PERINATAL DEPRESSION AND MATERNAL-INFANT BONDING DISORDERS IN MOTHERS OF FULL-TERM NORMAL INFANTS

BY

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DECLARATION

I, Dr. Tabitha Ndewa Munyoki Hereby declare that this is my original work and has not been presented to any university degree.

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DEDICATION

This work is dedicated to my daughter Hailey-Grace Tanu who was the inspiration behind this work.

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LIST OF ABBREVIATIONS

AD	Antepartum depression
AIDs	Acquired Immune Deficiency Syndrome
APGAR	Appearance, Pulse, Grimace, Activity, and Respiration
ANC	Antenatal care
CPMDs	Common perinatal mental disorders
CS	Caesarian section
COVID-19	Coronavirus Disease 2019
DSM	Diagnostic and Statistical Manual of Mental Disorders
ERC	Ethical Research Committee
EPDS	Edinburg Postnatal Depression Scale
GBD	Global burden of disease
HICs	High income countries
HIV	Human immunodeficiency virus
HPA	Hypothalamic-pituitary-adrenal
HRP	Human reproductive programme
ICD	International Classification of Diseases

IPV	Intimate partner violence
KNH	Kenyatta National Hospital
LICs	Low income countries
MIB	Mother-infant bonding
MIBD	Mother-Infant bonding Disorders
MCH	Mother and child health
MDD	Major depressive disorder
MDE	Major depressive episode
MOH	Ministry of Health
MNS	Mental health, neurological, and substance use
NCD	Non-communicable disease
OR	Odds Ratio
PD	Postpartum depression
PBQs	Postpartum bonding questionnaire Scale
SD	Standard Deviation
SSA	Sub-Saharan Africa
SOP	Standard Operating Procedure

SVD	Spontaneous vaginal delivery
UON	University of Nairobi
WHO	World Health Organisation
YLD	Years Lived with disability

OPERATIONAL DEFINITIONS

Mother-infant bonding impairment: Mother–infant bond is an attachment that forms between an infant and its mother beginning at birth. In this study the mother-infant bonding impairment will be defined as postpartum mothers who scored at least12 for impaired bonding and/or at least 13 for rejection and pathological anger and/or at least 10 for infant focused anxiety and/or at least 3 for incipient abuse in the postpartum bonding questionnaire scoring scale. This indicated that the parent has negative affection towards the baby and feels a greater psychological burden with regard to parenting.

Perinatal depression: This was measured as postpartum women with scores of 13 and above in the Edinburgh Postnatal Depression Scale (EPDS) based on gestation up to ten weeks postpartum.

Full term: This was defined as infants born from 37 weeks to 41 weeks gestation

Normal: This was defined as an infant born without congenital malformations

Parity: This was confirmed from the Antenatal Clinic (ANC) booklet and captured as either primiparous or multiparous

Obstetric complications: This was included a history of the following: abortion, miscarriage, still birth, premature birth or fistula. They were assessed as either being present or absent.

Social support: This was assessed using a semi structured questionnaire and will be Captured as Lack of social support or Presence of social support

Type of delivery: This was categorized as spontaneous vaginal delivery, assisted delivery or caesarean section

Unplanned pregnancy: This was denoted as either planned or unplanned

ABSTRACT

Background: The periods during pregnancy and postnatal are known to be vital for the commencement and progression of mother–infant bonding. A mother suffering from depression in the course of any of these stages may have issues with establishing effective bonding. An evaluation of whether perinatal depression influences postnatal mother-infant bonding has scarcely been researched in Kenya.

Methodology: This was a case control study, undertaken in a hospital setup within a period of three months in 2021. Participants were postpartum mothers aged between 18-49 years at 6-12 weeks postpartum attending Mother and child health clinic at Kenyatta National Hospital. Cases were mothers with postpartum bonding disorders per Postpartum Bonding Questionnaire scale while controls were mothers who did not have postpartum bonding disorders. Consecutive type of sampling was employed to recognize participants for the cases. For each case enrolled, there was a simultaneous recruitment and enrollment of two participants as controls. Owing to a comparable larger number of controls, a simple random method was engaged to identify controls from within the same source population as the cases. Two self-report scale tools, Postpartum Bonding Questionnaire scale and Edinburg Postnatal Depression scale were used to obtain data on depression and bonding. A semi-structured questionnaire collected obstetric information, presence of partner support and intimate partner violence. Data analysis was conducted using STATA version 11 and presented in tables and graphs. Statistical significance was set at 5%. Descriptive analysis of key variables was done. Bivariate regression analysis was done between the outcome variable (Mother-Infant Bonding Disorders) and categorical variables. The multivariate analysis that followed allowed for confirmation of whether the borderline or subtle associations were truly significant.

Results: A total of 225 mothers (81 primiparous and 144 multiparous) participated in this study. The proportion of women with perinatal depression was 40% in the case group and 9.3% in the control group. The odds of having perinatal depression were 6.48 more in the cases than the controls (OR: 6.48, (95% C.I: 3.16, 13.28) and P-value <0.001).None of the obstetric complications were significantly associated with Mother Infant Bonding Disorders. Assisted delivery was significantly associated with Mother Infant Bonding Disorders (OR: 0.20 95% CI: 0.04, 1.07, P=0.06). The odds of having Mother Infant Bonding Disorders were 79% less likely if the participant had assisted delivery.

Conclusion: Mother Infant Bonding Disorders and perinatal depression had an association that was statistically significant. This study concluded that none of the obstetric, social or biomedical factors were significantly associated with mother infant bonding disorder except assisted delivery that was noted to be protective.

Keywords: perinatal depression, Mother infant bonding, postpartum mothers, MCH

1. CHAPTER ONE: INTRODUCTION

1.1.Background

Mental health and social wellbeing are crucial in tackling the worldwide problem of non-communicable diseases (NCDs) (Stein et al., 2019). A projection by the World Health Organization (WHO) projected that depression would be a leading source of disease burden in the world by 2020 (Parsons, Young, Rochat, Kringelbach, & Stein, 2012). Additionally the high female: male sex ratio alluded to in relation to prevalence of depression, more so during the reproductive window, is a frequently replicated finding in epidemiology hence giving it more validity (Lépine, 2011). It is also documented that people can suffer from depression at any age group (Lépine, 2011). About I out 5 women globally suffer from depression during gestation (Parsons et al., 2012). Perinatal depressive illness comprises major and minor depressive episodes which ensue both during gestation or puerperium and up to 12 months after delivery. This illness can result in devastating consequences to both the woman and her entire family (Serati & Carnevali, 2018). Maternal depression, which encompasses both antepartum and postpartum depression, is unfortunately an ignored public health problem affecting maternal and child health with potentially far-reaching effects (Manikkam, Burns, Manikkam, & Burns, 2012). A diagnosis of depression is a major prevalent diagnosable psychiatric illnesses plus it has been shown to have long-standing consequences that may include affecting the connection between mother and her infant as well as hampering the child's development (Tronick & Reck, 2009). Perinatal depressive symptoms, falling under mood disorders is a diagnosis applicable to the duration of pregnancy and after child birth (Muzik & Borovska, 2010). The symptoms of depression include protracted melancholy and apathy in daily activities that one previously

enjoyed. These are the chief symptoms that last for a week or more. Additional symptoms may include ; detachment, feelings of inadequacy and worthlessness, feeling short-tempered and aggrieved, sleeplessness, appetite changes, and lethargy, inability to concentration and poor memory, and suicidal ideations (Pilling, Anderson, Goldberg, Meader, & Taylor, 2009).

In recent years clinicians have increasingly been captivated by Mother–infant relationship disorders including rejection of infants by their mothers (Ohashi, Kitamura, Sakanashi, & Tanaka, 2016). Mother-infant bonding (MIBD) impairment affects some women after delivery and these proceeds to at times infer chronic difficulties to this key relationship. This ultimately affects the child's social and emotional growth (Evertz, Janus, & Linder, 2012). Bonding is recognized as the progression of a bond concerning a mother and her child or the connection between the two (Afolabi, Bunce, Lusher, & Banbury, 2017). Maternal–infant bonding is thought to grow from birth and endure over time and is described as the mother to infant shared and mutual systems of communication in the connection process (Afolabi et al., 2017). Generally, instigation of the maternal disposition happens when the mother and baby meet after birth (Ohoka et al., 2014). Conversely attachment describes the connection between a newborn and a parent described as security experienced by the child as it explores (Evertz et al., 2012) . Bonding disorders encompass an essential aspect of perinatal psychiatry (Evertz et al., 2012). These disorders are varied intersecting clinical states with various distorted components of the mother-infant relationship. These include a lack of maternal instinct, bad temper, aggression or violence as well as neurotic ideas and outright rejection of their baby (C. M. Klier & Muzik, 2004).

It is well known that some mothers will have impersonal or adverse feelings towards their new born (O'Higgins, Roberts, Glover, & Taylor, 2013) and such conditions are called bonding disorders (Evertz et al., 2012). A child's welfare and development is pegged on the mother's emotions and temperament towards them (Wittkowski, Wieck, & Mann, 2007). However, some mothers have a hard time relating to their infants and this might have adverse effects on the health of their child. Despite this alarming consequence, bonding disorders have been a neglected area of research (Taylor, Atkins, Kumar, Adams, & Glover, 2005). A bonding disorder arises when establishing a connection between mother and child is seen as difficult (Ohoka et al., 2014). Nonetheless, bonding disorders are not acknowledged as a nosological category either in the ICD-10 (the International Classification of Diseases) or the DSM-IV(Diagnostic and Statistical Manual of Mental Disorders) (Ohoka et al., 2014). Possibly the core cause for the inattention of these conditions despite their consequences in maternal-child health, is that they do not appear in ICD-10 and DSM-IV (Brockington.I, 2004). "DSM-V recognizes two distinct forms of attachment disorders: reactive attachment disorder and disinhibited social engagement disorder which are diagnosable in the children" (Widiger, 2000).

A mother's depression either during gestation and puerperium may prevent effective bonding as these two periods are key in establishment of relationship between mother and child (Dubber, Reck, Müller, & Gawlik, 2015) . Bonding disorders are recognized as a serious diagnosis and if left untreated might result in adverse effects on the bond concerning a mother and her infant as well as be a cause of mistreatment of the child (Kitamura et al., 2015).

About 8.5% to 10% of females in the prenatal duration suffer from depression. Another 6.5%-12.9% also suffer from the same up to one year postpartum (Gavin et al., 2005). Existing social-

cultural practices related to pregnancy and early motherhood in Africa were initially thought that they would offer protection from developing perinatal depression (Ongeri, Otieno, Mbui, Juma, & Mathai, 2016). However, despite the aforementioned social-cultural practices, it is has become evident that perinatal depression exist in Africa and that it occurs more than in the west (Parsons et al., 2012). Furthermore, there is increasing proof that suggests a myriad of damaging effects related to both depression during gestation and puerperium that affect the mother, child and partner (Ongeri et al., 2016). In the poor countries health delivery have a tendency to be thronged by many challenges including those of access and are beyond the reach of many poor people. Unfortunately the weight of reproductive and mental disease in the aforementioned constitutes a serious public health concern (Parsons et al., 2012).

In addition, a previous history of major depressive illness is recognized as a key risk factors of perinatal depression (Cohen et al., 2010). Owing to commonness of these conditions, depression and anxiety for the period of gestation and after delivery constitute a major public health concern (Ali, Azam, Ali, Tabbusum, & Moin, 2012). Despite this, detection rates of depression in the continuum of care of both gravid and women in puerperium is commonly low, and a lot of women are not managed for this disease (Alder, Fink, Urech, & Bitzer, 2011). The study of mental health spanning the phases of gestation and immediately after birth is important for the reason of the documented negative sequelae associated with MIB disorders and the fact that women generally have more frequent contact with the health system during this period (Kopelman et al., 2008). These are the circumstances that women living in low social economic areas, who only make a hospital visit during pregnancy and childbirth find themselves in (Kopelman et al., 2008). In Low And Middle Income Countries (LAMISs), perinatal depression is common yet it remains under-reported and under-managed (Woldeyohannes et al., 2021). This

is partly due to the greater precedence that has been given to averting mortality associated to obstetric complications (Fisher et al., 2012). In addition, stigma, lack of adequate skills and knowledge, cultural biases and myths around depression by health care providers make it harder for perinatal mental health care delivery to be integrated (Noonan, Galvin, Jomeen, & Doody, 2019).

Research generally indicates depression in the perinatal phase and bonding disorders are associated (Rahman et al., 2002). Infant mortality in developing countries has remained a major concern despite relative improvement in poverty status and accessibility of contemporary healthcare (Woldeyohannes et al., 2021). Studies on the prevalence of disorders affecting the connection of a woman and her infant in sub-Saharan Africa is scarce though these disorders are treatable and manageable despite their pernicious long-term effects (Bindt et al., 2012). It is evident that Studies are needed to explore perinatal depression and its sequela in developing countries. There is an pressing prerequisite therefore to come up with integrated care programs aimed at identifying and managing mother's with perinatal depression as well as Mother-infant bonding disorders in these setups (Gelaye, Rondon, Araya, & Williams, 2016). Moreover, the impact of bonding disorders related to maternal depression and the long-term consequences to the child are areas for further exploration (Muzik & Borovska, 2010).

In Kenya, health professionals providing routine government antenatal health care and Mother Child services may not be competent to offer psychiatric services. Therefore, identification of perinatal depression and mother-infant- bonding disorders are regularly overlooked and this has severe ramifications for the health of the mother plus her child. It is therefore imperative to comprehend the bond between perinatal depression and mother-infant-bonding disorders and

how to mitigate them. Globally depression has a high prevalence and is a serious health problem; therefore its stoppage and management must be seen as a medical priority for the 21st century (Lépine, 2011).

1.2.Problem statement

Although Sustainable Development Goal highlights the advancement of mental wellbeing as adopted by all United Nations Member States in 2015, it is a neglected component of primary health provision in Kenya. The commonness of depressed mood in gestation is a call for health systems to put in place mechanisms to undertake screening and management of maternal depression (Hartley et al., 2011). In order to avert impaired maternal bonding, depression and other mood disorders must be recognized as soon as possible after delivery and bonding promptly assessed (Nakano et al., 2019). The quality of this emotional tie is a framework upon which the child's survival and psychosocial development is built (Nakano et al., 2019).

The general problem is that antenatal and postnatal cares traditionally are centered on physical health of the woman and rarely ever the emotional health. Perinatal depression among women residing in Africa is a public health burden due to the high frequency of this disease (Ongeri et al., 2016). Healthcare workers in obstetric setups should be sensitized on the risk factors for depression and trained on how to routinely use screening tools for the same (Alder et al., 2011). In Kenya, the routine antenatal healthcare and Mother-child health service provision is provided by health professions do not have the capacity to provide psychiatric services. Therefore the diagnosis of perinatal depression or mood disorders and sequela such as Mother-infant-bonding disorders are often missed or misdiagnosed and this ultimately has adverse effects to the

mother's and child' health. The specific problem is that Perinatal depression has been linked with bonding disorders (Ohoka et al., 2014) but the extent of the association is unclear (Rossen et al., 2016). Additionally in order to understanding the prevalence of these conditions, little is known about regarding their progression over time and if they have any genetic and psychosocial correlates (Wittkowski et al., 2007).

An evaluation of whether perinatal depression influences mother-infant bonding needs to have been thoroughly studied in Kenya however this is not the case. Studies on antenatal psychiatric disorders have become common in the last ten or so years (Parsons et al., 2012). The probable connotations between maternal pre/postnatal mood and mother–infant bonding must be thoroughly examined so as to develop preventive strategies (Ohoka et al., 2014). The availability of this pertinent data could lead to an improved monitoring system for women who are prone to develop depression and push for the instigation of more integrated mental health services**.** This study targets women from the urban poor. These two, poverty and urban living are known to exacerbate the risks of perinatal depression (Ongeri et al., 2016). Primary health care workers have an opportunity to screen and refer appropriately mothers with symptomatology of depression and MIBD impairment (Ongeri et al., 2016)**.** This study aims to sensitize HCWs and to make it common practice for screening tools for depression to be routinely applied by HCWs in both the antenatal and mother-child clinic. Further, comprehending the mechanisms that link maternal mental illnesses and the quality of their relationship with their infants postpartum should be a priority (Petri et al., 2018) . It is against this backdrop that this study targeted to evaluate the relationship between perinatal depression and maternal bonding disorders.

1.3.Study justification

Healthcare is majorly concentrated on physical ailments to the detriment of mental and social health of individuals more so in pregnant women in sub-Saharan African countries like Kenya. This is in part due to the emphasis in prevention and treatment of common morbidities and related mortalities associated with obstetric complications. During pregnancies and immediately after child birth, the physiological and psychological changes can be overwhelming to the pregnant woman especially those with underlying risk factors to depression. The diagnosis of depression in pregnant and women in puerperium remains largely low, and many women remain undetected with no support. Across numerous obstetric settings particularly in Kenya, screening tools for depression are not usually used and this points to a gap that should be addressed by sensitizing health care workers (Alder et al., 2011).

The advancement of both parental (mother) and child health are both global and domestic key areas of concerns. The sustainable development goals number three among others targets the decrease of international maternal mortality ratio to below 70 per 100 000 live births by 2030 whereas the ministry of health Kenya has recognized maternal and child health as a crucial area. During their lifetime, about 15% of women are said to suffer from depression more so during gestation and after childbirth (Sherr et al., 2010). A mother's ill health can have serious consequences on her infant, other children and the family (Brockington, 2004). The quality of bonding predicts a child's social, cognitive, physical and emotional development and little is known about the influences of that bonding (Perry, Ettinger, Mendelson, & Le, 2011), particularly in Kenya. During pregnancy and breastfeeding a woman experiences increased physical and emotional demands. A diagnosis of depression possibly interferes with many critical functions related both to the maternal functions. Likewise then, for a mother to have a

healthy bond with her newborn she must be in a healthy mental state Brockington, 2004). This is an important period in the child's development that is majorly reliant on the parenting experiences (Mason, Briggs, & Silver, 2011). Ultimately disorders of the mother-infant bond are linked with poorer maternal styles and abilities (Siddiqui & Hägglöf, 2000).

In developing countries, Maternal and Child Health Programs are structured to circumvent infectious diseases and improve nutritional status and less significance is given towards perinatal mental health (Patel et al., 2008). Political instability and high rate of civil unrest including the scourge of HIV/AIDs in Africa are some of the strong factors that are thought to contributed to the high rates of perinatal depression in the region (Babu et al., 2018). Consequently, many women and their infants will suffer from this fate if necessary steps are not undertaken starting with research in these areas. Another important reason for conducting this study is that mental health conditions affect both the well-being of the mother and her newborn. Despite this, there have been few studies that have assessed the mother-infant relationship (I. Brockington, 2004). Similarly if healthcare providers in obstetric setups understand the implication of picking out risk factors of depression in pregnancy, then they may be able to screen and make timely diagnosis (Lancaster et al., 2010) and offer appropriate treatment.

Given the important consequences of MIBD (mother-infant- bonding disorders) it is imperative to recognize the risk factors therefore and treat appropriately (Lehnig, Nagl, Stepan, Wagner, & Kersting, 2019). Despite how common this condition is, there is no coordinated response from the ministry of health for the management of maternal depression or Mother Infant bonding disorders. The lack of standardization of management and cascading of the information to healthcare workers, results in misdiagnosis or lack of treatment. To prevent the above

unfavorable effects, policies to monitor mother-to-infant bonding process are essential in addition to interventions targeting perinatal depression. Moreover most studies done in this area in sub-Saharan Africa have been descriptive cross-sectional and very few analytical studies done. Given this background, this study aims to assess whether perinatal depression has any association with impaired maternal bonding at 10-12 weeks postpartum.

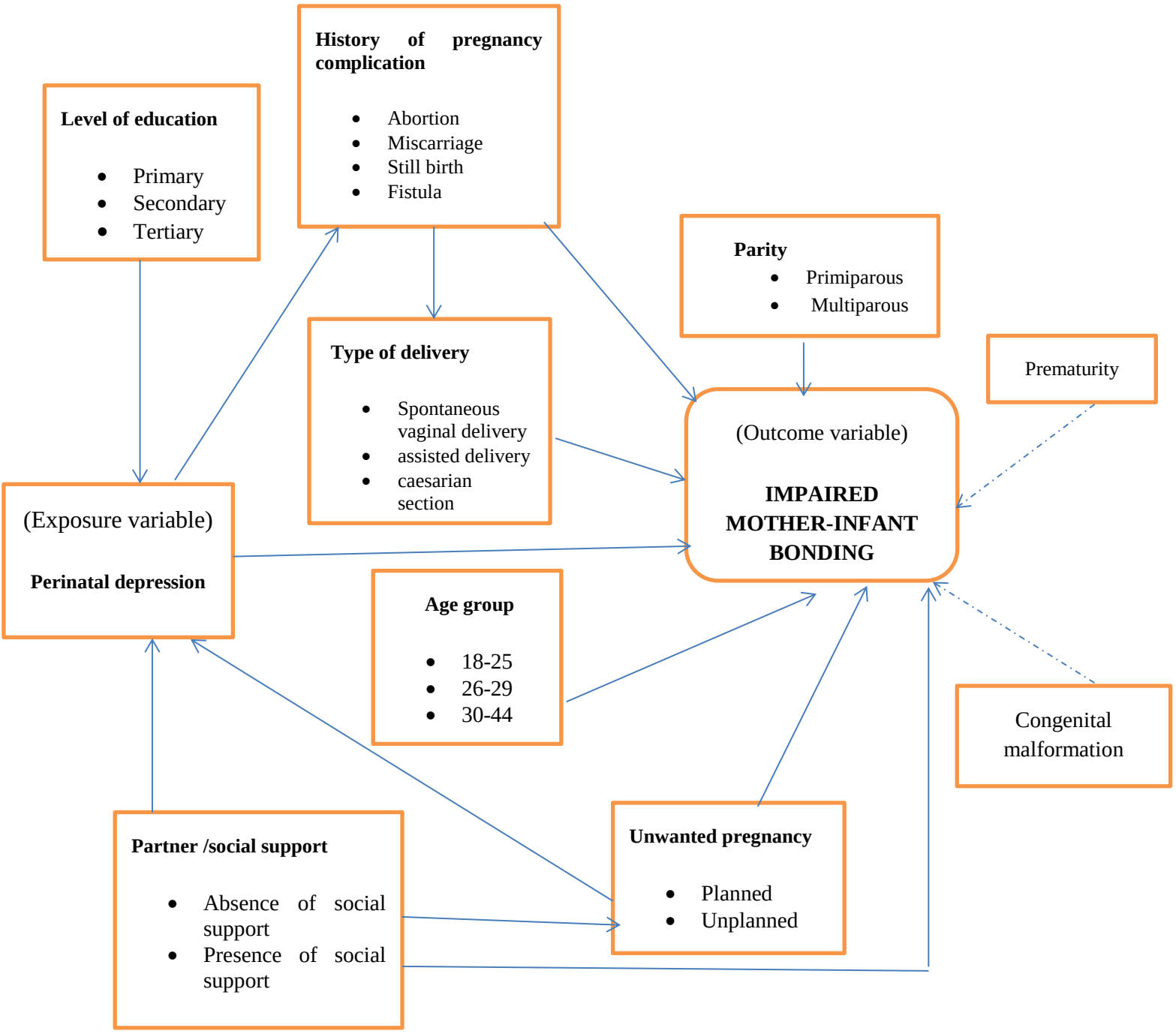
1.4.Conceptual framework

1.4.1. Narrative

Figure 1.1 illustrates the proposed relationship between the outcome; impaired maternal infant bonding and the risk factor of interest, perinatal depression. Likewise, various known confounding factors and their relationship between the exposure and outcome are demonstrated as well. The variables include; social support, age, level of education status, parity, unwanted pregnancy, type of delivery and pregnancy complication (Ohoka et al., 2014).

1.4.2. Diagrammatic

Figure 1.1: Conceptual Framework



1.5.Study objectives

1.5.1. Broad Objective

To evaluate the relationship between perinatal depression and impaired maternal bonding among postpartum mothers

1.5.2. Specific objectives:

- To determine distribution of the four different types of bonding disorders among postpartum mothers attending MCH at 6-12 weeks
- To determine proportion of mothers with depression among postpartum mothers with bonding disorders attending MCH at 6-12 weeks.
- To determine the association between perinatal depression and maternal bonding among postpartum mothers attending MCH at 6-12 weeks
- To determine the association between obstetric complications with maternal bonding among postpartum mothers attending MCH at 6-12 weeks
- To determine the association between bio-profile factors with maternal bonding among postpartum mothers attending MCH at 6-12 weeks
- To determine the association between social factors with maternal bonding among postpartum mothers attending MCH at 6-12 weeks

1.6.Hypothesis

1.6.1. Null hypothesis

Perinatal depression is not associated with impaired maternal bonding at 6-12 weeks postpartum**.**

1.6.2. Alternative hypothesis

Perinatal depression is associated with impaired maternal bonding at 6-12 weeks postpartum.

2. CHAPTER 2: LITERATURE REVIEW

2.1.Introduction

Maternal depression is mostly a non-psychotic depressive episode resulting in pregnancy-related morbidity and mortality. Depression during pregnancy and after child birth is called perinatal depression (Petri et al., 2018). Maternal depressive symptoms are thought to be connected to detrimental consequences in children some of which include psychological and developmental disorders (Gelaye et al., 2016). Despite this, this disease is under looked and many patients remain unmanaged (Gelaye et al., 2016). Mental well-being in low income countries is not prioritized yet it is estimated to become an important cause of disease globally (Bindt et al., 2012). In sub-Saharan African (SSA), the commonness of infectious illnesses like malaria and anemia in antenatal care settings pose exceptional challenges to the recognition of mental health issues throughout pregnancy (Kaaya et al., 2010). Both mother and child bear the brunt of depression medically and psychologically (Muzik & Borovska, 2010).

The term bonding was coined more than 40 years as the health of the emotional bond concerning a mother and her baby (Nakano et al., 2019). It is this bonding between a child and their mother that provides the security and know-hows required to develop both physically and emotionally. Complications that may inhibit and or delay Mother-infant bonding include; type of birth process, health of the infant, obstetric difficulties during birth, breastfeeding hurdles and drug abuse among others. This literature review is a write up to illustrate the knowledge gap that there is when it comes to perinatal depression and its association with impaired maternal bonding at 10-12 weeks postpartum.

2.2.Prevalence of perinatal depression

Depressive disorders among other two diseases are the three leading causes of DALYs in the baseline and pessimistic scenarios (Mathers & Loncar, 2006).There has been a 49.86% increase in cases of depression globally from 1990 compared 2017 with 25.8 million suffering from this disease(Liu et al., 2020). Mood disorders like depression have predicted to be a leading source of morbidity and disability by 2030 per a report done by the World health organization(Liu et al., 2020).

The low income economic nations utilize the smallest proportions of their general health resources on mental wellbeing. In contrast, counties with the highest proportions of poverty have the greatest need for psychiatric and psychological health care, however they have low accessibility (Saxena, Thornicroft, Knapp, & Whiteford, 2007). CPMDs (common perinatal mental disorders) are frequent in developing contexts, predominantly among the poor with gender based risk factors as well as psychiatric history (Fisher et al., 2012). The surge and dip of hormones during pregnancy may predispose women to various forms of affective disorders such as depression (Gawlik & Reck, 2011). A greater emphasis on perinatal depression and its co-morbidities is steadily being given priority in Sub-Saharan Africa (Ongeri et al., 2016). One research documented a minimum of 13% of mothers suffer the devastating consequences of major depressive disorder (MDD), whereas a different study found that 11–20% suffered from mood disorders postnatally (Muzik & Borovska, 2010).

But then again approximations of the prevalence of maternal depression significantly vary from 5-25% and above(Saxena et al., 2007). In West Africa specifically, Ghana and Côte d'Ivoire the occurrence of maternal depression is estimated to be 27% and 33% respectively. This is similar

picture to the high projections across sub-Saharan Africa like in a study by (Bindt et al., 2012) that showed that 26.6% (95%-CI =21.7; 31.8) of Ghanaian and 32.9% (95%-CI =29.5; 36.4) of Ivorian women had tallies that indicated major depression per DSM-IV criteria. Another study more specifically in East Africa showed that about 20% had maternal depression (Gavin et al., 2005). About 7-20% of pregnant women in the developed countries and 5.2 to 32.9% in developing countries have depression (Fisher et al., 2012). Epidemiologically, this significant variation in range can be largely credited to general differences in evaluation tools. The different study populations also significantly contribute to this (Gelaye et al., 2016). Mental health for pregnant and nursing mothers in developing countries is just now becoming a matter of research, perhaps because greater precedence rightfully so, was given to preventing mortality associated with pregnancy (Fisher et al., 2012).

Prevalence of maternal depression in developed nations stands approximately 10%–15%" (Marcus, 2009). In a prospective observational cohort study in a high income country (HIC) conducted at an academic medical center in Boston MA, 576 women which is 6.5% screened positive for possible depression. Of these, 69% of the women screened positive in the antepartum period (Venkatesh et al., 2016) . Whereas in a cross-sectional survey of women in the last trimester of gestation in Rio de Janeiro in Brazil attending a public facility, had a yearly depression prevalence that stood at 19·1% (Saxena et al., 2007). Additionally the observed rate of probable major depression in an outpatient section of a Tertiary University Hospital in Basel, Switzerland was found to be 21.1% which is comparable to other studies in similar setups (Alder et al., 2011). Higher rates of 39% have been reported from Cape Town and Tanzania and 47% from KwaZulu-Natal yet only one out ten of all those with depression are managed for the same (Organization, 2016). Similar rates have been reported in Asian countries like Bangladesh

at 33% and Pakistan at 48% (Manikkam et al., 2012). Comparable results were recorded in a longitudinal study carried out in two major public hospitals where the prevalence of antenatal depressive symptoms stood at 18% while that of postpartum depression was 21% (Ongeri et al., 2016).

In developing countries the surge of HIV/ AIDS, violence, absence of social support, drug abuse as well as adolescent pregnancy may be connected to the apparent greater rates of maternal depression (Manikkam et al., 2012). Lack of adherence to antenatal care, sleeplessness, high blood pressure and preterm delivery are recognized adverse effects witnessed in mothers diagnosed with depression according to other studies (Alder et al., 2011). The negative consequences related to depression after delivery go beyond distress and impairment in the woman to serious health effects on the child of the depressed mother (Sockol, Epperson, & Barber, 2013). Depression interferes with a mother's ability to effectively play the maternal role. A woman suffering from depression may have a protracted response time, neglect their child as well as be unable to follow through with recommended safety and health practices (Field, 2010). Furthermore behavioral, cognitive, and language problems in children are associated with mothers diagnosed with depression (Alder et al., 2011). Mothers who are depressed experience a mixed bag of emotions ranging from indifference to rage as well as completely rejecting their babies. Empirical evidence suggests that this can result in maternal-infant bonding failure which destabilizes this relationship and is a risk factor for the developmental problems (Afolabi et al., 2017). For these reasons, screening for mental health illnesses is of priority during gestation and after delivery, as it allows for prospects for timely intervention to avert both adverse pregnancy consequences and negatives effects on the newborn (Id, Shrestha, & Id, 2019).

2.3 Risk factors of perinatal depression

Pregnancy and depression affect each other and symptoms of depression can often be mixed up , or confused with some of the symptoms of pregnancy. Pregnancy results in major physical and emotional changes and in the face of normal life stressors can make women more prone to depression(Thompson & Ajayi, 2016a). The stimulation of hypothalamic-pituitary-adrenal (HPA) axis by sex steroids released during gestation is one of the main etiology models of perinatal depression (Pilling et al., 2009).

Numerous risk factors have been associated with maternal depression. Healthcare providers need to assess and monitor women identified to have the risk factors during pregnancy and post-delivery. Familiarity with psychosocial risk factors of maternal depression in antenatal and postnatal setups can serve as an alert to prompt healthcare workers to the likelihood of depressive disorders (Kaaya et al., 2010). Globally depression is linked with a personal or familial history of depression, the lack of adequate social support, being single, intimate partner violence, poverty, being young, unplanned pregnancy as well as low self-esteem (Hartley et al., 2011). A South African study examined the risk factors linked with antepartum depression echoed the above risk factors as being a key predictor of antenatal depression (Hartley et al., 2011). Moreover, obstetric history of a woman is of utmost importance as illustrated by a study that found that labor complications such as prolonged labor, pre/postnatal complications and non-vaginal delivery had an association with maternal depression (Saxena et al., 2007). A cross-sectional study done by Saxena et al. (2007) in Bangladesh from a prospective cohort study of 720 randomly carefully chose subjects who were 28 weeks and above pregnant. It showed that intimate partner violence was linked with maternal depression. A study done by Ongeri et al. IN Kenya (2016) showed Physical and verbal violence augmented the probability of developing

perinatal depression eighteen and seven times more respectively. This study concluded that based on these findings, maternal healthcare needed to be expanded to include screening from depression and provision of psychosocial support interventions (Ongeri et al., 2016).

A systematic review summarizing the data on IPV prevalence and risk factors in pregnant women from African studies by (Shamu, Abrahams, Temmerman, Musekiwa, & Zarowsky, 2011) showed that the prevalence of IPV through gestation ranged between two percent to 57% with meta-analysis pinpointing an overall prevalence of 15.23%. The aforementioned data provides concentrated evidence of the connection between IPV and maternal depression and the need to create intervention targeting the same. Other studies have pointed to the significance and the strong association of self-reported history of depression to elevated depressive symptoms during gestation (Perry et al., 2011). Thus, a history of depression should be identified and the woman monitored appropriately throughout the pregnancy. An in depth grasp of the sociodemographic and medical factors linked to maternal depression more so in Kenya, could better enhance care of women who are susceptible to develop depressive disorders (Babu et al., 2018)**.**

2.3.Barriers in provision of mental health care to pregnant women.

Studies done have shown that mood disorders are widespread during gestation (Fadzil et al., 2013). Most low- and middle-income countries (LMICs) have a significant gap in meeting mental healthcare needs (Hanlon et al., 2014). Conversely, identification alone of those at risk provides no benefit if successively the mother doesn't receive effective management (Goodman, 2009). This implores the need for more to be done to understand the existing barriers to treatment options available for perinatal depression. Moreover, targeted effective management

for depression are available and they include both pharmacological and nonpharmacological treatments like psychotherapy (Cohen et al., 2010). Despite this, less than 50% of those diagnosed with depression worldwide receive adequate treatment and health care. This management gap is projected to stand between 75% and 80% in LMIC, where mental disorders are not taken seriously (Lund et al., 2010).

Stigma and unacceptability to treatment especially pharmacological treatments comprise the most prevalent barriers to psychiatric treatment among primary care patients (Sareen et al., 2007). Others include absence of trust, presence of stigma and frustration with the systems of care (Jesse, Dolbier, & Blanchard, 2008). The social-cultural belief systems of what encompasses diseases plays into patients' health seeking behaviors for mental health issues. Additionally, health care providers dealing with pregnant and postnatal women are inhibited by illiteracy and knowledge in the evaluation and treatment of mental health conditions (Lancaster et al., 2010). Studies that have looked at barriers to psychiatric treatments in gestation and puerperium have found that most women favor psychotherapy over medication (Jesse et al., 2008) and this is because of the perceived risks to their unborn child or infant (Sareen et al., 2007). This is a pointer to the importance of considering the patient views when designing a management plan (Jesse et al., 2008).

A potential barrier as seen in sub-Saharan Africa is the overemphasis on physical health of mothers resulting in missing of this crucial diagnosis (Andrade et al., 2014). Mental health education remains an important endeavor (Andrade et al., 2014). There is still a lot to decipher and discover in relation to the social demographic risk factors among others and how they may

impact women's inclinations, suitability and treatment for perinatal depression (Goodman et al.,2009).

2.4.Mother-infant bonding

The relationship between mother and child is instigated from gestation to early postpartum. Healthy mother-infant bonding leads to good mental growth of the infants (Borji, Shahbazi, Nariman, Otaghi, & Safari, 2018). Mental disorders in gravid and breastfeeding women develop frequently and can have unfavorable effects on the growing connection between a mother and her child (Borji et al., 2018). Disruption of the mother-child connection and a disruption of a child's social-emotional development are some of the consequences that can occur in a percentage of women who experience mother-infant bonding impairment (Lehnig et al., 2019). Bonding and attachment are related, while bonding described the quality of the bond that ensues between mother and child, attachment defines the relationship that the infant cultivates with the mother (Nordahl et al., 2020). Bonding disorders are present in about 7-11.3% of mother-infant pairs (Lehnig et al., 2019). Research related to the quality of maternal-infant bonding remains vital because the bonding of the pair is prognostic of mother's sensitivity and is correlated to child developmental outcomes (Nordahl et al., 2020). Research shows that various factors influence mother-child bonding disorders. These include: infant related issues like; physical ailments e.g. congenital malformation, prematurity, breastfeeding factors; parental factors including physical ailments, social support and maternal mental wellbeing (Borji et al., 2018). Scientific evidence has demonstrated that maternal depression serious implications on both the unborn child and the development of mother-to-infant bonding (Ohoka et al., 2014). Likewise, impaired maternal bonding has been linked with a number of risk factors on the part of the mother like perinatal depression (Rossen et al., 2016). Bonding between mother and child can

begin in the gestation and this may predict the postpartum bonding. The infants of mothers who develop impaired bonding might have a higher risk of abusive parenting and consequently develop behavioral problems (Nakano et al., 2019). These bonding disorder include; a disturbing lack of maternal emotion, bad temper, hostility and violent tendencies, irrational thoughts plus complete rejection (Ohoka et al., 2014). Pregnancy and puerperium are stages that are have been shown to be challenging and the possibility of developing mental disorders then, is high (Pereira, Lima, Legay, de Cintra Santos, & Lovisi, 2012). About 29% of mothers who suffer from postpartum depression are diagnosed with bonding disorders (Klier, 2006). Bonding disorders can be classified into three: mild disorders (delay, ambivalence or loss in maternal response); rejection (threatened or established); pathological anger (mild, moderate or severe)(Klier, 2006). Two theories are used to explain binding disorders. The first suggest that maternal depression results in a bonding disorder while the other proposes that impaired bonding is not connected to maternal depression (Brockington et al., 2001). This second hypothesis proposes that bonding disorders are caused by other factors other than maternal depression. One cannot underestimate the vital role a mother plays in shaping the social framework and psychosocial development of their child and its therefore imperative to better understand how the mothers mental health would affect this outcomes (Erickson, Julian, & Muzik, 2019).

Both antepartum and postpartum factors have an impact on bonding disorders and more so perinatal depression (Erickson et al., 2019). The general consensus in research is that depressive symptoms in the perinatal stage are related to compromise of maternal bonding to the fetus. Most population-based, longitudinal studies that have assessed maternal depression and bonding have been done in the west (Nakano et al., 2019). Moreover, research has shown the occurrence of impaired maternal bonding to range from six to forty one percent in clinical samples to about 1%

in the general population. However, these data has been obtained from studies done in developed countries as alluded to earlier (Nakano et al., 2019).

One study reported that both antepartum and postpartum depressive symptoms have been independently linked to impaired maternal bonding (Nakano et al., 2019). A study done by (Sugishita, Kamibeppu, & Matsuo, 2016) resolved that depression in gestation and postpartum and the resulting bonding disorders are closely associated. These findings emphasize the significance of integrating mental health in the antepartum health package as a strategy to manage maternal depression and bonding disorders (Sugishita et al., 2016). In another prospective study done using self-ranking forms to elucidate the relationship concerning bonding disorder and maternal mood through gestation and after delivery, concluded that low mood was directly associated with impaired bonding disorders. This resonated with another study that stated that the quality of bonding between a mother and child was associated with the mother's mood as measured by the EPDS (Ohoka et al., 2014). Consequently, maternal depression has varied effect on the health of an infant, these include the biological, emotional and behavioral (Muzik & Borovska, 2010).

On the other hand, studies have shown that other variables like; loss of a twin baby, stillbirth, difficult delivery, or an unplanned pregnancy can result to the development of bonding disorders (Kumar, 1997). Further to these variables, it has also been stated certain disease and issues like handicaps, or delays in social communication due to prematurity of the infant are also risk factors (Ueda, Yamashita, & Yoshida, 2006). In addition, maternal factors that include and not limited to severe anxiety, obsessive temperament, distress due to struggles with feeding, soothing among others can hinder the growth of attachment (Brockington et al., 2001).

A Swedish research found that depressive indicators during the post-delivery time up to 6 weeks were linked to impaired maternal bonding up to 6 months following delivery (Dubber et al., 2015). In contrast another study reported controversy about whether the maternal depression was indeed the cause of the bonding disorder or it was the bonding disorder that led to the depression (Ohoka et al., 2014). This was echoed by another study that had a similar conclusion, mother-infant relationship had no association to the maternal mood disorders like pregnancy (Tharner et al., 2012).Nonetheless another study argued in favor of maternal depressive symptoms at two and six weeks, plus four months after delivery being strongly connected with impaired bonding. However the same was not true for an infant who was one year two months (Moehler, Brunner, Wiebel, Reck, & Resch, 2006). Moreover, a different study concluded that minor and undiagnosed maternal depressive symptoms could have a substantial sway on maternal bonding. Of note is that this study concluded that the above stood if the symptomatology ensued during the first four months of life. The findings warrant more studies that look at how maternal mental health interconnects with both physical and psychological health of their children more so in the early months of life (Moehler et al., 2006). For these reasons, it's imperative that early identification of maternal depression and bonding impairment during gestation and post-delivery period be undertaken together with appropriate management of the same (Dubber et al., 2015). The Postpartum Bonding Questionnaire (PBQ) tool has been used successfully to evaluate bonding disorders in conjunction with the Edinburgh Postnatal Depression Scale (EPDS) that is used to identify the likelihood of depression in the mother (Klier, 2006). Perinatal depression should be promptly identified, before or after delivery, so as to avert impaired maternal bonding, and an evaluation of the relationship between postpartum mothers and their child done (Nakano et al., 2019).

2.5.Summary

In conclusion research findings do suggest that the maternal mental health is intricately linked with both physical and psychological growth of their children. Maternal-infant bonding and poor maternal mental health are thought to be correlated and this is both during gestation and post-partum (Petri et al., 2018). This means that the maternal mental ill health impacts both her and her ability to nurture her children (Lehnig et al., 2019). Depression makes the mother irritable and apathetic hence she is likely to be less engaged and fully present as her children grow (Lehnig et al., 2019). However, the presence of alternative hypothesis suggesting the etiology of MIB disorders is only negligibly examined globally (Kitamura et al., 2013). The part depression plays in the etiology of MIB is a disputable issue in the scientific world (Afolabi et al., 2017). Nonetheless, more researchers are beginning to explore influences outside genetics around the gestation and postpartum periods that may predispose children to psychiatric illness (Muzik & Borovska, 2010).

Screening for depression as part of standard obstetric care has been introduced in healthcare systems in a few countries globally (Alder et al., 2011). Additional research and surveillance should be considered particularly in developing countries to aid the integration of mental health (Stein et al., 2019). The fact is that a lot of the proof on collaborative healthcare has been gathered from developed nations clinical backgrounds and it is imperative that studies are also done in developing countries to better contextualize the interventions (Stein et al., 2019). Promotion of the mental health of both pregnant and lactating mothers, is therefore closely linked to reduction of child morbidity and mortality (Nakku et al., 2016).

3. CHAPTER 3: STUDY METHODOLOGY

3.1.Study Design

This was a hospital-based case-control study. Women who had impaired MIBD were enrolled as cases while mothers without impaired MIBD were enrolled as controls. The participants were Postpartum mothers aged 18 to 49 years at 6-12 weeks postpartum. The study design was appropriate in investigating rare outcomes and because it was hospital based, there was some ease of recruitment. Even though a population-based type of research is often more idyllic it was not possible due to both cost and time implications. Of note is that perinatal depression and MIBD are not habitually screened for during MCH clinic visits.

3.2.Study Setting

This study was undertaken in the mother-child health clinic in Kenyatta National hospital, located in Nairobi County in Kenya. Kenyatta National Hospital is a public national tertiary referral and teaching hospital, a level seven facility that was established in 1901. It functions as a teaching hospital for the University of Nairobi's Faculty of Health Sciences. It also serves the same function for the Kenya Medical Training College as well as other medical colleges in Kenya. It has a bed capacity of around 1800 and serves patients with diverse social-demographic characteristics. Its clientele comes from various parts of the country and the greater East African region. The MCH clinic offers primary-level care to patients who reside in the vicinity and it also serves as a referral clinic for mother child pairs that need specialist care.

3.3. Study Population

The Study population was derived from postpartum mothers aged 18 to 49 years at 6-12 weeks postpartum at the KNH MCH who met the eligibility criteria. Cases fitting the description were

prospectively enrolled into the study. Bearing in mind mother-infant-bonding disorder is not regularly screened for in MCH appointments, the PBQ (Postpartum bonding questionnaire) tool was filled in the triage room after which routine MCH clinic services were administered.

3.4.Definition of cases and controls

1. Cases were postpartum mothers who scored at least 12 for impaired bonding and/or at least 13 for rejection and pathological anger and/or at least 10 for infant focused anxiety and/or at least 3 for incipient abuse in the postpartum bonding questionnaire scoring scale, attending MCH clinic at KNH during the recruitment period
2. Controls were postpartum mothers who scored below 12 for impaired bonding and/or below 13 for rejection and pathological anger and/or below 10 for infant focused anxiety and/or below 3 for incipient abuse in the postpartum bonding questionnaire scale attending MCH clinic at KNH during the recruitment period

3.5.Eligibility Criteria

3.5.1. Inclusion criteria for cases

1. Women at 6-12 weeks postpartum who were willing to give consent to participate
2. Women aged between 18 to 49 years
3. Women who scored at least 12 for impaired bonding and/or at least 13 for rejection and pathological anger and/or at least 10 for infant focused anxiety and/or at least 3 for incipient abuse in the postpartum bonding questionnaire scoring scale

3.5.2. Exclusion criteria for cases

1. Postpartum minors aged below 18 years

2. Non-consenting mothers

3. Mothers with preterm babies

4. Mothers with children with congenital malformation

3.5.3. Inclusion criteria for controls

1. Women at 6-12 weeks postpartum who consented to participate

2. Women aged 18 to 49 years

4. Women who scored (below 12 for impaired bonding and/or below13 for rejection and pathological anger and/or below10 for infant focused anxiety and/or below 3 for incipient abuse) in the Postpartum bonding questionnaire Scale

3.5.4. Exclusion criteria for controls

1. Postpartum minors aged below 18 years

2. Non-consenting mothers

3. Mothers with preterm babies

4. Mothers with children with congenital malformation

3.6.Sample Size Determination

Calculations of the sample size were done using formula for case control study (Kelsey, Whittemore, Evans, & Thompson, 1996)

$$n = \left(\frac{r+1}{r}\right)\frac{(\bar{p})(1-\bar{p})(Z_{\beta} + Z_{\alpha/2})^2}{(p_1 - p_2)^2}$$

The following assumptions were considered during the calculation:

n = sample size per arm

r = ratio of controls to cases, 1:2 in this case

P1= proportion of mothers with depression among those with MIBD, in this case 29% (C. Klier, 2006)

P2=proportion of mothers without depression among those with MIBD

Ṕ =measure of variability,

Zβ=Value corresponding to the power of the study, in this case, 80% = 0.84

Zα = Value corresponding to the normal standard deviate at 95% C.I, in this case, = 1.96, with 0.05 level of significance

P1- P2 = effect size (difference in proportions)

Odds ratio to be detected of 2.5 (Mother infant bonding disorders is present at 7%-11.3% in the general population (Lehnig et al., 2019), therefore proportion of mothers with depression among those with MIB disorder, in this case 29% (C. Klier, 2006) 29% divided by 11.3% was 2.5)

Applying the above gave a sample size of 225 where, 75 were cases and 150 were controls at a ratio of 1:2

3.7.Sampling procedure

The sampling frame was drawn from all mothers attending mother child health clinic in KNH which operates Monday to Friday starting at 8.00 a.m. to 2 p.m. The clinic attends to an average of 40 mothers a day and children of different ages coming in to receive immunization per KEPI (Kenya expanded program on immunization) schedule. The patients are mixture of those who delivered in KNH, larger Nairobi County as well as various parts of the country and the greater East African region. The participants were women at 6-10 weeks postpartum aged 18 to 49 years attending KNH MCH clinic. The aim and type of study was clarified to all the women waiting for their routine MCH appointments. Consecutive sampling was used meaning that every participant that met the standards of inclusion was selected until the required sample size of 75 was realized for the cases. This sampling technique is a better representation of the entire population of pregnant mothers who visited the hospital and it reduced bias because it included all the subjects that were available. For every case enrolled, there was a simultaneous enrolment and registration of two participants as controls. Controls were picked from the mothers at 6-10 weeks postpartum aged 18 to 49 years attending the KNH MCH clinic that did not have postpartum bonding disorders. These were all the mothers who attained the inclusion criteria for controls within the study period. About 250 controls were identified during this period. Owing to a comparable larger number of controls, a simple random method was used to select controls from the same source population as the cases at a ratio of 1:2(75:150). Each member of the selected subset of the population had an identical probability of being selected. This allowed control of both known and unknown confounders and ensured a high validity. The participants were requested to join in the study and allowed to sign a consent form after probable risks and benefits of the study and their rights as a volunteer were clarified. The women were offered

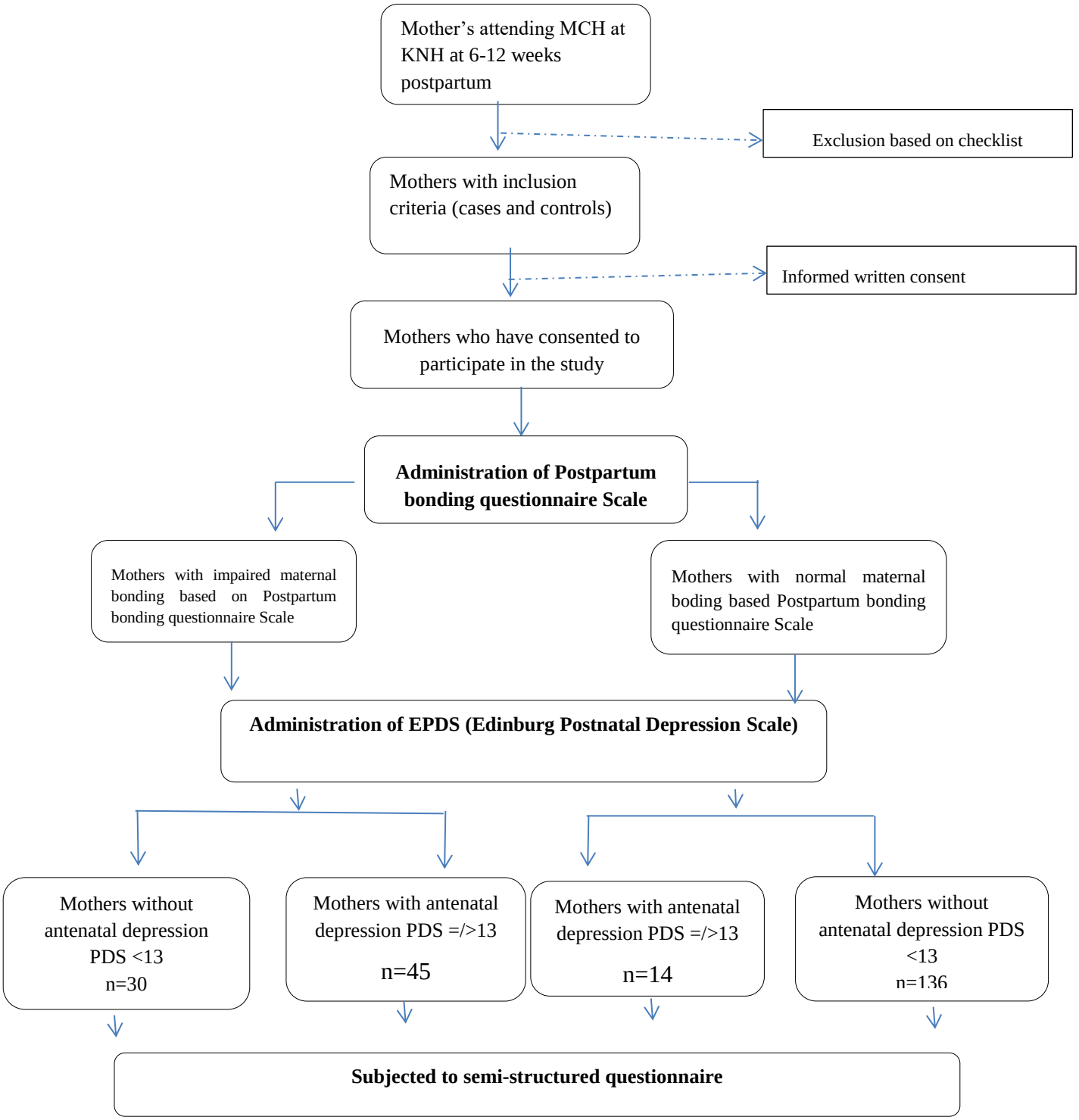
patient information sheets written in English or Kiswahili (appendix iii) and requested to take part before they received their MCH package at the triage area.

3.7.1. Recruitment procedures

The first routine MCH clinic is usually scheduled at six weeks postpartum and the second at 10 weeks which corresponds to the infants' immunization schedule. The study allowed for a leeway of extra two weeks to capture those who came in late for their second clinic visit, ideally scheduled at 10 weeks postpartum. Following recruitment and obtaining of the consent, a distinctive study number was assigned to the participants. The principle investigator and or research assistant handed over the two self-reporting structured questionnaires; first PBQs then EPDs to the participants. The Antenatal care booklet was then used to corroborate information given by the subjects on some biological factors (parity, History of pregnancy complication, and age). A semi-structured questionnaire was used to gather the other pertinent information on type of delivery, presence of partner support and unwanted pregnancy.

A summary of data collection procedure is depicted in the following flow chart.

Figure 3.1: Data collection procedure flow chart



3.8.Definition of variables

In this study the predictor variables were on demographic characteristics, obstetric history, presence of partner support and unwanted pregnancy, intimate partner violence. Two confounding variables i.e. prematurity and congenital malformation were controlled for at the study design stage by restriction. This meant that women with premature infants with congenital malformations were not included. A study showed that certain disease and issues like handicaps from congenital malformation, or delays in social interaction due to prematurity of the infant are also risk factors for bonding disorders (Ueda et al., 2006) hence the exclusion. On the other hand, studies have shown that other variables like; loss of a twin baby, stillbirth, difficult delivery, or an unplanned pregnancy can result to the development of bonding disorders (Kumar, 1997). Confounders were also controlled through randomization of the controls as well as picking of controls from the same environment as the cases. Further to this logistic regression catered for the rest.

3.8.1. Dependent variable Mother-infant bonding impairment

This was a nominal variable. The mother–infant bond is the relationship that develops between an infant and its mother beginning from birth. In this study the mother-infant bonding impairment was measured as postpartum mothers who had at least 12 scores for impaired bonding and/or at least 13 for rejection and pathological anger and/or at least 10 for infant focused anxiety and/or at least 3 for incipient abuse in the PBQs. This indicated that the mother had undesirable emotions towards her baby and felt a larger psychological burden regarding parenting. The cases were 75. The women who scored below 12 for impaired bonding and/or

below13 for rejection and pathological anger and/or below 10 for infant focused anxiety and/or below 3 for incipient abuse were considered as controls in this study and they were 150.

3.8.1.1.Independent variable

Perinatal depression

This was a nominal variable measured as a dichotomous variable of proportion of postpartum women with scores of 13 and above being considered as depressed and those with less than 13 scores considered as not depressed in the Edinburgh Postnatal Depression Scale (EPDS) based on gestation up to 12 weeks postpartum.

3.8.2. Other predictor variables

Demographic characteristics

Maternal Age:

This was the age of the postpartum mother which was a continuous variable as the number of completed years.

Level of education:

It was a categorical variable and was collected as primary, secondary or tertiary education level achieved in school.

Parity:

This was a dichotomous variable that was confirmed from the antenatal booklet and recorded as either primiparous or multiparous

Obstetric complications:

This was a nominal variable that included a medical history of the following: still birth, premature birth, abortion, miscarriage, or fistula. These were collected as either being present or absent.

Social support:

This was a nominal variable which was assessed using an unstructured questionnaire and was noted as Lack of social support or Presence of social support

Type of delivery:

This was a nominal variable, categorized as spontaneous vaginal delivery, assisted delivery or caesarian section

Unplanned pregnancy:

This was a nominal variable denoted as either planned or unplanned pregnancy.

3.9.Data collection instruments

The instruments of data collection included; antenatal care booklet, a standard recruitment checklist, Semi-structured questionnaire and structured questionnaires which included: Edinburg Postnatal Depression Scale and Postpartum bonding questionnaire (Appendix iii)

1. **Antenatal care booklet:** This was used to identify the subjects, their socio-demographic characteristics and some of the biological factors in the ANC profile therein.

2. **A standard recruitment checklist:** A standardized recruitment checklist assisted the investigator to screen for inclusion/exclusion criteria in the course of enrolment of participants. (Appendix iii. a)
3. **Semi-structured questionnaire**: A semi-structured questionnaire was used to identify; type of delivery, unwanted pregnancy, and social support, level of education status and pregnancy complication. (Appendix iii. b)
4. **The structured questionnaires**: included

    - Edinburg Postnatal Depression Scale (EPDS)

      This is a 10-item self-report scale evaluating the symptomatology of depression. Each item is scored on a four point scale with a total score ranging from 0 – 30. Probable major depression has a cutoff of 12/13 while a cutoff of 9/10 is for substantial symptoms of depression. Higher EPDS scores indicate greater possibility of depression. This scale has been found to have a high internal consistency (Cronbach's alpha 0.87) and good construct validity (Rossen et al., 2016). It has been validated for the recognition of both forms of maternal depression (Cox, Chapman, Murray, & Jones, 1996) and used in many countries including Kenya (Turan et al., 2014). (Appendix iii d)

    - Postpartum bonding questionnaire Scale (PBQs)

      Was used to assess attachment between mother and child and is one of the most extensively studied tools (Ohashi et al., 2016) . The PBQ scale was created by Brockington et al. (2001) for the early detection of mother infant bonding. It involves of four subscales as itemized below; impaired mother-infant bonding,

rejection and anger, anxiety about care and risk of abuse. The questions are graded on a 6-point Likert scale ranging from 0 (always) to 5 (never). PBQ scale is a valid and sensitive instrument (Brockington et al., 2001). It can be used in conjunction with Edinburgh Postnatal Depression Scale for the early diagnosis of mother-infant bonding disorders (Brockington et al., 2001). (Appendix iii e)

3.10. Data Quality Assurance

The study tools were subjected to a pre-test study to amend the language used so as to evade prejudice, misconstructions, and vagueness and increase the validity. The research assistant, a registered nurse was trained on the study methodology, proper interview technique and information retrieval. Further to this, training on the standard operating procedures was also done. The above was done to decrease interviewer bias by ensuring consistency in the information obtained from the respondents. In addition, the participants completed the questionnaires on their own after explanation of the Likert scale and care was taken to avoid the participants from discussing their responses with others. To minimize bias especially recall bias, the obstetric history was obtained from the ANC booklet. The questionnaires were physically checked for comprehensiveness and correctness. Data was then double checked and entered into an Excel Spreadsheet. The resulting datasets were then paralleled and modifications undertaken accordingly. In addition, as a way to deal with direct identifiers, participants were assigned a unique study ID. Further to this, coding of data was done so as to only retain the minimum necessary identifiable data.

3.11. Data Management and analysis

Data was obtained in hardcopies. Data authentication was conducted by the investigator on a daily basis. The corroborated data was fed into the excel software, by both the investigator and a data clerks using the double data entry procedure. For the purpose of data entry and analysis a biostatistician was involved. Verified data was subsequently imported to STATA software for the purpose of data cleaning, categorization of variables and subsequent analysis. Omitted, duplicate data and data erroneousness were checked and amendments were conducted. Finally a clean copy of collected data was kept for future reference. These same data was used for the analysis.

Data analysis was done using STATA software (version 16). Descriptive analysis of key variables was done. Comparison of sociodemographic, obstetric complications, IPV and social support of women with or without MIBD disaggregated into with or without perinatal depression was done using students T-test for continuous variables and chi-square for categorical data as appropriate. Confidence intervals and P values were also calculated in the comparative analysis stage. The outcomes were presented in form of tables and graphs. Measures of dispersion such as the mean were used to describe continuous data variables such as age.

Bivariate regression analysis was done between the outcome variable (MIBD) and categorical variables. These included the obstetric complications and bio-social factors done to assess the association between and maternal bonding among postpartum mothers attending MCH at 6-12 weeks. In each categorical variable, a reference category was selected and compared to the other categories. The reference category was either the most normative category or the lower limit. The multivariate analysis that followed allowed for confirmation of whether the borderline or

subtle associations were truly significant. This was done through removal of any confounding effect that would have been at the bivariate analysis stage. Confounding factors were also controlled for at the design stage using restriction and matching.

3.12. Ethical considerations

Permission from the KNH and UON Ethics Research Committee and KNH management to carry out the research as a requirement of the UON thesis dissertation was pursued (Appendix IV). Prior to recruitment, verbal and written Informed consent was gotten from the study participants. They were then given privacy with the information handled with confidentiality. Data obtained from this study was kept in a private and safe place only available to the investigator. Participants had a right to withdraw at any time during the study. The standard of care expected was not negotiated when a participant opted not to participate in the study. Any participant found to scores at least 13 indicating depression symptoms on PBQ scale or met the cut-off for the bonding disorders was linked to care and treatment. The result of the study was presented and bound copies to the department of public and Global health, University of Nairobi.

4. CHAPTER FOUR: RESULTS

4.1. Introduction

In this chapter the study findings are presented, per the study objectives and summarizes the findings from the data analysis.

4.2. Descriptive analysis

There were 75 participants as cases and another 150 as controls in this study with a completion rate of 100%.

4.2.1. Demographic characteristics of mothers of full-term normal infants

Table 4.1 illustrates descriptive analysis of study participants .The mean age among the cases was 30.2 years (SD=6.0 and 29.1 years (SD = 5.4) among the control group. The age group 30 to 44 years contributed the largest proportion of participants (Cases=52.0%; Controls=44.7%). Most of participants in the control group (54.7%) had a tertiary education in comparison to the case group where an equal number (46.7%) of participants had either a secondary or tertiary education. Most participants were married (Cases; 90.1%; controls; 87.3%). A majority of the participants in both the cases and control group were multiparous, 65.3% and 63.3% respectively. 34.7% of the cases were primigravida compared 36.7 % in the control group. Most participants underwent a vaginal birth with 61.3% and 51.3% for the cases and control respectively. Both cases and controls had 36% of them undergoing a caesarian section at delivery. A higher percent (12.7%) of controls had assisted delivery compared to 2.7% in the cases. A minor percent reported lack of partner support, 21.3% for the cases and 16% for the controls while 12% endured IPV (16% cases and 10% controls). Four percent of the cases had abortions compared to two percent in the controls. Miscarriage was the most reported obstetric complication in both the cases and control at 20% and 26.7% respectively. About 19.3% of the controls reported to have has a previous premature birth compared to 13.3% in the cases. Fistula as a complication was very rare with only one participant reporting in both the case and control group.

Table 4.1: Demographic characteristics of mothers of full-term normal infants

Maternal Characteristics		Case group (N = 75) n (%)	Control group (N = 150) n (%)
Demographic Characteristics			
Age	18-25 y	16(21.3%)	46(30.7%)
	26-29 y	20(26.7%)	37(24.7%)
	30-44 y	39(52.0%)	67(44.7%)
Education	Primary	5(6.7%)	14(9.3%)
	Secondary	35(46.7%)	54(36.0%)
	Tertiary	35(46.7%)	82(54.7%)
Marital status	Married	68(90.7%)	131(87.3%)
	Separated	5(6.7%)	14(9.3%)
	Single	2(2.7%)	5(3.3%)
Obstetric characteristics			
Parity	Primigravidae	26(34.7%)	55(36.7%)
	Multiparous	49(65.3%)	95(63.3%)
Mode of delivery	Caesarean section	27(36.0%)	54(36.0%)
	Spontaneous vaginal Delivery	46(61.3%)	77(51.3%)
	Assisted delivery	2(2.7%)	19(12.7%)
Social support and IPV Characteristics			
Planned pregnancy	Yes	57(76.0%)	114(76.0%)
	No	18(24.0%)	36(24.0%)
Supportive partner	Yes	59(78.7%)	126(84.0%)
	No	16(21.3%)	24(16.0%)
Intimate Partner Violence	Yes	12(16.0%)	15(10.0%)
	No	63(84.0%)	135(90.0%)
Obstetric complications Characteristics			
Procured abortion	Yes	3(4.0%)	3(2.0%)
	No	72(96.0%)	147(98.0%)
Miscarriage	Yes	15(20.0%)	40(26.7%)
	No	60(80.0%)	110(73.3%)
Stillbirth	Yes	3(4.0%)	4(2.7%)
	No	72(96.0%)	146(97.3%)
Premature birth	Yes	10(13.3%)	29(19.3%)
	No	65(86.7%)	121(80.7%)
Fistula	Yes	1(1.3%)	1(0.7%)
	No	74(98.7%)	149(99.3%)

4.2.2. Maternal infant bonding disorders in mothers of full-term normal infants

Maternal infant bonding disorders, the outcome variable was scored into four categories using the PBQ scale. Forty percent of the cases had perinatal depression while 60 % did not. A minority, 9.3 % of the controls had depression whereas 90.6 % did not.

Figure 4.1 illustrates that most of the cases had impaired bonding disorders 86.7 %. Four percent (3 mothers) had rejection and pathological anger, 5(6.7%) had infant focused anxiety and another 4 cases were found to have incipient abuse. Two cases had more than one category of bonding disorder (infant focused anxiety and impaired bonding).

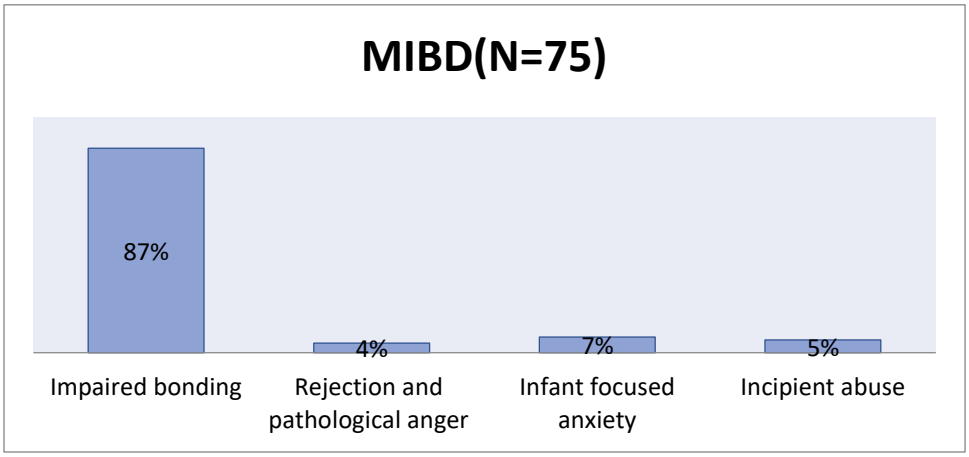


Figure 4.1: Distribution of MIBD types in the cases of mothers with full-term normal infants in KNH. The total number of MIBD types may sum up to a value greater than the number of subjects (n = 75) in the study because of co-occurrence of 2 MIBD types in a single individual.

Figure 4.2: Maternal infant bonding disorders in mothers of full-term normal infants, Twenty Seven 27 of the 65 cases (41.5%) with impaired bonding had perinatal depression (Figure 4.2). All the cases with rejection and pathological anger did not have depression. A majority of the

cases with infant focused anxiety had depression (3/5) whereas 50% of those with incipient abuse had depression.

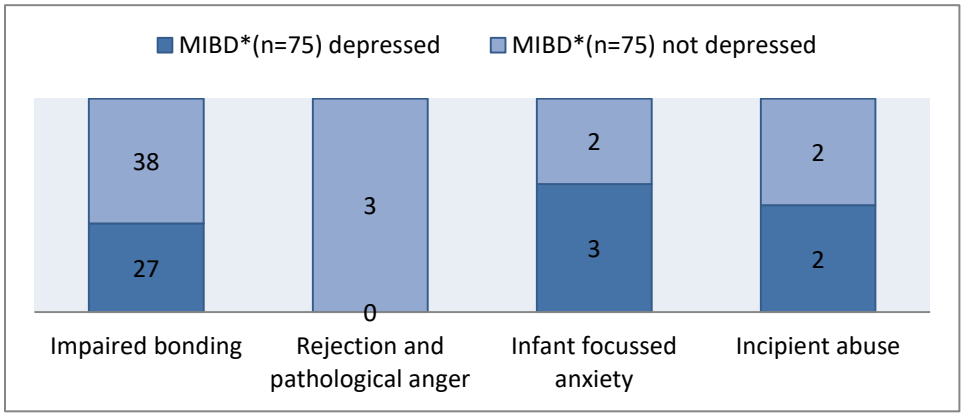


Figure 4.12: Proportion of perinatal depression per the categories of MIBD of full-term normal infants in KNH

4.3.Comparative Analysis

4.3.1. Association between socio-demographic characteristics of mothers of full-term normal infants with maternal infant bonding disorders

Table 4.2 Shows the bivariate regression analysis, between the outcome variable (MIBD) and the sociodemographic characteristics. For all the variables in table 3.0, 95% Confidence Interval crossed one and the p-value was above 0.05. This implied that age (OR for 26-29 years was 1.55; 95% CI: 0.71, 3.41), 30-44 years was 1.67; 95% CI: 0.84, 3.34) P= 0.318), education (Secondary education had an OR of 1.81; 95% CI: 0.60, 5.49) while tertiary education had an OR of 1.2; 95% CI: 0.40, 3.57) P= 0.291) and marital status (Separated had an OR of 0.69; 95% CI: of 0.24, 1.99) while single had an OR of 0.77; 95% CI: 0.15, 4.08) P= 0.75) were not significantly associated with maternal bonding disorders.

Table 4.2: Association between sociodemographic characteristics of mothers of full-term normal infants with maternal infant bonding disorders

Variable	Description	Case group (n = 75)	Control group (n = 150)	OR	95% C.I	P value
	18-25 y	16(21.3%)	46(30.7%)	1		0.318
	26-29 y	20(26.7%)	37(24.7%)	1.55	(0.71, 3.41)	
Age	30-44 y	39(52.0%)	67(44.7%)	1.67	(0.84, 3.34)	
	Primary	5(6.7%)	14(9.3%)	1		0.291
	Secondary	35(46.7%)	54(36.0%)	1.81	(0.60, 5.49)	
Education	Tertiary	35(46.7%)	82(54.7%)	1.2	(0.40, 3.57)	
	Married	68(90.7%)	131(87.3%)	1		0.75
	Separated	5(6.7%)	14(9.3%)	0.69	(0.24, 1.99)	
Marital status	Single	2(2.7%)	5(3.3%)	0.77	(0.15, 4.08)	

4.3.2. Association between obstetric characteristics of mothers of full-term normal infants with maternal infant bonding disorders

The SVD mode of delivery (OR=1.19; 95% C1: 0.66, 2.15) had no significant association with MIBD (Table 4.3). However assisted delivery was noted to have a significant association with MIBD with an OR of 0.21; 95% CI: 0.05, 0.97 and a p-value of 0.024. The odds of having MIBD were 79% less likely to occur if the mother had assisted delivery. The study also found that parity had no association with MIBD (OR= 0.92; 95% CI: 0.51, 1.64) p-value of 0.768.

Table 4.3: Association of Obstetric characteristics and maternal infant bonding disorders among mothers of full-term normal infants in KNH with maternal infant bonding disorders

Variable	Description	Case group (n = 75)	Control group (n = 150)	OR	95% C.I	P value
Parity	Primigravidae	26(34.7%)	55(36.7%)	0.92	(0.51, 1.64)	0.768
	Multiparous	49(65.3%)	95(63.3%)			
Mode of delivery	Caesarean section	27(36.0%)	54(36.0%)	1		0.024
	Spontaneous Vaginal Delivery	46(61.3%)	77(51.3%)	1.19	(0.66, 2.15)	
	Assisted delivery	2(2.7%)	19(12.7%)	0.21	(0.05, 0.97)	

4.3.3. Association of social support and IPV among mothers of full-term normal infants in KNH with maternal infant bonding disorders

There were no significant association between maternal infant bonding disorder and partner support (OR: 0.7; 95% CI: 0.35, P= 1.42) and intimate partner violence (OR: 1.71; 95%C1: 0.76, 3.88), P=0.2) (Table 4.4).

Table 4.4: Association between social support and IPV among mothers of full-term normal infants with maternal infant bonding disorders

Variable	Description	Case group (n = 75)	Control group (n = 150)	OR	95% C.I	P value
Planned pregnancy	Yes	57(76.0%)	114(76.0%)	1	(0.52, 1.91)	1.000
	No	18(24.0%)	36(24.0%)			
Supportive partner	Yes	59(78.7%)	126(84.0%)	0.7	(0.35, 1.42)	0.329
	No	16(21.3%)	24(16.0%)			
IPV	Yes	12(16.0%)	15(10.0%)	1.71	(0.76, 3.88)	0.2
	No	63(84.0%)	135(90.0%)			

4.3.4. Association between obstetric complications and maternal infant bonding disorders among mothers of full-term normal infants with maternal infant bonding disorders

Table 4.5 shows that none of the obstetric complications had a significant association with MIBD (procured abortion, miscarriage, stillbirth, premature birth, and fistula). Both the confidence interval and P value in all the categories were not significant.

Table 4.5: Association of obstetric complications and maternal infant bonding disorders among mothers of full-term normal infants with maternal infant bonding disorders

Variable	Description	case group (n = 75)	control group (n = 150)	OR	95% C.I	P value
Procured Abortion	Yes	3(4.0%)	3(2.0%)	2.04	(0.40, 10.37)	0.394
	No	72(96.0%)	147(98.0%)			
Miscarriage	Yes	15(20.0%)	40(26.7%)	0.69	(0.35, 1.35)	0.267
	No	60(80.0%)	110(73.3%)			
Stillbirth	Yes	3(4.0%)	4(2.7%)	1.52	(0.33, 6.98)	0.594
	No	72(96.0%)	146(97.3%)			
Premature birth	Yes	10(13.3%)	29(19.3%)	0.64	(0.29, 1.40)	0.254
	No	65(86.7%)	121(80.7%)			
Fistula	Yes	1(1.3%)	1(0.7%)	2.01	(0.12, 32.64)	0.626
	No	74(98.7%)	149(99.3%)			

4.3.5. Association of Perinatal depression and maternal infant bonding disorders among mothers of full-term normal infants

Figure 4.3 shows that about 40% of the cases had depression compared to 9.3% in the control. A significant association was found between maternal infant bonding disorders and perinatal depression (OR: 6.48, (95% C.I: 3.16, 13.28) and P-value <0.001). The odds of having perinatal depression were 6.48 more in the cases than the controls with a p value of (0.001)

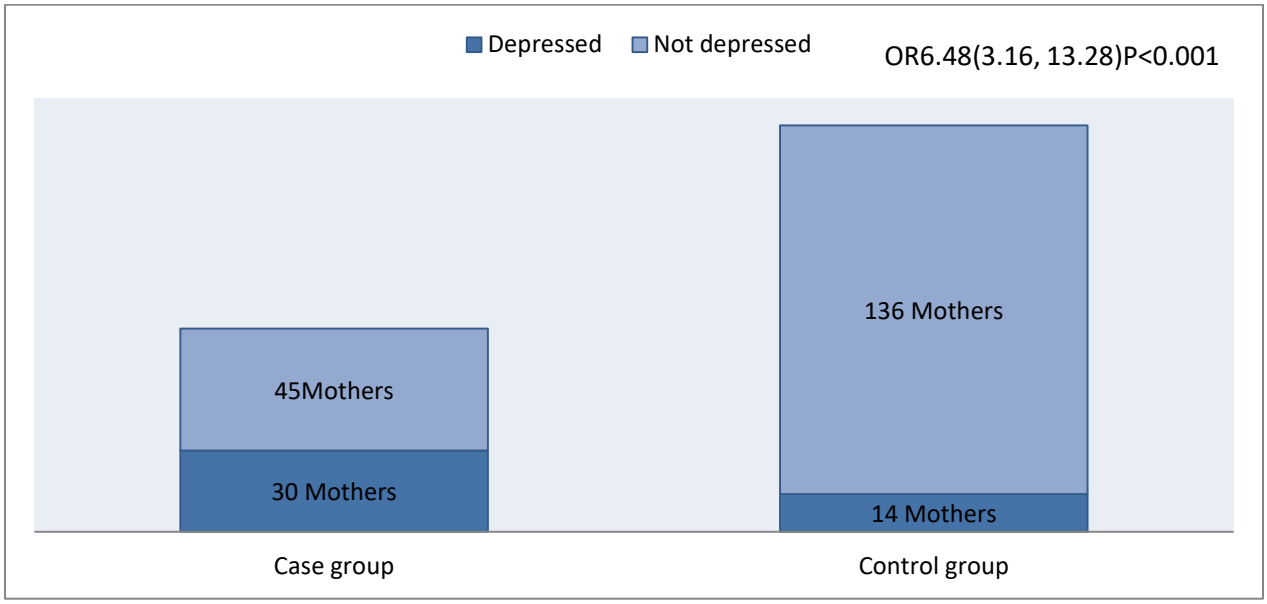


Figure 4.23: Association between perinatal depression and maternal infant bonding disorders among mothers of full-term normal infants

4.4. Multivariate logistic regression of factors associated with maternal infant bonding disorders in mothers of full-term normal infants

All the variables entered into the regression model had a threshold of p-value less than 0.2 in the bivariate analysis. However maternal age was included apriori although it had a p-value less than 0.2. The analysis in table 7.0 revealed a significant association between perinatal depression and assisted delivery with MIBD (OR: 0.20 95%CI: 0.04, 1.07, P=0.060). The odds of having perinatal depression were about seven times more in the cases than the controls with a confidence interval of 95%. The P-value was <0.001 indicating a strong evidence against the null hypothesis (Perinatal depression is not associated with impaired maternal bonding at 6-12 weeks postpartum).

Table 4.6: Multivariable logistic regression of factors associated with maternal infant bonding disorders in mothers of full-term normal infants

Variable	Description	Case group (n = 75)	Control group (n = 150)	aOR	95% C.I	P- value
Age	18-25 y	16(21.3%)	46(30.7%)	1		
	26-29 y	20(26.7%)	37(24.7%)	1.34	(0.56, 3.23)	0.511
	30-44 y	39(52.0%)	67(44.7%)	1.43	(0.66, 3.11)	0.358
Mode of delivery	CS	27(36.0%)	54(36.0%)	1		
	SVD	46(61.3%)	77(51.3%)	1.60	(0.81, 3.13)	0.173
	Assisted delivery	2(2.7%)	19(12.7%)	0.20	(0.04, 1.07)	0.06
Supportive partner	Yes	59(78.7%)	126(84.0%)	0.89	(0.41, 1.95)	0.778
	No	16(21.3%)	24(16.0%)	1		
IPV	Yes	12(16.0%)	15(10.0%)	1.00	(0.38, 2.68)	0.992
	No	63(84.0%)	135(90.0%)	1		
Perinatal depression	Yes	30(40.0%)	14(9.3%)	7.30	(3.30, 16.13)	<0.001
	No	45(60.0%)	136(90.7%)	1		

5. CHAPTER FIVE: DISCUSSION

5.1.Introduction

Promotion and prevention of the mental health of both pregnant and lactating mothers is an important aspect of public health. It is closely linked to the reduction of child morbidity and mortality. This study inspected the association between perinatal depressions and impaired maternal bonding among postpartum mothers of full-term normal infants. In this study, close to half of the postpartum mothers with impaired bonding had perinatal depression and the odds of having perinatal depression were about seven times more in the cases than the controls. Moreover, for the women with bonding disorders, 4% had rejection and pathological anger, 6.7% anxiety about the infant and 5.3% incipient abuse.

This study looked at the association of select socio-demographic characteristics with mother-infant bonding disorders. Age did not significantly influence the probability of maternal bonding disorders. Of note is that a majority of women had adequate social support and very few reported IPV hence age had no significant association. Conversely, a study in Sweden showed that younger mothers had a higher risk to reporting, suppressing and expressing problems in their children (Agnafors, Bladh, Svedin, & Sydsjö, 2019). This can be explained by the fact that these cohorts of young mothers have a higher probability of being financially unstable. Further to this, they may not have the social muscle and be emotionally ready to deal with pregnancy stresses and this puts them at risk of depression and MIBD. On the other hand some studies have shown that older women have a higher probability of developing depression while pregnant and have challenges bonding with their children (Weobong et al., 2009).

Marital status had no significant association with maternal bonding disorders. This was corroborated by a study that found that being single was not associated with developmental problems that affect children (Agnafors et al., 2019). However, the African culture stigmatizes single parenthood and this may predispose one to maternal depression and bonding disorders with their child (Thompson & Ajayi, 2016b). Interestingly, this study did not find the association between level of education and depression or MIBD to be significant. This kind of an association would have been anticipated, as a good number of studies on depression show that the higher the education status of the subjects, the lower the rates of depression (Ohoka et al., 2014).

Those who had partner support and or intimate partner violence had no significant association with maternal infant bonding disorders in both arms of the study. This is contrary to studies that have revealed that globally depression is connected with the lack of adequate social support, being single, intimate partner violence, poverty, being young and unplanned pregnancy (Hartley et al., 2011). Moreover a study done by (Kita, Haruna, Matsuzaki, & Kamibeppu, 2016) revealed that IPV in gestation was linked with mother-to-infant bonding difficulties at one month postnatal. In this study very few women reported intimate partner violence and lack of partner support. This could be due to the stigma associated with this and a lack of awareness on the part of the women of the various forms of gender-based violence hence leading to underreporting. Cultural, social and background elements have been found to also impact what is considered conventional or 'normal' in a particular setting in regards to admission of symptoms (Dinos, Ascoli, Owiti, & Bhui, 2017).

Selected obstetric characteristics like parity, type of delivery and select obstetric complications were assessed. Parity in this study, both in the cases and controls had no significant relationship

with MIBD which is contrast to another study that showed that primipara mothers showed poorer mother–infant bonding than multipara mothers, mode of delivery not withstanding (Yoshida, Matsumura, Tsuchida, Hamazaki, & Inadera, 2020). This study also found that those who had SVD or caesarian birth had no significant association with maternal infant bonding disorder in both the cases and control. Data from the aforementioned study showed that caesarian delivery seemed impose minimum effect on mother–infant bonding which is a similar finding in this current study (Yoshida, Matsumura, Tsuchida, Hamazaki, & Inadera, 2020). Additionally, results in this study showed that unplanned pregnancy and history of stillbirth and prior fetus loss had no association with maternal infant bonding disorders while assisted delivery was seen to be protective. On the contrary, some studies have shown that variables like: stillbirth, difficult delivery, or an unplanned pregnancy can result to the development of bonding disorders (Kumar, 1997). The findings in this study also contrasted with a study that the analysis of variance showed that women who underwent an assisted delivery or vaginal instrumental delivery had higher rates of somatization, obsessive compulsive disorder, and mood disorders levels in compared to women who had natural delivery (Dekel et al., 2019). The findings of the current study can be expounded by the minor proportions of women who reported to have had either assisted delivery or obstetric complications. A larger study could be better placed at accurately accessing these associations.

5.2.Association between perinatal depression and maternal infant bonding disorders

This study found the proportions of perinatal depression in the control group were at 9.3% which is similar to another study that showed that about 8.5% to 10% of females in the prenatal duration suffer from depression and another 6.5%-12.9% also suffers from the same up to one year postnatally (Gavin et al., 2005). In a prospective observational cohort study, screening was

undertaken at 24-28 weeks gestation and repeated at six weeks postpartum. Among the 8,985 pregnant women who obtained antenatal follow in the sites of interest, 8,840 mothers accounting for 98% were screened for depression in pregnancy, and another 7,780 (86%) were screened post-delivery. Overall, 576 women (6.5%) screened positive for possible depression while of these, 69% screened positive during pregnancy, and 31% screened positive post-delivery ($P < .01$) (Venkatesh et al., 2016). This is similar picture to the high projections across sub-Saharan Africa like a study by (Bindt et al., 2012) that showed that 26.6% (95%-CI =21.7; 31.8) of Ghanaian and 32.9% (95%-CI =29.5; 36.4) of Ivorian women had scores suggesting major depression according to DSM-IV criteria. Another study more specifically in East Africa showed that about 20% had maternal depression (Gavin et al., 2005).

A longitudinal study focusing on both types of perinatal depression carried out in two major public hospitals in Kenya, found that antenatal depressive symptoms had a prevalence of 18% while that of postpartum depression was 21% (Ongeri et al., 2016). The variance can be credited to the fact that aforementioned study was a longitudinal study with first screening of gravid women being conducted in last trimester of pregnancy and a follow up made at 6-10 weeks postnatally while this study focused on 6-12 weeks postpartum. The high projection of perinatal depression in the cases in this study might have been influenced by the global pandemic of COVID-19 as this challenging time could have exacerbated the viscous cycle between MIBD and maternal depression. In addition during the COVID 19 pandemic many studies done identified widespread mental symptoms among expectant women, such as mood disorders (Hessami, Romanelli, Chiurazzi, & Cozzolino, 2020). A study found that depressed mothers have a hard time adjusting and settling into motherhood, the sensitivity to their infant cues is reduced, leading to less than optimal bonding to their infants (Badr, Ayvazian, Lameh, &

Charafeddine, 2018). In addition, mild depressive symptoms in the post-delivery period also influence mother-infant bonding and child development (Nieto, Lara, & Navarrete, 2017).

In this study, more women with impaired mother-child bonding had perinatal depression in comparison to those without impaired bonding. Likert scales, like the ones used in this study offer a range of response options like; never, sometimes, often or all the time, frequently come from Western perspectives. It was difficult for the Kenyan mothers in this study to take their experiences and distill them into one response choices or a number. This could have led to under diagnoses of MIBD. Many times people present with symptoms that are exclusive in their presentations to a specific sociocultural background (Desai & Chaturvedi, 2017).

This high projections of maternal depression rates in MIBD are comparable to a study that found that about 29% of mothers with perinatal depression are diagnosed with bonding disorders (Klier, 2006). Another study undertaken in India revealed that the rate of bonding disorders to be 24% among perinatal mothers who screened negative for mental illness against 45.2% in mothers with psychiatric illness (Vengadavaradan, Bharadwaj, Sathyanarayanan, & Durairaj, 2019).Bonding disorders were present in about 7-11.3% of mother-infant pairs in the general population per a study done by (Lehnig et al., 2019). The odds of having perinatal depression were about seven times more in the mothers with MIBD than in mothers without it in the current study. Therefore, more mothers who experienced bonding disorders with their infants, screened positive for maternal depression indicating an association between the two diseases. Children whose mothers experience impaired bonding can have a higher risk of abusive parenting and consequently develop behavioral problems (Nakano et al., 2019).This is in congruence with a study that found perinatal depression to be the only significant independent predictor of MIBDs

(Afolabi et al., 2017). A study done by (Sugishita et al., 2016) observed the relationship between bonding disorders during pregnancy and compared that to the depressive state during the postpartum period and found that 24% of mothers who had bonding disorders in antepartum had depression in postnatal period. Another study also found that maternal depressive symptoms and maternal bonding to the infant and child were strongly associated (Cohen et al., 2010). Moreover, a different study looked at the structure of the PBQ cross diverse versions and concluded that minor and undiagnosed maternal depressive symptoms could have a substantial sway on maternal bonding (Ghahremani et al., 2019). It has been found that for a mother to have a healthy bond with her newborn she must be in a healthy mental state (Brockington, 2004) and that the first few weeks of life are critical period in the child's development that is majorly dependent on the parenting experiences (Mason et al., 2011).

Different studies have reported controversy about whether the maternal depression was indeed the cause of the bonding disorder or it was the bonding disorder that led to the depression (Ohoka et al., 2014) (Tharner et al., 2012)(Righetti-Veltema, Bousquet, & Manzano, 2003). This current study, being a case control study was not able to distinguish which came first, the outcome which was maternal bonding disorders or the risk factor maternal depression under study.

5.3. Study limitations

Limitations included the fact that in hospital-based study, prevalence cannot be determined because the population denominator cannot be calculated because the study is not population based. The outcomes cannot be generalized to all primary care MCH clinics or to mothers not attending MCH clinics. This study looked at proportion of mothers with perinatal depression

instead prevalence of the same. In addition to this, another limitation in this study is the use of the EPDS (a self-report screening tool) which is equated to a clinical diagnosis of depression. The drawback of self-report tools is that the subject may not be able to assess themselves accurately. However the EPDS has been validated to be used to screen for both antepartum and postpartum depression. Those who screen positive are referred to a psychiatrist or clinical psychologist for a diagnosis. Other foreseen limitations comprised sharing of false information and recall bias by the study participants. In this study, some of the obstetric information was gotten from the mother child booklet to try and mitigate this. Although the PBQ Scale was a short and easy to use; the cut-off points in the present study were not verified in this clinical setting. Moreover this study assumed that due to use of consecutive sampling (every single subject attaining the criteria of inclusion was selected until the necessary sample size was realized) for the cases. In addition randomization of the controls during enrollment of study participants was done and any possible confounding of MIBD would have randomly fallen on both sides of the study in an equally, and would therefore have negligible effect on the analysis.

6. CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS.

About half of the postpartum mothers with impaired bonding had perinatal depression. Most women with bonding disorders had impaired bonding in comparison to the other three types. This study concluded that none of the obstetric, social or biomedical factors were significantly associated with mother infant bonding disorder except assisted delivery that was noted to be protective. A significant association between perinatal depression and assisted delivery with MIBD was noted. These findings belabor the purpose behind the increased concern for mother–infant pairs in the first weeks postpartum, at period that could be considered critical for the development of the mother–child bonding relationship.

6.1.Recommendations

This study investigated bonding in postpartum up to 12 weeks after delivery. To the best of the investigator's knowledge, this was the first study of its kind in Kenya. It therefore forms a reference point for other forthcoming studies that are better placed at investigating causal relationships. The results of this study lead to the following policy recommendations:

1. The inclusion of mental health screening integrated in mother to child welfare check-ups by ministry of health,
2. Appropriate management and follow up by healthcare workers that include robust referral systems traversing both the antennal and postnatal period.

6.2.Recommendations for further research

1. More research on perinatal mental health issues is required for better contextualization in creation of preventive programs focusing on both maternal and infant/early childhood mental health.
2. More research focusing on the impact of bonding disorders related to maternal depression and the long-term consequences to the child and mother is necessary in sub-Saharan Africa.

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8. APPENDICES

Appendix I: Research Consent Form

PARTICIPANT INFORMATION AND CONSENT FORM

SAMPLE ADULT CONSENT FOR ENROLLMENT IN THE STUDY

(To be administered in English or any other appropriate language e.g. Kiswahili translation)

Title of Study: Perinatal depression and maternal-infant bonding disorders in mothers of full-term normal infant Investigator\and institutional affiliation:

DR. Tabitha Munyoki

Department: Department of Public and Global health

Phone: +254720346134

Email: munyokinyoks@gamil.com

Introduction:

I would like to tell you about a study being conducted by the above listed researcher. The purpose of this consent form is to give you the information you will need to help you decide whether or not to be a participant in the study. Feel free to ask any questions about the purpose of the research, what happens if you participate in the study, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When we

have answered all your questions to your satisfaction, you may decide to be in the study or not. This process is called 'informed consent'. Once you understand and agree to be in the study, I will request you to sign your name on this form. You should understand the general principles which apply to all participants in a medical research: i) Your decision to participate is entirely voluntary ii) You may withdraw from the study at any time without necessarily giving a reason for your withdrawal iii) Refusal to participate in the research will not affect the services you are entitled to in this health facility or other facilities. We will give you a copy of this form for your records.

May I continue? YES / NO

This study has approval by The Kenyatta National Hospital-University of Nairobi Ethics and Research Committee protocol No. _____

WHAT IS THIS STUDY ABOUT?

The researchers listed above are interviewing individuals who are 10-12 weeks postpartum. The purpose of the interview is to find out if you have Mother Infant Bonding disorders. Participants in this research study will be asked questions about their mental health and the bonding with their new born child. This will be done by providing the participants with two scales i.e. EPDs and PBQs that will allow them provide crucial details to assess the same.

There will be approximately 225 participants in this study randomly chosen. We are asking for your consent to consider participating in this study.

WHAT WILL HAPPEN IF YOU DECIDE TO BE IN THIS RESEARCH STUDY?

If you agree to participate in this study, the following things will happen:

You will be interviewed by a trained interviewer in a private area where you feel comfortable answering questions. The interview will last approximately 20 minutes. The interview will cover topics such as mental health and bonding with your infant.

After the interview has finished, we will ask for a telephone number where we can contact you if necessary. If you agree to provide your contact information, it will be used only by people working for this study and will never be shared with others. The reasons why we may need to contact you include: the need to contact you in the event you are seen to need treatment and support

ARE THERE ANY RISKS, HARMS DISCOMFORTS ASSOCIATED WITH THIS STUDY?

Medical research has the potential to introduce psychological, social, emotional and physical risks. Effort should always be put in place to minimize the risks. One potential risk of being in the study is loss of privacy. We will keep everything you tell us as confidential as possible. We will use a code number to identify you in a password-protected computer database and will keep all of our paper records in a locked file cabinet. However, no system of protecting your confidentiality can be absolutely secure, so it is still possible that someone could find out you were in this study and could find out information about you.

Also, answering questions in the interview may be uncomfortable for you. If there are any questions you do not want to answer, you can skip them. You have the right to refuse the interview or any questions asked during the interview.

It may be embarrassing for you to have depression. We will do everything we can to ensure that this is done in private. Furthermore, all study staff and interviewers are professionals with special training in these examinations/interviews. Also, issues related to your pregnancy may be stressful (e.g. event recalls).

In case of an injury, illness or complications related to this study, contact the study staff right away at the number provided at the end of this document. The study staff will treat you for minor conditions or refer you when necessary.

ARE THERE ANY BENEFITS BEING IN THIS STUDY?

You may benefit by receiving free health information regarding perinatal depression and Mother infant bonding, (list e.g. Counselling, health information etc.) .We will refer you to a hospital for care and support where necessary. Also, the information you provide will help us better understand how depression in pregnancy and after birth affects bonding between the mother and newborn. This information is a contribution to science and will be used to better improve the mental health services pregnant and postpartum mothers receive.

WILL BEING IN THIS STUDY COST YOU ANYTHING?

(Explain)

_____NO_____

WILL YOU GET REFUND FOR ANY MONEY SPENT AS PART OF THIS STUDY?

(Enter statement)

_____NO_____

WHAT IF YOU HAVE QUESTIONS IN FUTURE?

If you have further questions or concerns about participating in this study, please call or send a text message to the study staff at the number provided at the bottom of this page.

For more information about your rights as a research participant you may contact the Secretary/Chairperson, Kenyatta National Hospital-University of Nairobi Ethics and Research Committee Telephone No. 2726300 Ext. 44102 email uonknh_erc@uonbi.ac.ke.

The study staff will pay you back for your charges to these numbers if the call is for study-related communication.

WHAT ARE YOUR OTHER CHOICES?

Your decision to participate in research is voluntary. You are free to decline participation in the study and you can withdraw from the study at any time without injustice or loss of any benefits**.**

CONSENT FORM (STATEMENT OF CONSENT)

Participant's statement

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counselor. I have had my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation

in this study is voluntary and that I may choose to withdraw any time. I freely agree to participate in this research study.

I understand that all efforts will be made to keep information regarding my personal identity confidential.

By signing this consent form, I have not given up any of the legal rights that I have as a participant in a research study.

I agree to participate in this research study: Yes No

I agree to provide contact information for follow-up: Yes No

Participant printed name:

_____

Participant signature / Thumb stamp _____ Date _____

Researcher's statement

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and have willingly and freely given his/her consent.

Researcher‘s Name: _____ Date: _____

Signature

_____

Role in the study: _____ *[i.e. study staff who explained informed consent form.]*

For more information contact

1. DR. Tabitha Munyoki

Department: Department of Public and Global health

Phone: +254720346134

Witness Printed Name (*If witness is necessary, a witness is a person mutually acceptable to both the researcher and participant*)

Name _____ Contact information _____

Signature /Thumb stamp: _____ Date;

_____

Kiambatisho III: Fomu ya Idhini ya Utafiti

Sehemu ya kwanza: Maelezo

Mada ya Utafiti: Uhusiano kati ya ugojwa wa unyogovu mkubwa katika ujauzito na shida ya dhamana baina ya mama ambaye amejifungua mimba na mtoto aliyejifungua katika hospitali kuu ya Kenyatta.

Mtafitii Mkuu:

Daktari Tabitha Ndewa Munyoki, Mwanafunzi katika idara ya afya ya umma chuo kikuu cha Nairobi

Utangulizi

Maudhui ya ridhaa hii ni kukupa maelezo utakayohitaji kutumia katika uamuzi ya kushiriki au kutoshiriki katika uchunguzi huu. Uwe huru kuuliza maswali yoyote kuhusu lengo la utafiti huu, nini kinachotokea ukishiriki katika utafiti, faida na hasara ya kushiriki, na haki zako kama aliyejitolea kushiriki, na chochote kile ambacho hakieleweki vyema. Tutakapo kuwa tumejibu maswali yako yote, utaamuwa kushiriki katika uchunguzi au la. Mchakato huu unaitwa ridhaa ya maelezo, maanake “informed consent.” Unakaribishwa kushiriki katika uchunguzi huu na waweza chukua muda wowote unayoitaji kufanya uamuzi wa kushiriki ni kwa hiari yako. Kama kuna maswali yoyote au ufafanuzi utakao hitajika, kuwa huru kuwasiliana na mdadisi mkuu au manaibu wake.

Je, naweza kuendelea? NDIO/ LA

Utafiti huu umekubaliwa na kamati ya maadili ya utafiti ya hospitali kuu ya Kenyatta na chuo kikuu cha Nairobi, itifaki nambari _____

LENGO LA UTAFITI/ UTAFITI WAHUSU NINI?

Uchunguzi huu una nia ya kukusanya taarifa ili kutambua kama kuna uwezekano wa uhusiano wowete ule kati Uhusiano kati ya ugojwa wa unyogovu mkubwa katika ujauzito na shida ya dhamana baina ya mama ambaye amejifungua mimba na mtoto aliyejifungua. Kugundua uhusiano huu unaweza kutusaidia kuboresha matibabu, kupunguza madhara, nahata kutuwezesha kutambua watu wanaohitaji kufuatiliwa Zaidi. Ukikubali kushiriki, utaulizwa maswala kuhusu afya ya ki akili na vile vile hali ya dhamana baina yako na mtoto uliyojifungua. Baadaye utakuwa na chaguo la kujibu maswali yaliyomo kwenye vyombo vya utafiti vya kupima hayo magojwa .vyombo hivyo ni EPDS and PBQ. Takriban watu mia moja na ishirini na tano watashiriki. Tunaomba ridhaa yako, kukubali kushiriki.

NAMNA / NINI KITAKACHOTOKEA UKISHURIKI?

Ukikubali kushiriki kwa utafiti, zifuatazo zitafanyika:

Utahitajika kutia sahihi na tarehe kwa fomu ya idhini/makubaliano. Nakala ya fomu hii itatengenezwa na utapewa moja kuweka na kubaki nayo. Utafanyiwa mahojiano mahali ya kibinafsi,kuhusu mada tofauti kama vile magonjwa yoyote wakati wa ujauzito, shida za kijamii. baadaye utapewa fomu mbili zilizo na maswali ambayo utahitajika kujibu. Mdadisi atakuwepo kujibu maswali yoyote ambayo huenda ukawa nayo iwapo maelezo Zaidi yatahitajika.

Tutaomba nambari yako ya simu ambayo tutawasiliana na wewe ijapo itahitajika.Ukikubali kutupa maelezo ya mawasiliano, itatumika tuu na wahusika wa utafiti huu pekee na haitashirikisha wengine kamwe. Tunaweza wasiliana nawe ikiwa utahitaji kufuatiliwa.

UWEZEKANO WA HATARI NA USUMBUFU

Hakuna hasara inayotarajiwa katika uchunguzi huu isipokuwa tu pengine aibu ya kuzungumuza kuhusu afya ya akili

FAIDA INAYOTARAJIWA

Utafaidika mafunzo ya habari za afya. Matokeo ya uchunguzi huu yana lengo la kutoa matibabu bora kwa waadhiriwa wa unyogovu mkubwa katika ujauzito na shida ya dhamana baina ya mama ambaye amejifungua mimba na mtoto aliyejifungua. Ikija ikawa kwamba matokeo ya majibu yako yatukuwa na shida yeyote mtafiti mkuu atakupigia simu kukuelezea maelezo ya jinsi utahitaji kufuatiliwa Zaidi.

USIRI

Habari utakayopeana itakuwa ya siri. Matokeo ya uchunguzi huu yatawekwa siri. Hakuna majina yatatumika. Utapewa nambari halisi itakayowekwa kwa kompyuta iliyotunzwa na neno siri.Wadadisi tuu ndio wataweza kupata habari hii. Rekodi za karatasi zitafungiwa chini ya kifuli na ufunguo. Matokeo ya uchunguzi yatakabidhiwa kwa wanaohusika.

JE, KUSHIRIKI KWENYE UTAFITI UTAKUGARIMU CHOCHOTE?

Hapana/la.

HAKI YA KUKATAA/ WAWEZA KUJIONDOA KWENYE UTAFITI?

Kushiriki katika uchunguzi huu, ni kwa kujitolea kwa hiari yako. Una haki ya kujitoa kwa uchunguzi wakati wowote bila ya madhara yoyote, na matibabu yako bado yataendelea kwa njia mwafaka bila matatizo yoyote. Kutoshiriki ni haki yako, na haki hii itaheshimiwa.

SEHEMU YA PILI: MAKUBALIANO (TAARIFA YA IDHINI)

Taarifa ya mshirika.

Nimesoma na nikaelewa ujumbe ulioko hapa juu. Nimeelezewa kikamilifu kuhusu utafiti huu na nilipata nafasi ya kuuliza maswali yaliyojibiwa kwa ukamilifu kutumia lugha ninayoielewa. Nimeelezewa kuhusu faida na hasara ya utafiti. Nimekubali kushiriki katika utafiti huu bila kulazimishwa ama kupewa hongo,na naweza kuchagua kutoshiriki wakati wowote.

Naelewa kwamba juhidi zote zitafanywa kuweka usiri kuhusu habari yangu ya kibinafsi.

Nimekubali kushiriki kwenye utafiti NDIO HAPANA/LA

Nimekubali kutoa habari ya mawasiliano ya kufuatiliwa NDIO HAPANA/LA

Jina la Muhusika: …… AU Alama ya Kidole…….

Saini ya Muhusika: ……

Tarehe: ……..

Saini ya Shahidi: …… Tarehe: …….

Taarifa ya Mdadisi

Nimewaelezea wahusika kuhusu utafiti na nikawapatia nafasi ya kuuliza maswali. Nimeyajibu maswali yote niwezavyo. Nimehakikisha kuwa wanaohusika wamekubali kwa hiari yao.

Jina la mdadisi: ……..……

Saini: ……..

Tarehe: ……

Kuwasiliana

Kwa maswali yoyote au ufafanuzi wowote wasiliana na:

Daktari Tabitha Ndewa Munyoki

Mtafiti mkuu

Nambari ya simu: 0720346134

Barua pepe: munyokinyoks@gmail.com

Appendix IV: Study instruments

APPENDIX iii a: A standard checklist

a) English version

A standard checklist	**YES**	**NO**
Have you delivered in the last 10-12 weeks		
Can you speak or read Kiswahili or English?		
Are you aged between 18-49 years		
Did you deliver at 37 week and above		
Was your child diagnosed with a congenital malformation at birth?		

b) Swahili version

ORODHA YA UKAGUZI WA KAWAIDA	**NDIO**	**HAPANA**
Umezaa katika wiki 10-12 zilizopita		
Unaweza kuzungumza au kusoma Kiswahili au Kiingereza?		
Je, una umri kati ya miaka 18-49		
Ulizaa katika wiki 37 au baada ya wiki 37 na zaidi		
Mtoto wako aligundulika kuwa na kasoro ya uzazi wakati wa		

kuzaliwa		

APPENDIX iii b: Semi-structured questionnaire

a) English version

Semi-structured questionnaire	**YES**	**NO**
Did you have a spontaneous vaginal delivery in your last delivery		
Did you have an assisted delivery(vacuum/forceps) in your last delivery		
Did you have a caesarian section in your last delivery		
Was this pregnancy wanted		
Was your partner supportive during your pregnancy		
Have you experienced any partner violence; sexual or physical		
Did you have any of the following complications prior to this pregnancy;		
Abortion		
Miscarriage		
Still birth		

Premature birth		
Fistula		

b) Swahili version

ORODHA YA UKAGUZI WA KAWAIDA	**NDIO**	**HAPANA**
Je, ulipata uzazi wa kawaida kwa mtoto wako wa mwisho		
wakati wa kuzaliwa kwa mtoto wako wa mwisho ulikuzaa (utupu/vikosi)		
Je, ulifanya sehemu ya kaisari katika kuzaliwa kwa mtoto wa mwisho		
Je, ujauzito huu ulitaka		
Aliyekuwa mpenzi wako alikunga mkono wakati wa ujauzito wako		
Umepata uzoefu wa unyanyasaji wowote wa kijinsia au wa kimwili		
Je, ulikuwa na matatizo yoyote yafuatayo kabla ya ujauzito huu;		

Utoaji mimba		
Kuharibika kwa mimba		
kuzaliwa kwa mtoto aliyekufa		
Kuzaliwa kabla ya wakati		
Fistula		

APPENDIX iiid : Edinburgh Postnatal Depression Scale 1 (EPDS)

a) English version

Edinburgh Postnatal Depression Scale (EPDS)

Name:_____ _____Address:

_____ _____

Your Date of Birth: _____ _____

Baby's Date of Birth:_____ Phone: _____

As you are pregnant or have recently had a baby, we would like to know how you are feeling. Please check the answer that comes closest to how you have felt **IN THE PAST 7 DAYS**, not just how you feel today.

Here is an example,

already completed. I

have felt happy:

□ Yes, all the time

☒ Yes, most of the time This would mean: "I have felt happy most of the time"

□ during the past week. No, not very often Please complete the other questions in the same way.

□ No, not at all

In the past 7 days:

1. I have been able to laugh and see the funny side of things
   - □ As much as I always could
   - □ been able

*6. Things have been getting on top of me

- □ Yes, most of the time I haven't

□ Not quite so much now

□ Definitely not so much now

□ Not at all

2. I have looked forward with enjoyment to things

□ coping as well as ever

□ As much as I ever did

□ Rather less than I used to

□ Definitely less than I used to

Hardly at all

*3 I have blamed myself unnecessarily when things went wrong

□ Yes, most of the time

□ Yes, some of the time

□ Not very often

□ No, never

4. I have been anxious or worried for no good reason

□ No, not at all

□ Hardly ever

□ Yes, sometimes

□ Yes, very often

*5 I have felt scared or panicky for no very good reason

□ Yes, quite a lot

□ Yes, sometimes

□ No, not much

□ No, not at all

to cope at all

□ yes, sometimes I haven't been coping as well as usual

□ No, most of the time I have coped quite well

□ No, I have been coping as well as ever

*7 I have been so unhappy that I have had difficulty sleeping

□ Yes, most of the time

□ Yes, sometimes

□ Not very often

□ No, not at all

*8 I have felt sad or miserable

□ Yes, most of the time

□ Yes, quite often

□ Not very often

□ No, not at all

*9 I have been so unhappy that I have been crying

□ Yes, most of the time

□ Yes, quite often

□ Only occasionally

□ No, never

*10 The thought of harming myself has occurred to me

□ Yes, quite often

□ Sometimes

□ Hardly ever

□ Never

Administered/Reviewed by_____Date _____

[1]Source: Cox, J.L., Holden, J.M., and Sagovsky, R. 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 150:782-786 .

[2]Source: K. L. Wisner, B. L. Parry, C. M. Piontek, Postpartum Depression
N Engl J Med vol. 347, No 3, July 18, 2002, 194-199

Edinburgh Postnatal Depression Scale[1] (EPDS)

Postpartum depression is the most common complication of childbearing.[2] The 10-question Edinburgh Postnatal Depression Scale (EPDS) is a valuable and efficient way of identifying patients at risk for "perinatal" depression. The EPDS is easy to administer and has proven to be an effective screening tool.

Mothers who score above 13 are likely to be suffering from a depressive illness of varying severity. The EPDS score should not override clinical judgment. A careful clinical assessment should be carried out to confirm the diagnosis. The scale indicates how the mother has felt ***during the previous week***. In doubtful cases it may be useful to repeat the tool after 2 weeks. The scale will not detect mothers with anxiety neuroses, phobias or personality disorders.

Women with postpartum depression need not feel alone. They may find useful information on the web sites of the National Women's Health Information Center <www.4women.gov> and from groups such as Postpartum Support International <www.chss.iup.edu/postpartum> and Depression after Delivery <www.depressionafterdelivery.com>.

SCORING

QUESTIONS 1, 2, & 4 (without an *)

Are scored 0, 1, 2 or 3 with top box scored as 0 and the bottom box scored as 3.

Maximum score: 30

Possible Depression: 10 or greater Always look at item 10 (suicidal thoughts)

Instructions for using the Edinburgh Postnatal Depression Scale:

1. The mother is asked to check the response that comes closest to how she has been feeling in the previous 7 days.
2. All the items must be completed.

3. Care should be taken to avoid the possibility of the mother discussing her answers with others. (Answers come from the mother or pregnant woman.)

4. The mother should complete the scale herself, unless she has limited English or has difficulty with reading.

[1]Source: Cox, J.L., Holden, J.M., and Sagovsky, R. 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 150:782-786.[2]Source: K. L. Wisner, B. L. Parry, C. M. Piontek, Postpartum Depression N Engl J Med vol. 347, No 3, July 18, 2002, 194-199

APPENDIX iiib : FOMU YA MIZANI YA EDINBURGH (EPDS)

b) Swahili version

Jina:_____ Anwani: _____

Tarehe yako ya kuzaliwa: - _____

Tarehe ya Kuzaliwa kwa Mtoto:_____ Simu:_____

Unapokuwa mjamzito au umepata mtoto hivi karibuni, tungependa kujua jinsi unavyohisi. Tafadhali angalia jibu ambalo linakaribia jinsi ulivyohisi katika siku 7 zilizopita, sio tu jinsi unavyohisi leo.

Hapa kuna mfano, tayari umekamilika.

Nimehisi furaha:

☐ Ndiyo,

☒ Ndiyo, wakati wote "Nimehisi furaha zaidi ya wakati" katika wiki iliyopita.: “

☐ Hapana, nosi mara nyingi kamilisha maswali mengine kwa njia ile ile.

☐ Hapana, sio kabisa

: Katika siku 7 zilizopita:

1. Nimeweza kucheka na kuona upande wakuchekesha wa mambo

Ndio, kama kwaida

Sio, kama hapo mbeleni(awali)

Kwa hakika, sio kama hapo mbeleni

La, hasha

2. Nimetarajia mamabo kwa furaha

Kama tu hapo mbeleni
Imepunguka kidogo
Imepunguka kabisa
Mara chache sana

3. *Nimejilaumu bila sababu wakati mambo yaliopenda vibaya

   Ndio, mara nyingi
   Ndio mara kadha
   Sio kawaida
   La sijawahi

4. Nimekuwa na wasiwasi bila sababu nzuri

   La sijawahi
   Sio, kama kawaida
   Ndio mara kwa mara
   La sijawahi

5. Nimeshikwa na woga au hofu bila sababu

   Ndio mara nyingi
   Ndio mara kwa mara
   La, si sana
   La sijawahi

6. *Mambo yamekuwa yakinilemea

   Ndio mara nyingi nimeshindwa kukabilina nayo
   Ndio mara kwa mara sijaweza kukubaliana nayo
   La mara nyingi nimeweza kukabaliana nayo
   La,mara nyingi nimeweza kukubaliana vyema kama hapo mbeleni/awali

7. *Nimekuwa na huzun hadi nimekuwa na ugumu kupata usingizi

   Ndio mara nyingi
   Ndio mara kwa mara
   Sio kila wakati
   La hapana

8. Nimekuwa na huzui sana hadi nimekuwa na ungumu kupatana furaha

   Ndio mara nyingi

Ndio mara kwa mara
Sio kila wakati
La , hapana

9. *sijakuwa na furaha kabia hadi nimetokwa na machozi

   Ndio mara nyingi
   Ndio mara kwa mara
   Mara moja moja
   La sijawahi

10. Nimekuwa na mawazo ya kujitendea mabaya

    Ndio mara nyingi
    Ndio mara kwa mara
    Sio kawaida
    La sijawahi

Maagizo

Mama anaulizwa kupigia mstari jibu tu kati ya majibu manne aliyopewa, jibu lililokaribia Zaidi kuhusu jinsi amekuwa akihisi kwa kipindi cha siku saba zililizopita. Masawli yote kumi lazima yajibiwe

Lazima kuwe na uangalifu uwezekanayo wa mama kujadili majibu yake na wengine

Mama lazima ajibu maswali haya mwenyewe atasaidiwa iwapo hawezi kusoma au kufahamu lugha hii

1Source: Cox, J.L., Holden, J.M., na Sagovsky, R. 1987. Kugundua majonzi baada ya kuzaa: Maendeleo ya kiwango cha majonzi baada ya kuzaa ya Edinburgh. Jarida la Uingereza la Psychiatry 150:782-786 .
2Source: K. L. Wisner, B. L. Parry, C.M. Piontek, Majonzi baada ya kujifungua N Engl J Med vol. 347, No 3, Julai 18, 2002, 194-199

Watumiaji wanaweza kuzaliana kiwango bila ruhusa zaidi kutoa wanaheshimu hakimiliki kwa kunukuu majina ya waandishi, kichwa na chanzo cha karatasi katika nakala zote zilizozalishwa.

APPENDIX iii : e PBQ Scoring Sheet

a) English version

Name ----------Baby's age ---------- Date ----------

Please indicate how often the following are true for you. There are no 'right' or 'wrong' answers.

Choose the answer which seems right in your recent experience:

	Always	Very	Quit	Some-	Rarely	Never
I feel close to my baby	**0**	**1**	**2**	**3**	**4**	**5**
I wish the old days when I had no baby would come back	**5**	**4**	**3**	**2**	**1**	**0**
I feel distant from my baby	**5**	**4**	**3**	**2**	**1**	**0**
I love to cuddle my baby	**0**	**1**	**2**	**3**	**4**	**5**
I regret having this baby	**5**	**4**	**3**	**2**	**1**	**0**
The baby doesn't seem to be mine	**5**	**4**	**3**	**2**	**1**	**0**
My baby winds me up	**5**	**4**	**3**	**2**	**1**	**0**
I love my baby to bits	**0**	**1**	**2**	**3**	**4**	**5**
I feel happy when my baby smiles or laughs	**0**	**1**	**2**	**3**	**4**	**5**
My baby irritates me	**5**	**4**	**3**	**2**	**1**	**0**
I enjoy playing with my baby	**0**	**1**	**2**	**3**	**4**	**5**
My baby cries too much	**5**	**4**	**3**	**2**	**1**	**0**
I feel trapped as a mother	**5**	**4**	**3**	**2**	**1**	**0**
I feel angry with my baby	**5**	**4**	**3**	**2**	**1**	**0**
I resent my baby	**5**	**4**	**3**	**2**	**1**	**0**
My baby is the most beautiful baby in the world	**0**	**1**	**2**	**3**	**4**	**5**
I wish my baby would somehow go away	**5**	**4**	**3**	**2**	**1**	**0**
I have done harmful things to my baby	**5**	**4**	**3**	**2**	**1**	**0**
My baby makes me feel anxious	**5**	**4**	**3**	**2**	**1**	**0**
I am afraid of my baby	**5**	**4**	**3**	**2**	**1**	**0**
My baby annoys me	**5**	**4**	**3**	**2**	**1**	**0**
I feel confident when caring for my baby	**0**	**1**	**2**	**3**	**4**	**5**
I feel the only solution is for someone else to look after my	**5**	**4**	**3**	**2**	**1**	**0**

I feel like hurting my baby	**5**	**4**	**3**	**2**	**1**	**0**
My baby is easily comforted	**0**	**1**	**2**	**3**	**4**	**5**

Postpartum Bonding Questionnaire Scoring

I wish the old days when I had no baby would come back		
The baby doesn't seem to be mine		
My baby winds me up		
I love my baby to bits		
I feel happy when my baby smiles or laughs		
My baby irritates me		
My baby cries too much		
I feel trapped as a mother		
I resent my baby		
My baby is the most beautiful baby in the world		
I wish my baby would somehow go away		
Impaired bonding	(12=high)	

I feel distant from my baby		
I love to cuddle my baby		
I regret having this baby		
I enjoy playing with my baby		
I feel angry with my baby		
My baby annoys me		
I feel the only solution is for someone else to look after my baby		
Rejection and pathological anger	(13=high)	
My baby makes me feel anxious		
I am afraid of my baby		
I feel confident when caring for my baby		
My baby is easily comforted		
Infant-focused anxiety	(10=high)	

I have done harmful things to my baby		
I feel like hurting my baby		
Incipient abuse	(3=high)	
Obs: The cutoff for "Rejection and pathological anger" was changed to 13, given the preliminary results of recent research. (The original cutoff value is 17).		

APPENDIX iii : e PBQ Scoring Sheet

b) Swahili version

Jina ----------Umri wa mtoto ---------- Tarehe ----------

Tafadhali onyesha ni mara ngapi yafuatayo ni kweli kwako. Hakuna majibu 'sahihi' au 'mabaya'.

Chagua jibu ambalo linaonekana kuwa sahihi katika uzoefu wako wa hivi karibuni:

	Daima	Sana	Mara nyingi kabisa	Baadhi ya nyakati	Ni nadra	Kamwe (hapana
Najisikia karibu na mtoto wangu	**0**	**1**	**2**	**3**	**4**	**5**
Natamani siku za zamani wakati sikuwa na mtoto	**5**	**4**	**3**	**2**	**1**	**0**
Ninahisi mbali na mtoto wangu	**5**	**4**	**3**	**2**	**1**	**0**
Ninapenda kumkumbatia mtoto wangu	**0**	**1**	**2**	**3**	**4**	**5**

Najuta kuwa na mtoto huyu	**5**	**4**	**3**	**2**	**1**	**0**
Mtoto haonekani kuwa wangu	**5**	**4**	**3**	**2**	**1**	**0**
Mtoto wangu ananikasirikia	**5**	**4**	**3**	**2**	**1**	**0**
Ninampenda mtoto wangu sana	**0**	**1**	**2**	**3**	**4**	**5**
Ninajisikia furaha wakati mtoto wangu anatabasamu au kucheka	**0**	**1**	**2**	**3**	**4**	**5**
Mtoto wangu ananikera	**5**	**4**	**3**	**2**	**1**	**0**
Ninafurahia kucheza na mtoto wangu	**0**	**1**	**2**	**3**	**4**	**5**
Mtoto wangu analia sana	**5**	**4**	**3**	**2**	**1**	**0**
Nahisi kunaswa kama mama	**5**	**4**	**3**	**2**	**1**	**0**
Nasikia hasira na mtoto wangu	**5**	**4**	**3**	**2**	**1**	**0**
Sijapendezwa na mtoto wangu	**5**	**4**	**3**	**2**	**1**	**0**
Mtoto wangu ni mtoto mzuri zaidi duniani	**0**	**1**	**2**	**3**	**4**	**5**
Natamani mtoto wangu angeondoka kwa namna fulani	**5**	**4**	**3**	**2**	**1**	**0**
Nimefanya mambo hatari kwa mtoto wangu	**5**	**4**	**3**	**2**	**1**	**0**
Mtoto wangu ananifanya nijisikie wasiwasi	**5**	**4**	**3**	**2**	**1**	**0**
Nina hofu ya mtoto wangu	**5**	**4**	**3**	**2**	**1**	**0**
Mtoto wangu ananiudhi	**5**	**4**	**3**	**2**	**1**	**0**
Ninajisikia ujasiri wakati wa kumtunza mtoto wangu	**0**	**1**	**2**	**3**	**4**	**5**
Ninahisi suluhisho pekee ni kwa mtu mwingine	**5**	**4**	**3**	**2**	**1**	**0**
Nahisi kama kumuumiza mtoto wangu	**5**	**4**	**3**	**2**	**1**	**0**
Mtoto wangu anafarijika kwa urahisi	**0**	**1**	**2**	**3**	**4**	**5**

Postpartum Bonding Questionnaire Scoring

Najisikia karibu na mtoto wangu		

Natamani siku za zamani wakati sikuwa na mtoto angerudi		
Mtoto haonekani kuwa wangu		
Mtoto wangu ananikasirikia		
Ninampenda mtoto wangu sana		
Ninajisikia furaha wakati mtoto wangu anatabasamu au kucheka		
Mtoto wangu ananikera		
Mtoto wangu analia sana		
Nahisi kunaswa kama mama		
Nasikia hasira na mtoto wangu		
Mtoto wangu ni mtoto mzuri zaidi duniani		
Natamani mtoto wangu angeondoka kwa namna fulani		
Muunganisho wenye athari	(12=juu)	

Ninahisi mbali na mtoto wangu		
Ninapenda kumkumbatia mtoto wangu		
Najuta kuwa na mtoto huyu		
Ninafurahia kucheza na mtoto wangu		
Nasikia hasira na mtoto wangu		
Mtoto wangu ananikera		
Ninahisi suluhisho pekee ni kwa mtu mwingine kumtazama mtoto wangu		
Kukataliwa na hasira ya patholojia	(13=juu)	
Mtoto wangu ananifanya nijisikie wasiwasi		
Nina hofu ya mtoto wangu		
Ninajisikia ujasiri wakati wa kumtunza mtoto wangu		
Mtoto wangu anafarijika kwa urahisi		
Wasiwasi unaozingatia watoto wachanga	(10=juu)	

Nimefanya mambo hatari kwa mtoto wangu		
Nahisi kama kumuumiza mtoto wangu		
unyanyasaji unaoanzia	(3=Juu)	
Obs: Kukatwa kwa "hasira ya kukataliwa na patholojia" ilibadilishwa hadi 13, kutokana na matokeo ya awali ya utafiti wa hivi karibuni. (Thamani ya awali ya kukata ni 17).		

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Ref: KNH-ERC/A/120

6th April 2021

Dr.Tabitha Ndewa Munyoki
Reg. No.H57/88312/ 2016
School of Public Health
College of Health Sciences
University of Nairobi

KENYATTA NATIONAL HOSPITAL APPROVED 06 APR 2021 KNH/UoN-ERC P.O. BOX 20723 - 00202 NAIROBI

Dear Dr. Munyoki

RESEARCH PROPOSAL – PERINATAL DEPRESSION AND MATERNAL-INFANT BONDING DISORDERS IN MOTHERS OF FULL-TERM NORMAL INFANTS (P685/12/2020)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 6th April 2021 – 5th April 2022.

This approval is subject to compliance with the following requirements:

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

This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

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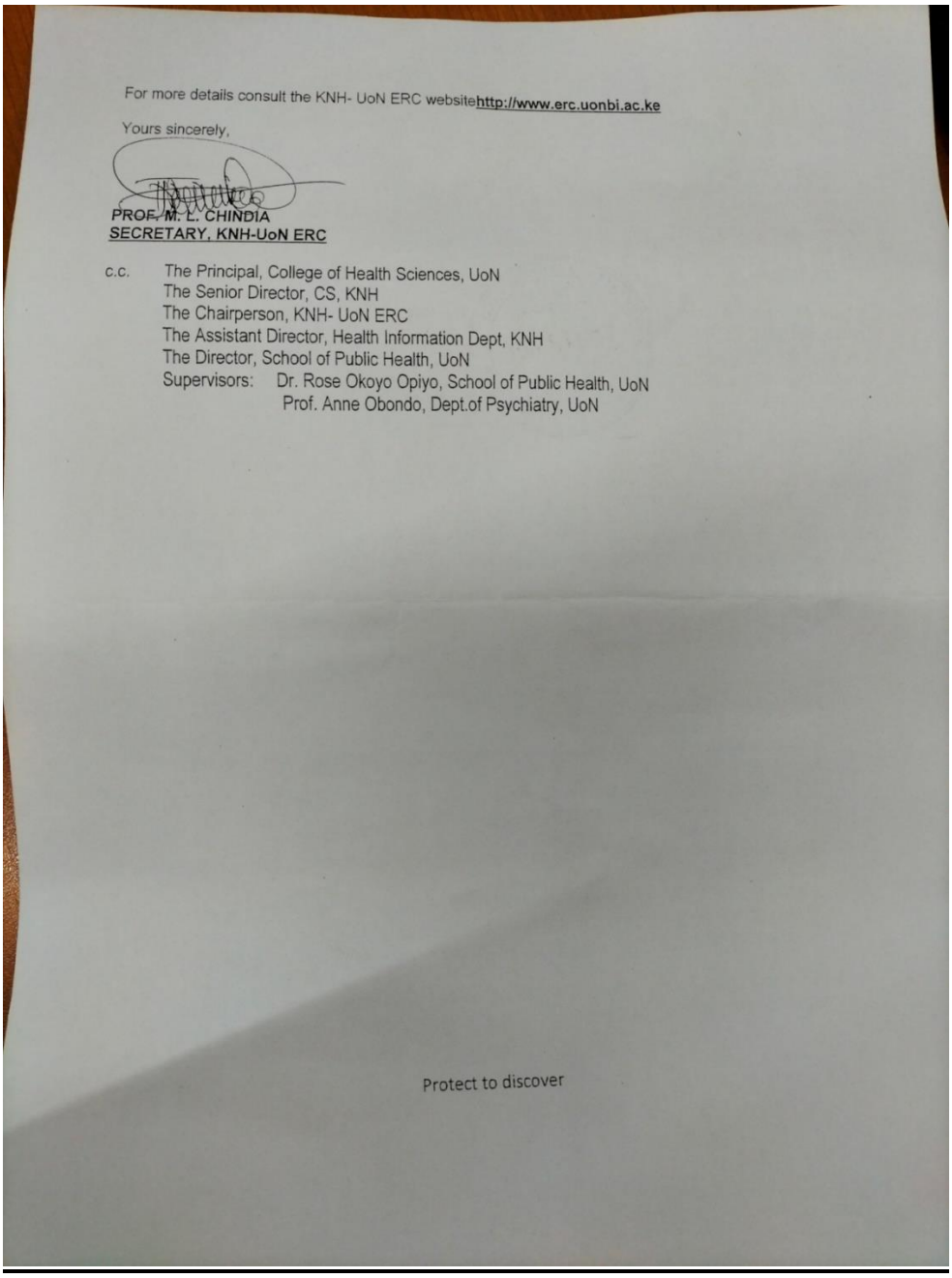

For more details consult the KNH- UoN ERC website **http://www.erc.uonbi.ac.ke**

Yours sincerely,

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

c.c. The Principal, College of Health Sciences, UoN
The Senior Director, CS, KNH
The Chairperson, KNH- UoN ERC
The Assistant Director, Health Information Dept, KNH
The Director, School of Public Health, UoN
Supervisors: Dr. Rose Okoyo Opiyo, School of Public Health, UoN
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