permitted to conduct
research in *Embu County*

on the topic: *UPTAKE OF PRETERM BIRTH INTERVENTIONS AMONG HEALTH CARE PROVIDERS DURING PROVISION OF INTRAPARTUM AND PERINATAL CARE IN EMBU COUNTY, KENYA*

for the period ending:
14th September,2019

Permit No : NACOSTI/P/18/76201/24373
Date Of Issue : 15th September,2018
Fee Recieved :Ksh 1000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014.

CONDITIONS

1. The License is valid for the proposed research, location and specified period.
2. The License and any rights thereunder are non-transferable.
3. The Licensee shall inform the County Governor before commencement of the research.
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
5. The License does not give authority to transfer research materials.
6. NACOSTI may monitor and evaluate the licensed research project.
7. The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice.

National Commission for Science, Technology and innovation
P.O. Box 30623 - 00100, Nairobi, Kenya
TEL: 020 400 7000, 0713 788787, 0735 404245
Email: dg@nacosti.go.ke, registry@nacosti.go.ke
Website: www.nacosti.go.ke

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEARCH LICENSE

Serial No.A 20660

CONDITIONS: see back page