PREVALENCE OF POSTPARTUM DEPRESSION AT THE POSTNATAL CLINIC OF KENYATTA NATIONALAND REFERAL HOSPITAL

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DECLARATION

I declare that this research is my original work and has not been submitted for any degree or educational award in any University.

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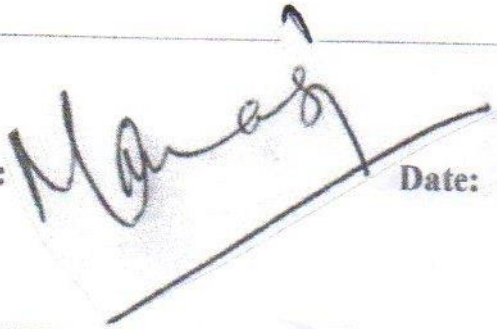
Signature:  **Date:** 15th/July/2021

DEDICATION

To my loving husband, Dr Francis Okoth, my children, Malakai and Imani, my parents, Agnes Odindo Awuoche and the Late Allan Otwak Awuoche and my sister Edna Awuoche, you have made me whom I am and given me morale and support all through my postgraduate training, Most importantly, to Almighty God for constant strength throughout my life and through this dissertation.

Thank you.

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To my lecturers, thank you for your assistance and guidance that led me to realize my dream.

May God bless you.

LIST OF ABBREVIATIONS

AIDS: Acquired Immuno-Deficiency Syndrome

BGQ: Brief Grief Questionnaire

EPDS: Edinburg Postnatal Depression Scale

ERC: Ethics Review Committee

HIV: Human Immunodeficiency Virus

IPI: Interpregnancy Interval

IPV: Intimate Partner Violence

KNH: Kenyatta National Hospital

LMIC: Low- and Middle-Income Countries

PI: Principal Investigator

SPSS: Statistical Package for Social Scientists

SSA: Sub Saharan Africa

WHO: World Health Organisation

PPD: Postpartum depression

OPERATIONAL DEFINITIONS

Depression: A mental condition characterized by feelings of severe despondency and dejection

Prevalence: The fact or condition of being prevalent

Stillbirth: A baby born with no signs of life at or after 28 weeks' gestation

Live birth: The complete expulsion or extraction from its motherof a product of human conception, irrespective of the duration of pregnancy,that, after such expulsion or extraction, breathes or shows any other evidenceof life such as beating of the heart, pulsation of the umbilical cord or definitemovement of voluntary muscles, whether the umbilical cord has beencut or the placenta is attached.

Postpartum Depression: Is defined as a major depressive episode with a peripartum onset

Peripartum Period: The period that begins immediately after childbirth as the mother's body including hormone levels and uterus size return to a non-pregnant state

Nulliparous: A woman who has never given birth to a child or has had a miscarriage, stillbirth, or elective abortion but has never given birth to a live baby

Multiparous: A woman who has given birth more than once

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ABSTRACT

Background: The prevalence of stillbirths is 10% globally. In Africa it ranges from 4-20%. In Kenya, the goal of Every New-born Action Plan of 12 stillbirths per 1000 births was not met, with the incidence of stillbirth deliveries at Kenyatta National Hospital estimated to be 8.0%.However, whether stillbirth increases the odds of postpartum depression has not been studied.

Objective: To compare prevalence of postpartum depression among women who delivered a living healthy baby and a stillbirth at the postnatal clinic of the Kenyatta national Hospital.

Methodology: This was a comparative analytical cross-sectional study of 144 postpartum mothers who delivered a stillbirth at ≥28weeks gestation and another 144 postpartum mothers with healthy babies attending the postnatal clinic of Kenyatta National Hospital. Participants filleddemographic and reproductive data, Relationship Assessment Scale, Edinburgh Postnatal Depression Scale and Brief Grief questionnaires, after signing informed consent, data was uploaded intothe Statistical Package for Social Scientists software (SPSS, version 25)and demographic data of mothers who delivered a living healthy baby and a stillbirth compared using the Chi-square test. Chi-square test was also used to compare the prevalence of postpartum depression between women who delivered a stillbirth and a health live baby at 95% confidence interval.The Edinburgh Postnatal Depression scale was used to screen for depression and a cut off score of 14 and above was regarded as Probable Depression. A follow up assessment at 6 weeks postpartum was carried out.This study took place during the peak of the COVID 19 pandemic. As such, all participants and the study staff (research assistants) were required to fully comply with the COVID 19 safety measures.

Results: 288 participants were evaluated with a majority belonging to age group <35 years(78.8%), married (84.7%), unemployed (74.3%), and having secondary education (54.9%). Most were primiparous (45.0%) and had a wanted pregnancy (91.3%). Prevalence of post-partum depression was 28.8%, higher among women with a stillbirth (37.5%) compared to a livebirth (20.1%), OR=2.38 (1.40-4.07), P=0.001. Odds of depression was also higher among single women (OR=2.39 (1.25-4.72), P=0.008), unemployed (OR=2.03 (1.03-4.05), P=0.036), women with secondary education (OR=2.25 (1.23-4.19), P=0.007). Women with large babies (OR=14.63 (1.88-173), P=0.001), and unwanted pregnancies (OR=3.58 (1.57-7.81), P=0.001).

Conclusion: The prevalence of postpartum depression at KNH is high at 28.8%. Women who deliver a stillbirth compared to a livebirth are 2.38 times more likely to develop postpartum depression. Being single, poorly educated, having a low socioeconomic status, delivering a big baby, and having unwanted pregnancies are the main correlates for postpartum depression.

CHAPTER ONE

1 INTRODUCTION

In accordance to the World Health Organisation (WHO), a still birth is defined as a foetal death >28 weeks of gestation whereas a live birth is defined as when a foetus, whatever the gestational age, exists the maternal body and subsequently shows any sign of life such as voluntary movement.Complications of pregnancy are health problems that occur during pregnancy often associated with the development or occurrence of a stillbirth. These health problems can arise before pregnancy, and or during pregnancy. Examples include High blood pressure, gestational diabetes, Pre-Eclampsia, infections amongst others.

Stillbirths are reported in approximately 1 in every 100 pregnancies globally. In Africa, a slightly higher incidence of 21.3 per 1000 live birthshas been reported (Saleem *et al*., 2018)mostly due to the low socio-economic status of the populace and over stretched health systems(Wagura *et al*., 2018). In Kenya, estimates show that the goal of the Every New-born Action Plan of 12 per 1000 birth might not be met, with the incidence of stillbirth at the Kenyatta National Hospital estimated to reach 8.0%.(Saleem *et al*., 2018). Stillbirth therefore is a major loss in a female/family life that often engenders traumatic grief, whichcan trigger persistent depression. This is the gap this study is designed to fill in the Kenyan setting where there is paucity of epidemiological data in this identified area.

1.1 Background information

From published data, delivering a stillbirth has been reported to induce psychological and physical deficits, with depression estimated toafflict 6.5-12.9% of women during the post-partum period (Gavin *et al*., 2005). It is also a well-recognised stressor of women of a reproductive age, with nulliparous women identified to be a high risk group (Gravensteen *et al*., 2018). In the USA, women whose previous pregnancy ended in a stillbirth delivery were

more likely to be depressed than women who had a previous live birth delivery (Hughes *et al*., 1999). in a Norwegian cohort, Gravensteen*et al*., (2018) reported a significantly higher prevalence of depression after a stillbirth delivery (19.7%) than a live birth (9.7%), peaking among multiparous women with a short IPI (<12 months). Hogue *et al*., (2015) found the incidence of depressive symptoms after an index delivery of stillbirths to be higher compared to after a healthy live birth (38+ weeks) among African Americans in the United States (US).

The incidence of serious psychological disorders has been reported to differ by socio-demographic characteristics of women, key among them being the marital status, occupation, and age. In Canada, a four-year follow-up study of 2433 residents of Montreal by Meng *et al*. (2017) reported a higher risk of depression with increasing age, which was consistent with the findings of Saluja *et al*. (2004) in the United States (US). For Kenya, a cross-sectional study of 150 women from Mombasa found thatbeing married and having a poor education level increased the odds of depression significantly, especially when social support when poor (Mirieri *et al*., 2020). In the study, strengthening social support systems for women who were at risk of depression could improve their coping mechanisms and improve outcomes.

The psychological status of patients has been reported to influence the prevalence of depression in prospective/ retrospective studies. In Montreal Canada, the risk of depression was 77% higher when participants had a history of mental illness(Meng *et al*., 2017), which mirrored the results of Hogue *et al*. in a 2016 case control study in the US. According to Hogue, having a history of mental illness increased the risk of depression among women with a stillbirth and live birth delivery proportionally, eliminating stillbirth the sole predictor for depression. Alcohol consumption increases the risk of depression by 5.1% at two years and 105 at 5 years (Meng *et al*., 2017), while victims of intimate partner violence (IPV) are more at risk of developing depression compared to people from stable homes (Mirieri *et al*., 2020).

Recent studies hypothesised an association between stillbirth delivery and depression in Kenya (Ongeri *et al.*, 2018; Osok *et al.*, 2018) but data is limited. It is not clear if socio-demographic characteristics of women who deliver stillbirths influence therisk of developing depression and its complications, as data on the epidemiology of postpartum depression is limited in referral public health institution such as Kenyatta National Hospital. The incidence of depression among women who deliver stillbirths has not been studied, presenting a gap for its management. In this study, the prevalence of depression among postpartum women, the socio demographic correlates for depression and socio demographic correlates of depression of mothers who had still births will be compared to mothers who had a live birth at KNH.

1.2 Problem statement

About 8.0% of deliveries at the Kenyatta National Hospital (KNH) are stillbirths (KNH Health Management Unit, 2019). Women with medical conditions such as high blood pressure, gestational diabetes, preeclampsia, neural tube defects, and psychological deficits such as postpartum depression are most at risk of stillbirth deliveries (Rosenstein *et al.*, 2012). The risk of developing depression increases when there is adverse psychological deficits such as anxiety. Recent studies also recognise stillbirth as a risk factor for depressive symptoms, but its epidemiology in a referral public health institution such as KNH is poorly explored. There is paucity of data on the prevalence of depression among women with well-characterised stillbirths. Moreover,the independent contribution of stillbirthdeliveries on the development of depression among Kenyan women has not been evaluated to date, even though around one in every ten deliveries at the KNH is hypothesized to be a stillbirth.By conducting this study, we will offer insights on the prevalence of depression among Kenyan women with a stillbirth delivery and determine the impact of a stillbirth delivery on the development of depression.

CHAPTER TWO

2 LITERATURE REVIEW

2.1 Depression - Global and African perspectives

Depressive symptoms are among the commonest psychological deficits for men and women worldwide, with its incidence associated with suffering and a reduction of quality of life. The prevalence of depression has been reported widely worldwide, with its prevalence estimated to reach 20%. In a meta-analysis of secondary data of one million adults from 30 countries between 1994 and 2014, Lim *et al*.(Lim *et al*., 2018) found the aggregated point prevalence of depression to be 12.9% with the heterogeneity of findings from different continents and countries found to be statistically significantly different. Aggregate prevalence of depression was highest in South America (20.6%), followed by Asia, North America, and Europe at 16.7%, 13.4%, and 11.9%. Even though Africa and Australia reported the lowest rate at 11.5% and 7.3%, the difference was insignificant statistically, hinting that depression was a common problem globally that affectspeople from different regions proportionally. The one-year prevalence was 7.2% and the lifetime prevalence around 0.5%, which was consistent with the findings of other studies from sub–Saharan African (SSA) and southern Africa.

While evaluating the mental health status of 2,187 individuals ages 15+ years from a poor urban centre in Ouagadougou, Burkina Faso, Duthé *et al*. (2016)reported the prevalence of major depressive episodes to be 4.3%, range 3.1-5.5%, which was lower than the findings of Lim*et al*. In the cross-sectional study, poor standard of living, regular food shortages, and alcohol consumption as a coping strategy for stress predisposed participants to depression and associated chronic health problems. The call to have sustainable treatment and management strategies for depression were made by the authors, as it seemed to be a growing public health problem inthe growing urban population. In another study sponsored by the World Health Organisation (WHO) in Ghana and South Africa,Bahadur Thapa *et al*. (2014) reported the

one-year pooled prevalence of mild depression to be 2.7% among 3668 South Africans and 6.7% adult Ghanaian ages 50 years and older, which was in line with the findings of Duthe*et al*. Although Thapaevaluated an older segment of the population, the study underscored the need for gender and culture sensitive management and prevention programs for depression, as they were associated with a higher incidence of depression in the population studied.

In Kenya, the prevalence of depression is within international levels among the youth, but significantly higher than global rateswith health complications such as HIV/AIDS indicated. In a cross-sectional study of 923 students in Nairobi, Othieno *et al*. (2014)found the prevalence of severe depression to be 5.6% - slightly higher among males (5.3%) than females (5.1%), but not statistically. Moderate depressive symptoms were significantly higher at 35.7%, showing a growing public health problem among the youths. Complicated with comorbidities such as HIV, depression was reported in 13.8% of residentsof Kilifi, Kenya(Nyongesa *et al*., 2019).

2.2 Prevalence of postpartum depression

The prevalence of postpartum depression seems to be higher in Low to Middle Income Countries (LMIC) than developed countries, with rates as high as 25% reported in the latter. In the USA, the prevalence of postpartum depression was 2.5% in a prevalence study of 441 women by Pawar *et al*. (2011)during the immediate postpartum period, which suggested that evaluation or screening for depression was not suitable in early postpartum. Evaluations were done 1-2 days after delivery using the PHQ-9 questionnaire. In Canada, 8% of mothers who were enrolled in the Maternity Experiences Survey of the Canadian Perinatal Surveillance System in 2012 developed postpartum depressionin the first postpartum year(Dennis *et al*., 2012), which was also lower, compared toreports from LMIC such as Ethiopia and Lebanon.

In Debre Berhan, Ethiopia, postpartum depressionwas reported in 15.6% of postnatal attendeesin 2018 (Wubetu *et al*., 2020), almost twice the Canadian rate (Dennis *et al*., 2012). In Northwest Ethiopia, postpartum depression was reported in 25% of 526 postnatal women (Asaye *et al*., 2020), while the prevalence in Lebanon and Turkey were 21% (Chaaya *et al*., 2002) and 17.7% (Kirpinar *et al*., 2010) respectively in 2002 and 2010, respectively. In Kenya, the prevalence of postpartum depression is high at between 13.0% and 21%(Madeghe *et al*., 2016; Ongeri *et al*., 2016, 2018) in low income urban settlements, but its association with stillbirth delivery has not be evaluated to date in public and private hospitals.

2.3 Socio-demographic correlates of postpartum depression

Sociodemographic characteristics of mothers have been reported to predispose women to postpartum depression.Mirieri *et al*. (2020)reported a 17-fold increase in the odds of developing postpartum depressionamong married Kenyan mothers, especially if they hadlow education level and inadequatesocial support. In Ethiopia,poor widows/widowers witha low education, and a hospitalised child are more likely to develop postpartum depression (Madeghe *et al*., 2016; Wubetu *et al*., 2020), whilemost Canadian mothers who had postpartum depression in 2012 had a low economic status (Dennis *et al*., 2012). According to the authors, mothers with a low/poor socio-economic status who do not receive enough child rearing support from their husbands or partners struggle more with raising babies compared to those with support, leading to stress and thereforedevelopment post-partum depression. InCanada and the USA, postpartum depression has also been reported to increase with increasing age and excessive alcohol consumption,(Meng *et al*., 2017; Saluja *et al*., 2004).

Intimate partner violence (IPV) is a major contributor to the development of depression during the postpartum period. At the Kenyan coast Mirieri *et al*. (2020) found that victims of IPV were more at risk of postpartum depression, while was similar to the previous findings of

Ongeri *et al*. in 2016 and 2018. According Ongeri and colleagues, conflict with partners after delivery is the strongest independent predictor for the development of postpartum depression, with a 7.5 fold increase in its incidence reported 6-10 weeks postpartum in Nairobi, Kenya. In Canada, a 1.4 fold increase in rate of depression was reported with IPV (Dennis *et al*., 2012).

The presence of antepartum depression has been identified as a significant prognostic factor for depression in the postpartum period. In a follow up study of urban mothers from Nairobi, the presence of antepartum depression increased the risk of postpartum depression six fold (Ongeri *et al*., 2016), while a cross-sectional study of Canadian women revealed a 1,87 fold increase in postpartum depression in the presence of antepartum depression(Dennis *et al*., 2012). In Beirut, Lebanon, prenatal depression increased the risk of postpartum depression significantly (Chaaya *et al*., 2002), while (Hogue *et al*., 2015) reported the risk of postpartum depression to increase by up to 77% in mothers with a history of mental illness.

Socio-demographic characteristics of mothers are not sole risk factors for postpartum depression, as correlations with reproductive factors have been reported. In a community-based study in Ethiopia, reproductive outcomes such as low birth weight, abortion history, small for gestation age, and unplanned pregnancies increased the adjusted odds of post-partum depression by between 1.20-4.05 fold (Asaye *et al*., 2020). There is also growing evidence thatpostpartum depression is more likely to develop after stillbirths comparedto healthy live births, but data from Africa is limited. In a study of 362 pregnant women who delivered a live baby and 174 who delivered a stillbirthGravensteen *et al*. (2018) reported a significantly higher prevalence of depression after a stillbirth (19.7%) compared to a healthy live birth (9.7%), especially if they were multiparous and had a short IPI (<12 months). After an index delivery at 38+ weeks gestation, the incidence of post-partum depression was also higher with a stillbirth (14.8%) than healthy live birth (8.3%) in the US (Hogue *et al*., 2015).

At KNH, 1758 neonates are wheeled in the new born unit monthly but only 594 are discharged alive, translating to a death rate of 34% (Cheptum *et al*., 2016). However, the level to which the deaths contribute to development of postpartum depression and maternal factors associated with its development are unclear, as scientific data is limited.

2.4 Research Questions

- Is there a difference in the prevalence of depressive disorders among Kenyan women who delivered a stillbirth compared to those who have delivered a live birth at the Kenyatta National Hospital?
- What factors are associated with the development of depressive disorder among postpartum women who deliver stillbirths at the Kenyatta National Hospital

2.5 Objectives

2.5.1 Broad objective

To identify factors associated with postpartum depression and compare prevalence of postpartum depression among women who delivered a stillbirth and a live and healthy baby at the Kenyatta National Hospital

2.5.2 Specific objectives

- To determine the prevalence of depression among postpartum women attending postnatal clinic at KNH
- To assess socio-demographic correlates associated with the postpartum depression among women attending postnatal clinic at KNH
- To compare socio-demographic correlates of depression among mothers who had still births and live births attending postnatal clinic at KNH

- To compare depressive symptomatology and depressive prevalence among women who have had still births and live births attending postnatal clinic at KNH

2.6 Hypotheses

2.6.1 Null Hypothesis

There is no difference in prevalence of postpartum depression among women who deliver a stillbirth and live and health baby at Kenyatta National Hospital.

2.6.2 Alternative hypothesis

The prevalence of postpartum depression among women who deliver a stillbirth compared to a live and health baby at Kenyatta National Hospital are the same.

2.7 Conceptual framework

The independent variable was the birth outcome of women who delivered at 28 weeks or more gestation at KNH. This was a dichotomous variable in two levels live birth (normal) of stillbirth, hypothesised to influence the occurrence of postpartum depression postpartum. The birth outcome of women depends on their medical characteristics, herein referred to as confounders. Women with medical complications during pregnancy and labour are prone to delivering a stillbirth and thus a depressive disorder. The effect is often higher when patients are old, have a low level of educational, and are in an unsatisfactory or violent relationship.

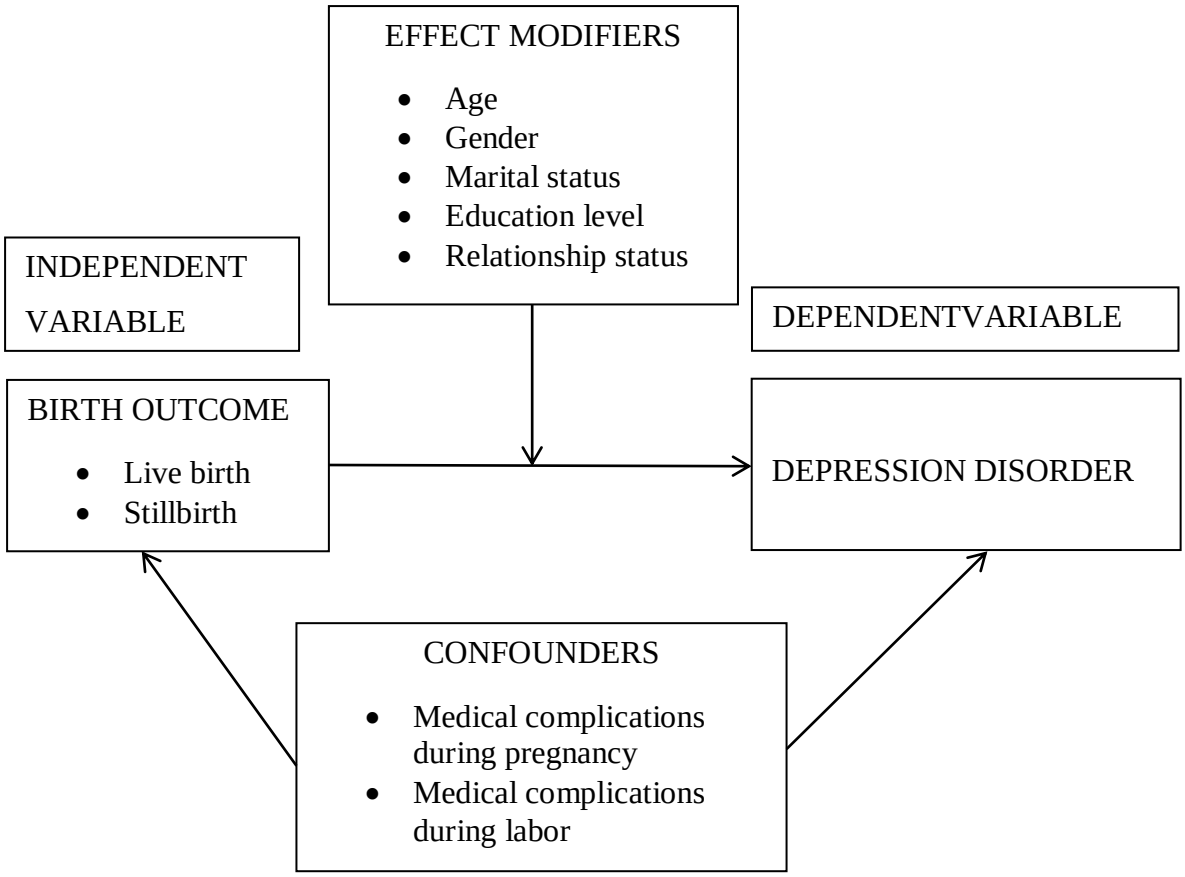


Figure 2.1. Conceptual framework showing the relationship between independent, intermediate, and dependant variables

2.8 Theoretical framework

The theory of operant condition paradigm, or Behavioural Theory for depressive episodes, elucidated by Davidson et al. in 2004were adopted in this study. In this theory, traumatic life changes such as the loss of a parent/child, low self-esteem, and low parental/societal/spousal support after the major life event disrupt the normal behaviour of individuals, causing psychological deficits such as depression. The impact of these traumatic events and the inability of affected persons to manoeuvre the environment affect mood, which creates a positive reinforcement for the development of psychological disorders such as depression(Hammen & Brennan, 2002).In this study, the major traumatic event was the loss of a child (stillbirth). Outcome was development of postpartum depression, while the socio-demographic, medical, and societal information were evaluated as intermediate variables.

CHAPTER THREE

3 METHODOLOGY

3.1 Study design

This was a comparative cross-sectional analytical study of women who delivered a stillbirth and healthy brink children at the Kenyatta National Hospital (KNH). The study compared the prevalence of postpartum depression among women who deliver a stillbirth and those who deliver normal healthy babies to establish whether delivering stillbirth predispose women to postpartum depression. Observational data was collected from a single time point.

3.2 Study site

Kenyatta National Hospital (KNH) – the largest referral hospital in Kenya, located in the Upper hill area of Nairobi. KNH is located five kilometres from the central business district of Nairobi and offers routines and specialised obstetrics, psychiatry, internal medicine, and surgical services to residents of the Nairobi Metropolitan region. KNH also receives referral patients from all over Kenya and the East Africa region. KNH was founded in 1901 as a Native Civil Hospital with a bed capacity of 40. To date, it covers 45.7 acres, employs over 6000 staff, and tends to over 3000 patients every day, making it one of the busiest referral hospitals in East African region. It also serves as the teaching and research hospital for the University Of Nairobi College Of Health Sciences and the Kenya Medical Training College (KMTC). Within KNH, the reproductive unit, including the labour ward and clinic 18,werethe study sites. The labour ward has a 24-hour schedule for provision of theatre services and has about 45 nurses and 19 doctors who oversee close to 30 deliveriesdaily. Clinic 18 offers reproductive health services, such as antenatal care and maternity postnatal care.It follows up parturient and mothers on Mondays and Wednesdays with the time interval for reviews after delivery being 24 hours.

3.3 Population characteristics

Approximately 1500 deliveries are reported at KNH every month with the stillbirth rate approximated to reach 8.0%, mainly among high-risk women referred for specialised care. The study population consisted of women who were attending postnatal clinics at KNH with either a stillbirth delivery or a healthy live birth and meet the inclusion criteria.

3.3.1 Inclusion criteria

- Delivered a healthy baby or a stillbirth at 28 of more weeks of gestation
- Attending post-natal clinics at the Kenyatta National Hospital(**a one-point evaluation of up to 6 weeks post-delivery was used)**
- Volunteer to be a participant by providing written informed consent

3.3.2 Exclusion criteria

- Normal/ live birth of stillbirth at <28 weeks' gestation
- Delivery of abnormal babiesor babies who had poor APGAR scores (<8/10 at one minute who required resuscitation)
- Decline to provide informed consent
- Lost a child in six weeks after a normal delivery

3.4 Sample size determination

In a study ondepression among women who had delivered a stillbirthGravensteen *et al.* (2018)found depression in 19.7% of women. In another study by Hogue *et al.* (2015), the postpartum depression in motherswith a normal baby was 8.3%. We used these rates to compute sample size at 80% power and alpha of 0.05 using the formula by Rosner (2011). The formula uses two population proportions (prevalence) to compute sample size at a

specified recruitment ratio to determine the minimum number of subjects that should be recruited per group for adequate study power. The formula assumes a dichotomous endpoint.

$$N_1 = \left\{ z_{1-\alpha/2} * \sqrt{\bar{p} * \bar{q} * (1 + \frac{1}{k})} + z_{1-\beta} * \sqrt{p_1 * q_1 + (\frac{p_2 * q_2}{k})} \right\}^2 / \Delta^2$$

$$q_1 = 1 - p_1$$

$$q_2 = 1 - p_2$$

$$\bar{p} = \frac{p_1 + kp_2}{1 + K}$$

$$\bar{q} = 1 - \bar{p}$$

$$N_1 = \left\{ 1.96 * \sqrt{0.14 * 0.86 * (1 + \frac{1}{1})} + 0.84 * \sqrt{0.197 * 0.803 + (\frac{0.083 * 0.917}{1})} \right\}^2 / 0.114^2$$

$$N_1 = 144$$

$$N_2 = K * N_1 = 144$$

p_1, p_2 = proportion (incidence) of groups #1 and #2
$\Delta = |p_2 - p_1|$ = absolute difference between two proportions
n_1 = sample size for group #1
n_2 = sample size for group #2
α = probability of type I error (usually 0.05)
β = probability of type II error (usually 0.2)
z = critical Z value for a given α or β
K = ratio of sample size for group #2 to group #1

To get sufficiently powered data, 144 women who delivered a stillbirth and 144 women whodelivered a healthy normal baby were recruited.

3.5 Sampling procedure

Consecutive sampling was used. During antenatal care visits, women who delivered normal live babies or a stillbirthand satisfy our inclusion criteria were approached and the objectives, procedures, and the expected outcomes of the studydiscussed. Written informed consent was sought in English or Kiswahili and 288 participants (144 who delivered a normal live baby and 144who delivered a stillbirth) recruited consecutively into the study.

3.6 Data collection procedure (COVID 19 Measures)

There were Covid 19 measures which were strictly followed during interviews. Participants had temperatures screened and hands sanitized. Both the interviewer and participants also wore masks during interviews and social distancing with respondents (1.5 meters) was maintained.

A pretested interviewer-administered questionnaire was used to collect data. All participants were led into a quiet room within the Kenyatta National Hospital and one on one interviews conducted. After briefing women on the expectations, the PI or a qualified nurse read the questionnaire verbatim and recorded responses in pre-coded questionnaires. The biodata of participants such as age, gender, education, and marital status were recorded. History of mental disorders, use of antidepressant drugs, presence of medical complications such as diabetes, antenatal care attendance, and alcohol/ drug use were also being recorded.

The Relationship satisfaction scale was used to evaluate relationship satisfaction and the Edinburgh Postnatal Depression Scale to evaluate psychological wellness of participants.
Grief cycle of patients was evaluated using a 5-item Brief Grief Questionnaire (BGQ). The relationship satisfaction scale is a 7-item scale that measures the general satisfaction with a relationship. Each item is scored using a 5-point Likert scale that ranges from 1 (or low satisfaction) to 5 (or high satisfaction). The total scores of respondents range from 3 to 21, with high scores interpreted as having good relationship satisfaction. Cronbalch's alpha has been reported to reach 0.95(Røysamb et al., 2014), making it a reliable study tool. Therefore, the questionnaire will not be pretested before use. The Edinburg depression scale consists of ten statements, each with four possible answers that a mother checks off. The items evaluate her feelings during the past week and the score summed into an overall wellness score. Its Cronbalch's alpha has been reported to reach 0.80 (Montarezi et al., 2007), making it a valid

tool that will not be pretested before use. The BGQ is a 5-item interview or self-report that screens for complicated grief. Cronbach alpha is high at 0.75, making it a valid research tool.

For women who delivered at KNH and were not attending postnatal clinics, phone interviews were scheduled. Contacts were retrieved from files and the patients contacted. Oral consent was administered, women who offered consent recruited, and the relationship satisfaction scale, and 5-item Brief Grief Questionnaire (BGQ) administered via phone.

3.7 Variables

3.7.1 Dependent

Presence or absence of depression was the dependent variable, as determined using the Edinburgh Postnatal Depression Scale. The variable was nominal in two categories – normal and depressed. Severity of depression was analysed in three categories – mild depression, moderate depression, and severe depression, guided by the EPDS scale.

3.7.2 Independent

Independent variable was the birth outcome of study participants. The variable was nominal and was evaluated in two categories - stillbirth delivery and healthy normal delivery.

3.7.3 Intermediate

Intermediate variable included demographic and reproductive characteristics such as age, education, marital status, and economic status of mothers. Medical characteristicsincluded the history of mental illness, use of antidepressants, and chronic medical conditions such as diabetes and HIV. Social characteristics entailed alcohol and or recreational drug use.

3.8 Data quality assurance

Experienced medical staff who are knowledgeable on research, collected data. Before deployment, staff were trained on research ethics. Personnel were also familiarised with the

questionnaire and data collection procedures. The PI checked data collection tools for completion. Questionnaires withover 5% missing data were excluded from analysis.

3.9 Ethical considerations

3.9.1 ERC approval

An application was made to KNH/UoN ethics review committee for clearance. The proposal and all study protocols were submitted for review and used only after approval.

3.9.2 Institutional approval

Approval was sought from the KNH administration before conducting the study.

3.9.3 Consent

Written consent was sought before recruitment. Consent forms were provided in Kiswahili and English for review under guidance of the principal investigator. Consent was uncoerced. Participants signed and dated forms or use thumbprints and received a copy for their records.

3.9.4 Confidentiality

The confidentiality of study participants was upheld. The recruitment of participants, for instance, was within KNH in a secluded location of the reproductive unit. Interviews were in a secluded area at KNH, at home, or the preferred location of the participants. During data collection, personal identifiers such as the identification number and names of participants were not recorded. Instead, study participants were identified using unique study numbers, which were not linked to personal information such as names and identification numbers. The file numbers of patients were linked to the study numbers in a password-protected Excel file only that was accessible to the PI to ease access to secondary hospital data whenever it was needed.

3.9.5 Beneficence

Women did not receive monetary rewards or gifts for agreeing to be participants in the study. However, all participants underwent psychiatric evaluation and patients deemed to have a psychiatric disorder referred to a specialist for treatment. Participants also gained a better understanding of postpartum depression through our discussions, while the generated data was presented tophysicians and psychiatrists to offer insights on the “triggers” signs for depression.

3.10 Data management procedures

After data extraction, entry and analysis, questionnaires were de-identified and stored in spring or box files. The box files and spring files were locked in cabinets for safe storage for up to 10 years, after which they will be destroyed. Digital data in spread sheetsand or databases were password protected and backed up in computers and on the cloud.

3.11 Data analysis

Comparability of the demographic and medical data of women who delivered stillbirths and healthy normal babies was determinedusing chi-square test or Mann-Whitney U test to identify confounders. The prevalence of depression wascomputed and the association between delivering a stillbirth and the development of depressive symptoms evaluated using the Chi-square test.The Statistical Package for Social Scientists software (SPSS, version 21) was used at 95% confidence interval (CI), with a p value of <0.05 considered to be significant.

3.12 Study dissemination plan

An academic report waswritten and presented at the department of psychiatry. Data will be presented in a conference and a manuscript published in a peer reviewed journal.

3.13 Study closure plan

A closure session was organised with staff. Execution of the study was reviewed and the limitations discussed. All the study tools (unused questionnaires and consent forms) were collected, pending staff fees cleared. A study closure report will be submitted to the KNH/ERC.

CHAPTER FOUR

4 RESULTS

In this section, we present data for 288 patients (144 who delivered a stillbirth and 144 who delivered a live baby between February and June 2021 at Kenyatta National Hospital.

4.1 Demographic and reproductive characteristics

Demographiccharacteristics are presented in table 4.1. Most patients were age group <35 years (78.8%), married (84.7%), had secondary education (54.9%), and were unemployed (74.3%).

Table 4.1. Demographic characteristics of women who delivered at KNH in 2021

		N=288	Percent
Age group	<35 years	227	78.8
	35+ years	61	21.2
Marital status	Married	244	84.7
	Single	44	15.3
Education level	Primary	33	11.4
	Secondary	158	54.9
	Tertiary	97	33.7
Employment	Employed	71	25.7
	Unemployed	205	74.3
	Unknown	12	26.2

Around 45.0% were primiparous, while 28.7% and 26.2% were nulliparous and multiparous respectively. Only 23.3% and1.4% had a history of abortions and stillbirths, while 91.3% had wanted pregnancies. The mode of delivery was mostly via a caesarean section (53.9%). Most patients delivered normal weight babies (56.5%) at term (54.9%) with only 3.5% of babies

having neonatal anomalies. History of mental health and antidepressant use were low at 0.3% and 1.0% respectively. 17.0% had comorbidities, mainly hypertension (79.6%) (Table 4.2).

Table 4.2. Reproductive and medical characteristics of women

		N=288	Percent
Parity	Nulliparous	74	28.7
	Primiparous	81	45.0
	Multiparous	127	26.2
	Unknown	6	0
History of abortions	Yes	67	23.3
	No	221	76.7
History of stillbirths	Yes	4	1.4
	No	284	98.6
Type of pregnancy	Wanted	263	91.3
	Unwanted	25	8.7
Mode of delivery	SVD	130	46.1
	CS	152	53.9
	Unknown	6	0
Birth weight	Low	118	41.4
	Normal	161	56.5
	Macrosomia	6	2.1
	Unknown	3	0
Gestation at delivery	Pre term	124	45.1
	Term	151	54.9
	Unknown	13	0
Neonatal anomalies present	Yes	10	3.5

	No	275	96.5
	Unknown	3	
History of mental health	Yes	1	0.3
	No	287	99.7
Antidepressant use	Yes	3	1.0
	No	285	99.0
Comorbidity present	Yes	49	17.0
	No	239	83.0
Hypertension		39	79.6
Deep vein thrombosis		1	2.0
Diabetes		3	6.1
HIV		4	8.2
Alcohol use		22	7.6

4.2 Sociodemographic and reproductive correlates of stillbirths

Participants who delivered a stillbirth compared to a livebirth were more likely to be aged 35+ years compared to <35 years (OR=2.98 (1.65-5.34), p<0.01), unemployed (OR=1.74 (1.01-2.97), P=0.046), and have a secondary education (OR=6.19 (3.54-10.71), P<0.001) or primary education (OR=3.42 (1.53-7.82), P=0.002) compared to secondary education. Marital status of participants was not associated with stillbirths statistically significantly (Table 4.3).

Table 4.3. Socio-demographic correlates for stillbirths

		Stillbirth (n=144)	Livebirth (n=144)	OR (95% CI)	P value
Stillbirth	<35 years	101 (44.5)	126 (55.5)	Reference	
	35+ years	43 (70.5)	18 (29.5)	2.98 (1.65-5.34)	<0.01
Marital status					

	Married	122 (50.0)	122 (50.0)	Reference	
	Single	22 (50.0)	22 (50.0)	1.00 (0.52-1.94)	1.000
Education	Primary	17 (51.5)	16 (48.5)	3.42 (1.53-7.82)	0.002
	Secondary	104 (65.8)	54 (34.2)	6.19 (3.54-10.71)	<0.001
	Tertiary	23 (23.7)	74 (76.3)	Reference	
Employment	Employed	28 (39.4)	43 (60.6)	Reference	
	Unemployed	109 (53.2)	96 (46.8)	1.74 (1.01-2.97)	0.046
	Unknown	7	5		

Multiparity (OR=2.37 (1.34-4.22), P=0.003), having underweight babies (OR=9.59 (5.41-17.0), P<0.01), pre term delivery (OR=14.16 (7.92-25.0), P<0.01), and having comorbidities (OR=2.37 (1.27-4.67), P=0.007) were reproductive correlates for stillbirths. Relationship, type of pregnancy, and history of abortions or stillbirths were not associated (Table 4.4).

Table 4.4. Reproductive correlates for stillbirths

		Stillbirth (n=144)	Livebirth (n=144)	OR (95% CI)	P value
Parity	Nulliparous	28 (37.8)	46 (62.2)	Reference	
	Primiparous	39 (48.1)	42 (51.9)	1.53 (0.81-2.94)	0.195
	Multiparous	75 (59.1)	52 (40.9)	2.37 (1.34-4.22)	**0.003**
	Unknown	2	4		
Birth weight	Underweight	93 (78.8)	25 (21.2)	9.59 (5.41-17.0)	**<0.01**
	Normal	45 (28.0)	116 (72.0)	Reference	
	Macrosomia	3 (50.0)	3 (50.0)	1.55 (0.39-6.19)	0.558
	Unknown	3	0		
History of abortions	Yes	35 (52.2)	32 (47.8)	1.12 (0.65-1.96)	0.675

	No	109 (49.3)	112 (50.7)	Reference	
History of stillbirths	Yes	2 (50.0)	2 (50.0)	1.00 (0.15-6.45)	1.000
	No	142 (50.0)	142 (50.0)	Reference	
Pregnancy	Wanted	131 (49.8)	132 (50.2)	Reference	
	Unwanted	13 (52.0)	12 (48.0)	1.09 (0.48-2.55)	0.843
Gestation	Pre term	99 (79.8)	25 (20.2)	14.16 (7.92-25.0)	<**0.01**
	Term	33 (21.9)	118 (78.1)	Reference	
	Unknown	12	1		
Neonatal anomalies	Yes	4 (40.0)	6 (60.0)	0.67 (0.21-2.56)	0.541
	No	137 (49.8)	138 (50.2)	Reference	
	Unknown	3	0		
Comorbidity	Yes	33 (67.3)	16 (32.7)	2.37 (1.27-4.67)	**0.007**
	No	111 (46.4)	128 (53.6)	Reference	
Relationship	Poor	13 (54.2)	11 (45.8)	1.20 (0.52-2.63)	0.669
	Good	131 (49.6)	133 (50.4)	Reference	

4.3 Prevalence of post-partum depression among women attending postnatal clinic

Of the 288, 83 has postpartum depression, translating to a prevalence of 28.8% (Figure 4.1).

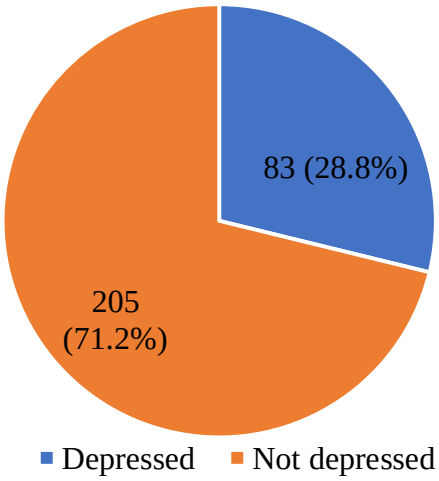


Figure 4.1. Prevalence of post-partum depression in the postpartum period at KNH

4.4 Socio-demographic and reproductive correlates of postpartum depression

A few socio-demographic correlates for postpartum depression were identified. Being single compared to married increased the odds for postpartum depression 2.39 (95% CU=1.25-4.72) fold (P=0.008). A secondary level of education compared tertiary education increased the odds of postpartum depression 2.25 (95% CI=1.23-4.19) fold (P=0.007), while unemployment increased the odds of postpartum depression 2.03 (95% CI=1.03-4.05) fold (P=0.036). While elderly women (35+) were 1.69 (95% CI=0.94-3.02) times more likely to develop postpartum depression than younger women (<35 years), the difference was not statistically significant.

Table 4.5. Socio-demographic correlates of postpartum depression

		Depression			
		Yes (n=83)	No (n=205)	OR (95% CI)	P value
Age group	<35 years	60 (26.4)	167 (73.6)	Reference	
	35+ years	23 (37.7)	38 (62.3)	1.69 (0.94-3.02)	0.084
Marital status	Married	63 (25,8)	181 (74.2)	Reference	
	Single	20 (45.5)	24 (54.5)	2.39 (1.25-4.72)	**0.008**
Education level	Primary	8 (24.2)	25 (75.8)	1.31 (0.51-3.43)	0.569
	Secondary	56 (35.4)	102 (64.6)	2.25 (1.23-4.19)	**0.007**
	Tertiary	19 (19.6)	78 (80.4)	Reference	
Employment	Employed	13 (18.3)	58 (81.7)	Reference	
	Unemployed	64 (31.2)	141 (68.8)	2.03 (1.03-4.05)	**0.036**

	Unknown	6	6		

Having an unwanted pregnancy increased the odds of postpartum depression 3.58 (95% CI=1.57-7.81) fold (P=0.001), while women who delivered large babies (macrosomia) were 14.63 (95% CI=1.88-173) times more likely to develop postpartum depression compared to those who delivered babies with normal weights.Nulliparity, history of abortions or stillbirths, having comorbidities, antidepressant use, alcohol consumption, and having poor relationship status increased the odds of postpartum depression but not statistically significantly (Table 4.4).

Table 4.6. Reproductive correlates of postpartum depression

		Depression			
		Yes (n=83)	No (n=205)	OR (95% CI)	P value
Parity	Nulliparous	25 (33.8)	49 (66.2)	1.07 (0.59-1.98)	0.827
	Primiparous	17 (21.0)	64 (79.0)	0.56 (0.29-1.04)	0.076
	Multiparous	41 (32.3)	86 (66.7)	Reference	
	Unknown	0	6		
History of abortions	Yes	24 (35.8)	43 (64.2)	1.53 (0.85-2.69)	0.149
	No	59 (26.7)	162 (73.3)	Reference	
Pregnancy	Wanted	69 (26.2)	194 (73.8)	Reference	
	Unwanted	14 (56.0)	11 (44.0)	3.58 (1.57-7.81)	**0.001**
Birth weight	Low	34 (28.8)	84 (71.2)	1.19 (0.69-1.99)	0.533
	Normal	41 (25.5)	120 (74,5)	Reference	
	Macrosomia	5 (83.3)	1 (16.7)	14.63 (1.88-173)	**0.001**
	Unknown	3	0		
Gestation	Pre term	39 (31.5)	85 (68.5)	1.36 (0.82-2.28)	0.248

	Term	38 (25.2)	113 (74.8)	Reference	
	Unknown	6	7		
Anomalies	Yes	0 (0.0)	10 (100)	-	-
	No	80 (29.1)	195 (70.9)		
	Unknown	3	0		
History of mental health	Yes	1 (100)	0 (0.0)	-	-
	No	82 (28.6)	205 (71.4)		
Antidepressants use	Yes	3 (100)	0 (0.0)	-	-
	No	80 (28.1)	205 (71.9)		
Comorbidity	Present	15 (30.6)	34 (69.4)	1.10 (0.58-2.13)	0.761
	Absent	68 (28.5)	171 (71.5)	Reference	
Alcohol use	Yes	8 (36.4)	14 (63.6)	1.46 (0.60-3.65)	0.416
	No	75 (28.2)	191 (71.8)	Reference	
Relationship Status	Poor	9 (37.5)	15 (62.5)	1.54 (0.62-3.59)	0.326
	Good	74 (28.0)	190 (72.0)	Reference	

4.5 Postpartum depression among women who have had still births and live births

Prevalence of postpartum depression among women who delivered a stillbirth (37.5%) was higher than those who had a livebirth (20.1%).Delivering a stillbirth compared to a livebirth increased the odds of postpartum depression 2.38 (1.40-4.07) fold (P=0.001) (Table 4.7).

Table 4.7. Postpartum depression among women who have had still births and live births

		Depressed (n=83)	Not depressed (n=205)	OR (95% CI)	P value

Birth outcome	Livebirth	29 (20.1)	115 (79.9)	0.42 (0.25-0.71)	**0.001**
	Stillbirth	54 (37.5)	90 (62.5)	2.38 (1.40-4.07)	**0.001**

4.6
Socio-demographic and reproductive correlates of postpartum depression among mothers who had stillbirths and live births

After a stillbirth, single (72.7%) and unemployed (40.4%) womenwere more likely to develop postpartum depression than those who were married (31.1%) or employed (17.9%) respectively (P<0.05). However, among women who had a livebirth, the prevalence postpartum depression was comparable by age, marital status, education level, and employment (Table 4.8).

Table 4.8. Socio-demographic correlates of postpartum depression among mothers who had stillbirths and live births

		Stillbirth (n=54)	P value	Live birth (n=29)	P value
Age group	<35 years	35 (34.7)	Reference	25 (19.8)	Reference
	35+ years	19 (44.2)	0.280	4 (22.2)	0.814
Marital status	Married	38 (31.1)	Reference	25 (20.5)	Reference
	Single	16 (72.7)	**<0.001**	4 (18.2)	0.804
Education	Primary	3 (17.6)	0.527	5 (31.3)	0.214
	Secondary	45 (43.3)	0.128	11 (20.4)	0.688
	Tertiary	6 (26.1)	Reference	13 (17.6)	Reference
Employment	Employed	5 (17.9)	Reference	8 (18.6)	Reference
	Unemployed	44 (40.4)	**0.027**	20 (20.8)	0.762

	Unknown	5		1	

Women who delivered large babies (macrosomia) were more likely to develop postpartum depression that those who delivered normal weight babies whether they delivered a stillbirth (P=0.042) or a livebirth (P=0.046). However, while depressed women who delivered a stillbirth were more likely to be nulliparous than multiparous (P=0.001), depressed women who had a livebirth were more likely to be multiparous than nulliparous (P<0.001) and more likely to have an unwanted pregnancy than a wanted pregnancy (P=0.001). History of abortions, the gestation at delivery, presence of comorbidities, alcohol use, and relationship status were not associated with development of depression when groups were analysed separate (Table 4.9).

Table 4.9. Reproductive correlates of postpartum depression among mothers who had stillbirths and live births

		Stillbirth (n=54)	P value	Live birth (n=29)	P value
Parity	Nulliparous	19 (67.9)	**0.001**	6 (13.0)	**<0.001**
	Primiparous	10 (25.6)	0.398	7 (16.7)	0.920
	Multiparous	25 (33.3)	Reference	16 (30.8)	Reference
History of abortions	Yes	16 (45.7)	0.249	8 (25.0)	0.437
	No	38 (34.9)	Reference	21 (18.8)	Reference
Pregnancy	Wanted	47 (35.9)	Reference	22 (16.7)	Reference
	Unwanted	7 (53.8)	0.202	7 (58.3)	**0.001**
Birth weight	Low	30 (32.3)	0.370	4 (16.0)	0.659
	Normal	18 (40.0)	Reference	23 (19.8)	Reference
	Macrosomia	3 (100)	**0.042**	2 (66.7)	**0.046**
		3		0	

	Unknown				
Gestation	Pre term	32 (32.3)	0.095	7 (28.0)	0.291
	Term	16 (48.5)	Reference	22 (18.6)	Reference
	Unknown	6		0	
Anomalies	Yes	0 (0.0)	-	0 (0.0)	-
	No Unknown	51 (37.2) 3		29 (21.0)	
History of mental health	Yes	0 (0.0)	-	1 (100)	-
	No	54 (37.5)		28 (19.6)	
Antidepressants use	Yes	3 (100)	-	0 (0.0)	-
	No	51 (36.2)	Reference	20 (20.1)	
	Unknown	0		9	
Comorbidity	Present	12 (36.4)	0.878	3 (18.8)	0.883
	Absent	42 (37.8)	Reference	26 (20.3)	Reference
Alcohol use	Yes	6 (50.0)	0.350	2 (20.0)	0.991
	No	48 (36.4)	Reference	27 (20.1)	Reference
Relationship status	Poor	5 (38.8)	0.940	4 (34.6)	0.163
	Good	49 (37.4)	Reference	25 (18.8)	Reference

CHAPTER FIVE

5 DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

5.1 Discussion

We evaluated the prevalence of postpartum depression and sociodemographic and reproductive correlates of postpartum depression in women who either had a stillbirth delivery or livebirth delivery at the Kenyatta National Hospital in 2021.From the data, women were mostly married, young, well-educated but were unemployed.Women were mostly primiparous with good health and delivered at term. The prevalence of postpartum depression was high at 28.8% with women who delivered a stillbirth found to develop postpartum depression at a higher rate (37.5%) than those who delivered a live baby (20.1%). While stillbirth delivery was the main correlate for postpartum depression, other sociodemographic and reproductive factors were indicated, key among them being a low level of education, unemployment, and unwanted pregnancies.Overall, demographic factors such as low level of education and unemployment increases the odds of postpartum depression predominantly among women who had stillbirth than a livebirth, while reproductive factors were correlates for depression in both groups.

The first objective was to demonstrate the prevalence of postpartum depression among women who delivered a stillbirth and a livebirth. From the data, we reporteda prevalence rate of 28.8%, which was higher than the rated reported from the developed countries by comparable to data from Africa.In a cross-sectional institution-based study conducted in Ethiopia in 2020, Wubetu et al. (2020) reported the prevalence of postpartum partum depression in a sample of 308 mothers attending postpartum clinics in 2020 of 15.5% (95%CI = 11.7, 19.8). The authors used EDPS to assess postpartum depression and called for an increase in the awareness of factors that can contribute to this psychological state in this cohort. In another cross-sectional study conducted in Northwest Ethiopia, Asaye et al. (2020)

reported the prevalence of post-partum depression to reach 25% (95% CI: 21, 28) among 526 postnatal women drawn from a rural town in 2020. The authors called for early identification and treatment of cases during the antenatal period to improve the obstetric and psychological outcomes of women postpartum. Overall, a systematic review and meta-analysis on "Epidemiology of antenatal depression in Africa" points to a high public burden with a prevalence of 26.3%(Dadi et al., 2020). About one in every four mothers are depressed due to unmet need for mental health care services.

The situation is different from the developed world with a prevalence of 2.5% reported in the United States of America (Pawar et al. 2011).A possible explanation for this finding is the disparities in access to and utilisation of quality health care between the developed countries and Africa. Generally, care for mothers and their babies is traditionally thought to be better in the developed world where access to universal care is a right. Lack of proper bereavement care frameworks in public hospitals in Africa also put mothers at a greater risk of depression.

Women who bore a stillbirth compared to a livebirth seemed to bear the greatest burden of postpartum depression after univariate analysis. The prevalence of postpartum depression was significantly higher in this cohort with statistical testing demonstrating a 2.38-fold increase in the odds of developing postpartum depressionafter a stillbirth delivery compared to live birth. This seems to be a common trend from published data from Africa and the developed world.In Uganda for instance, having a postnatal death was associated with a significantly higher odd of developing postpartum depression in a rural hospital-based study conducted in 2015 (Kiguli et al., 2015). In Ghana, Weobong and colleagues found a significantly higher risk of developing post-partum depression after a stillbirth delivery in 2015 among 16 560 mothers, while Dadi et al. (2020) identified stillbirth as a correlate for postpartum depression in a 2020 systematic review and meta-analysis of 28 published

original studies with a sample size of 17,938 mothers.Mirieri et al. (2020) had similar findings in a hospital-based case control study in Mombasa. Kingi et al.., (2018), found that there was a positive association between antenatal depression and preterm delivery during a prospective cohort study hospital in Nairobi. They found that the risk of delivering a preterm was 3.8 times higher amongst those mothers who had antenatal depression. In the developed world, Gravensteen et al. reported a higher prevalence of postpartum depression among Norwegian women who had a stillbirth compared to a livebirth in 2018, while Hogue et al., (2015) found the incidence of depressive symptoms to be higher after an index stillbirth delivery compared to after a healthy live birth (38+ weeks) in the United States (US).Screening for postpartum depression in the postpartum period should therefore be prioritised especially after a stillbirth delivery and counselling provided to women at risk of postpartum depression.

Apart from stillbirths, our data showed a few non-modifiable sociodemographic correlates for postpartum depression. Women who delivered while single had a significantly higher odds of developing postpartum depression especially when the pregnancy resulted in a stillbirth.Low level of education, unemployment, delivering large babies (macrosomia), and having unwanted pregnancies were other sociodemographic and reproductive correlates of post-partum depression. While our finding differed from the findings of (Mireri et al. 2020) at the Coast General Hospital found that marriage increases the risk of postpartum depression, the findings were largely comparable with published data from other regions of Kenya, from Africa, and from the developed world. While comparing the correlated for antepartum and postpartum depression in Kenya in 2016, (Ongeri et al.2016), reported a 10-fold increase in the odds of developing postpartum depression the presence of conflict or partner violence at home.(Oksok et al.2018) associated development of postpartum depression and other psychological risks among Kenyan adolescents with pregnancy, low economic status, youth,

and comorbidities such as HIV/AIDS. In Ethiopia, (Wubetu et al.., 2020), found an association between being widowed/single and a higher odds of postpartum depression in 2016 and 2020, while small and large for gestation, having an unplanned pregnancy, and low economic status were reported by Asaye et al..,(2020)in North West Ethiopia.In Montreal Canada, the risk of depression was 77% higher when participants had a history of mental illness (Meng *et al*., 2017), which mirrored the results of (Hogue *et al.,2016)*. in a case control study in the US. Screening for such correlates should be prioritized to identify the at-risk women early, institute management, and improve outcomes.Chmielewska et al.., (2020), found that global maternal and foetal burden have worsened during the Covid 19 pandemic in 2020 with an increase in maternal deaths, still births, ruptured ectopic and maternal depression reported. Although weonly evaluated associations between stillbirth deliveryand postpartum depression, the study took place during the peak of the Covid19 pandemic, and it is thus possible that the pandemic was a stressor that influenced the outcomes.

5.2 Conclusions

- The prevalence of postpartum depression at KNH is high at 28.8%
- Women who deliver a stillbirth compared to a livebirth are more likely to develop postpartum depression
- Being single, poorly educated, low socioeconomic status, delivering a big baby, and having unwanted pregnancies were the main correlates for postpartum depression.

5.3 Recommendations

- Interventions that can lower postpartum depression at KNH are warranted as the prevalence rate is high.
- Screening for postpartum depression during antenatal visits should be a priority, especially when a woman delivers a stillbirth.

5.4 Study limitations

Getting enough women who delivered a stillbirth took a longer time as they were less prone to attending postnatal clinics.This study was also conducted took place during the peak of the COVID 19 pandemic and as such getting enough participants took longer as the participants were more less likely to attend clinics due to the fear of contracting the COVID 19 virus. To get sufficient numbers, the contact information of women who delivered a stillbirth and were not attending postnatal clinics were retrieved from files and the patients invited for an interview. Phone interviews were scheduled for patients who could not make it to the hospital. Postpartum depression was evaluated at one-time point (**within the post-partum period of 6weeks**). Its progression and/or development over time was not evaluated.

REFERENCES

Asaye, M. M., Muche, H. A., & Zelalem, E. D. (2020). Prevalence and Predictors of Postpartum Depression: Northwest Ethiopia. *Psychiatry Journal*, *2020*, 1–9. https://doi.org/10.1155/2020/9565678

Bahadur Thapa, S., Martinez, P., & Clausen, T. (2014). Depression and Its Correlates in South Africa and Ghana among People Aged 50 and Above: Findings from the WHO Study on Global Ageing and Adult Health. *African Journal of Psychiatry*, *17*(06). https://doi.org/10.4172/1994-8220.1000167

Chaaya, M., Campbell, O. M. R., El Kak, F., Shaar, D., Harb, H., & Kaddour, A. (2002). Postpartum depression: prevalence and determinants in Lebanon. *Archives of Women's Mental Health*, *5*(2), 65–72. https://doi.org/10.1007/s00737-002-0140-8

Cheptum, J. J., Muiruri, N., Mutua, E., Gitonga, M., & Juma, M. (2016). Correlates of Stillbirths at Nyeri Provincial General Hospital, Kenya, 2009-2013: A Retrospective Study. *International Journal of MCH and AIDS*, *5*(1), 24–31. https://doi.org/10.21106/ijma.89

Dadi, A. F., Wolde, H. F., Baraki, A. G., & Akalu, T. Y. (2020). Epidemiology of antenatal depression in Africa: a systematic review and meta-analysis. *BMC Pregnancy and Childbirth*, *20*(1), 251. https://doi.org/10.1186/s12884-020-02929-5

Dennis, C.-L., Heaman, M., & Vigod, S. (2012). Epidemiology of Postpartum Depressive Symptoms Among Canadian Women: Regional and National Results From a Cross-Sectional Survey. *Canadian Journal of Psychiatry*, *57*(9), 537–546.

Duthé, G., Rossier, C., Bonnet, D., Soura, A. B., & Corker, J. (2016). Mental health and urban living in sub-Saharan Africa: major depressive episodes among the urban poor in Ouagadougou, Burkina Faso. *Population Health Metrics*, *14*(1), 18. https://doi.org/10.1186/s12963-016-0084-2

Gavin, N. I., Gaynes, B. N., Lohr, K. N., Meltzer-Brody, S., Gartlehner, G., & Swinson, T. (2005). Perinatal Depression. *Obstetrics & Gynecology*, *106*(5, Part 1), 1071–1083. https://doi.org/10.1097/01.AOG.0000183597.31630.db

Gravensteen, I. K., Jacobsen, E.-M., Sandset, P. M., Helgadottir, L. B., Rådestad, I., Sandvik, L., & Ekeberg, Ø. (2018). Anxiety, depression and relationship satisfaction in the pregnancy following stillbirth and after the birth of a live-born baby: a prospective study. *BMC Pregnancy and Childbirth*, *18*(1), 41. https://doi.org/10.1186/s12884-018-1666-8

Hogue, C. J. R., Parker, C. B., Willinger, M., Temple, J. R., Bann, C. M., Silver, R. M., Dudley, D. J., Moore, J. L., Coustan, D. R., Stoll, B. J., Reddy, U. M., Varner, M. W., Saade, G. R., Conway, D., & Goldenberg, R. L. (2015). The Association of Stillbirth with Depressive Symptoms 6-36 Months Post-Delivery. *Paediatric and Perinatal Epidemiology*, *29*(2), 131–143. https://doi.org/10.1111/ppe.12176

Hughes, P. M., Turton, P., & Evans, C. D. H. (1999). Stillbirth as risk factor for depression and anxiety in the subsequent pregnancy: cohort study. *BMJ*, *318*(7200), 1721–1724. https://doi.org/10.1136/bmj.318.7200.1721

Kiguli, J., Namusoko, S., Kerber, K., Peterson, S., & Waiswa, P. (2015). Weeping in silence: community experiences of stillbirths in rural eastern Uganda. *Global Health Action*, *8*(1), 24011. https://doi.org/10.3402/gha.v8.24011

Kirpinar, Ä., GÃ¶zÃ¼m, S., & PasinlioÄŸlu, T. (2010). Prospective study of postpartum depression in eastern Turkey prevalence, socio-demographic and obstetric correlates, prenatal anxiety and early awareness. *Journal of Clinical Nursing*, *19*(3–4), 422–431. https://doi.org/10.1111/j.1365-2702.2009.03046.x

Lim, G. Y., Tam, W. W., Lu, Y., Ho, C. S., Zhang, M. W., & Ho, R. C. (2018). Prevalence of Depression in the Community from 30 Countries between 1994 and 2014. *Scientific Reports*, *8*(1), 2861. https://doi.org/10.1038/s41598-018-21243-x

Madeghe, B. A., Kimani, V. N., Vander Stoep, A., Nicodimos, S., & Kumar, M. (2016). Postpartum depression and infant feeding practices in a low income urban settlement in Nairobi-Kenya. *BMC Research Notes*, *9*(1), 506. https://doi.org/10.1186/s13104-016-2307-9

Meng, X., Brunet, A., Turecki, G., Liu, A., D'Arcy, C., & Caron, J. (2017). Risk factor modifications and depression incidence: a 4-year longitudinal Canadian cohort of the Montreal Catchment Area Study. *BMJ Open*, *7*(6), e015156. https://doi.org/10.1136/bmjopen-2016-015156

Mirieri, H. K., Mweu, M. M., & Olenja, J. M. (2020). Determinants of prenatal depression among women attending the antenatal clinic at a referral facility in Mombasa County, Kenya: a case control study. *F1000Research*, *9*, 36. https://doi.org/10.12688/f1000research.22017.1

Mochache, Kingi & Mathai, Muthoni & Gachuno, Onesmus & Vander Stoep, Ann & Kumar, Manasi. (2018). Depression during pregnancy and preterm delivery: A prospective cohort study among women attending antenatal clinic at Pumwani Maternity Hospital. Annals of General Psychiatry. 17. 31. 10.1186/s12991-018-0202-6.

Nyongesa, M. K., Mwangi, P., Wanjala, S. W., Mutua, A. M., Newton, C. R. J. C., & Abubakar, A. (2019). Prevalence and correlates of depressive symptoms among adults living with HIV in rural Kilifi, Kenya. *BMC Psychiatry*, *19*(1), 333. https://doi.org/10.1186/s12888-019-2339-5

Ongeri, L., Otieno, P., Mbui, J., Juma, E., & Mathai, M. (2016). Antepartum Risk Factors for Postpartum Depression: A Follow up Study among Urban Women Living in Nairobi, Kenya. *Journal of Pregnancy and Child Health*, *03*(05). https://doi.org/10.4172/2376-127X.1000288

Ongeri, L., Wanga, V., Otieno, P., Mbui, J., Juma, E., Stoep, A. Vander, & Mathai, M. (2018). Demographic, psychosocial and clinical factors associated with postpartum depression in Kenyan women. *BMC Psychiatry*, *18*(1), 318. https://doi.org/10.1186/s12888-018-1904-7

Osok, J., Kigamwa, P., Stoep, A. Vander, Huang, K.-Y., & Kumar, M. (2018). Depression and its psychosocial risk factors in pregnant Kenyan adolescents: a cross-sectional study in a community health Centre of Nairobi. *BMC Psychiatry*, *18*(1), 136. https://doi.org/10.1186/s12888-018-1706-y

Othieno, C. J., Okoth, R. O., Peltzer, K., Pengpid, S., & Malla, L. O. (2014). Depression among university students in Kenya: Prevalence and sociodemographic correlates. *Journal of Affective Disorders*, *165*, 120–125. https://doi.org/10.1016/j.jad.2014.04.070

Pawar, G., Wetzker, C., & Gjerdingen, D. (2011). Prevalence of Depressive Symptoms in the Immediate Postpartum Period. *The Journal of the American Board of Family Medicine*, *24*(3), 258–261. https://doi.org/10.3122/jabfm.2011.03.100249

Rosenstein, M. G., Cheng, Y. W., Snowden, J. M., Nicholson, J. M., & Caughey, A. B. (2012). Risk of Stillbirth and Infant Death Stratified by Gestational Age. *Obstetrics & Gynecology*, *120*(1), 76–82. https://doi.org/10.1097/AOG.0b013e31825bd286

Saleem, S., Tikmani, S. S., McClure, E. M., Moore, J. L., Azam, S. I., Dhaded, S. M., Goudar, S. S., Garces, A., Figueroa, L., Marete, I., Tenge, C., Esamai, F., Patel, A. B., Ali, S. A., Naqvi, F., Mwenchanya, M., Chomba, E., Carlo, W. A., Derman, R. J., … Goldenberg, R. L. (2018). Trends and determinants of stillbirth in developing countries: results from the Global Network's Population-Based Birth Registry. *Reproductive Health*, *15*(S1), 100. https://doi.org/10.1186/s12978-018-0526-3

Saluja, G., Iachan, R., Scheidt, P. C., Overpeck, M. D., Sun, W., & Giedd, J. N. (2004). Prevalence of and Risk Factors for Depressive Symptoms Among Young Adolescents. *Archives of Pediatrics & Adolescent Medicine*, *158*(8), 760.

https://doi.org/10.1001/archpedi.158.8.760

Wagura, P., Wasunna, A., Laving, A., Wamalwa, D., & Ng'ang'a, P. (2018). Prevalence and factors associated with preterm birth at kenyatta national hospital. *BMC Pregnancy and Childbirth*, *18*(1), 107. https://doi.org/10.1186/s12884-018-1740-2

Weobong, B., ten Asbroek, A. H. A., Soremekun, S., Gram, L., Amenga-Etego, S., Danso, S., Owusu-Agyei, S., Prince, M., & Kirkwood, B. R. (2015). Association between probable postnatal depression and increased infant mortality and morbidity: findings from the DON population-based cohort study in rural Ghana. *BMJ Open*, *5*(8), e006509. https://doi.org/10.1136/bmjopen-2014-006509

Wubetu, A. D., Engidaw, N. A., & Gizachew, K. D. (2020). Prevalence of postpartum depression and associated factors among postnatal care attendees in Debre Berhan, Ethiopia, 2018. *BMC Pregnancy and Childbirth*, *20*(1), 189. https://doi.org/10.1186/s12884-020-02873-4

APPENDICES

Appendix 1. Questionnaire

Prevalence of Postpartum Depression among Women with Still Births versus Normal Infants at the Kenyatta National Hospital

Study questionnaire

Fill all sections

Demographic characteristics

1. Age (years)……
2. Gender
   ☐Male
   ☐Female
3. Marital status
   ☐Married
   ☐Single
   ☐Divorced/separated
4. Education
   ☐Primary
   ☐Secondary
   ☐Tertiary
5. Employment status
   ☐Employed
   ☐Unemployed

Reproductive characteristics

6. What was the weight in grams at birth?.....
7. Number of previous pregnancies……
8. Have you had any abortions?
   ☐Yes
   ☐No

If yes, number of abortions…….

9. Have you had any stillbirths?
   ☐Yes
   ☐No

If yes, how many?.....

10. How was the pregnancy?
    ☐Wanted
    ☐Unwanted
11. What was your birth outcome?
    ☐Live birth

☐Stillbirth

If alive:

Apgar score at 1 minute……
Apgar score at 5 minutes……
Apgar score at 10 minutes……

If stillbirth, cause…….

12. What gestation was the baby born?.....
13. Were there any abnormalities?
    ☐Yes
    ☐No
    If yes, which one(s)……..

Medical characteristics

14. History of mental health
    ☐Yes
    ☐No
15. Use of antidepressants
    ☐Yes
    ☐No
    If yes, which one……..
16. Do you have any medical problem?
    ☐Yes
    ☐No

If yes, which one

    ☐HIV
    ☐Diabetes
    ☐Asthma
    ☐Hypertension
    ☐Kidney Disease
    ☐Heart Diseases
    ☐Rheumatoid arthritis
    ☐Epilepsy
    ☐Urinary tract infections
    ☐Other (specify)……..

Social characteristics

17. Alcohol use
    ☐Yes
    ☐No
18. Tobacco use

☐Yes
☐No

19. Relationship assessment scale

	Low				High
1. How well does your partner meet yourneeds?	1	2	3	4	5
2. In general, how satisfied are you withyour relationship?					
3. How good is your relationshipcompared to most?					
4. How often do you wish you had notgotten into this relationship?					
5. To what extent has your relationshipmet your originalexpectations?					
6. How much do you love your partner?					
7. How many problems are there in yourrelationship?					

20.EDINBURGH POSTNATAL DEPRESSION SCALE

Edinburgh Postnatal Depression Scale 1 (EPDS) Name: _____
Address: _____ Your Date of Birth: _____
_____ Baby¶s Date of Birth: _____ Phone: _____

In the past 7 days:

1. I have been able to laugh and see the funny side of things
A. As much as I always could (SCORE OF 0)
B.Not quite so much now to cope at all (SCORE OF 1)
C.Definitely not so much now (SCORE OF 2)
D.Not at all as usual (SCORE OF 3)

2. I have looked forward with enjoyment to things

A..As much as I ever did (SCORE OF 0)
B.Rather less than I used to (SCORE OF 1)
C.Definitely less than I used to (SCORE OF 2)
D.Hardly at all (SCORE OF 3)

3.I have blamed myself unnecessarily when things went wrong

- Yes most of the time (SCORE OF 3)
- Yes some of the time (SCORE OF 2)
- Not very often (SCORE OF 1)

- No never (SCORE OF 0)

4.I have been anxious or worried for no good reason
- Not at all (SCORE OF 0)
- Hardly ever (SCORE OF 1)
- Yes sometimes (SCORE OF 2)
- Yes,very often (SCORE OF 3)

5.I have felt scared or panicky for no good reason

- Yes, quite often (SCORE OF 3)
- Yes sometimes (SCORE OF 2)
- No,Not much (SCORE OF 1)
- No not at all (SCORE OF 0)

6.Things have been getting on top of me

A Yes most of the time I haven't been able to cope at all (SCORE OF 3)
B, Yes sometimes I haven't been coping as well as usual (SCORE OF 2)
C. No most of the time I have coped quite well (SCORE OF 1)
D.No I have been coping as well as usual (SCORE OF 0)

7.I have been so unhappy and have heard difficulty sleeping

A Yes,Most of the time (SCORE OF 3)
B Yes, sometimes (SCORE OF 2)
C Not very often (SCORE OF 1)
D No,not at all (SCORE OF 0)

8.i have felt sad or miserable

A.yes most of the time (SCORE OF 3)
B.Yes quite often (SCORE OF 2)
C.Not very often (SCORE OF 1)
D. No not at all (SCORE OF 0)

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

- Yes most of the time (SCORE OF 3)
- Yes, quite often (SCORE OF 2)
- Only occasionally (SCORE OF 1)
- No,never (SCORE OF 0)

10. The thought of harming myself has occurred to me

- Yes quite often (SCORE OF 3)

- Sometimes (SCORE OF 2)
- Hardly ever (SCORE OF 1)
- Never. (SOCRE OF 0)

21. Brief Grief Questionnaire (stillbirths only)

1. How much are you having trouble accepting the death of ……

0	1	3
Not at all	Somewhat	A lot

2. How much does your grief still interfere with your life?

0	1	3
Not at all	Somewhat	A lot

3. How much are you having images or thoughts of…….. when he/she died or other thoughts about the death that really bother you?

0	1	3
Not at all	Somewhat	A lot

4. Are there things you used to do that you avoid or avoid looking at pictures or talking about …….. How much are you avoiding these things?

0	1	3
Not at all	Somewhat	A lot

5. How much are you feeling cut off or distant from other people since……. Died, even when people used to be close to you like family or friends?

0	1	3
Not at all	Somewhat	A lot

Appendix 2. Informed consent (English)

PREVALENCE OF POSTPARTUM DEPRESSION AT THE POSTNATAL CLINIC OF KENYATTA NATIONALAND REFERAL HOSPITAL

Principal Investigator\and institutional affiliation: DR VICTORIA AWIOCHE, UNIVERSITY OF NAIROBI

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 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. P688/12/202, which will be evaluating the prevalence of postpartum depression at the postnatal clinic of Kenyatta national and referral hospital.

WHAT WILL THE STUDY BE ABOUT?

The researchers listed above are interviewing individuals who delivered at KNH and are attending or attended postnatal care in the hospital, either with a stillbirth delivery or a normal birth delivery. The purpose of the interview is to find out whether the women who delivered a stillbirth are more likely to develop postpartum depression compared to women who had a normal live birth. Participants in this research study will be asked questions about their most recent delivery, characteristics, and history of medical complications of diseases. ParticipantsThere will be approximately 288 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 your age, the number of children you have, and your previous delivery status. We will also ask you a serious questions to determine whether you have postpartum depression or not. After the interview has finished, you will undergo psychological counselling if

neededand allowed to go home at your own leisure. 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: clarification of research data and to know how you are doing after your successful or unsuccessful pregnancy.

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 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 answer some of the questions that we might ask. We will do everything we can to ensure that this is done in private. Furthermore, study staff and interviewers are professionals with special training in these examinations/interviews. Also, taking about your lost pregnancy may be stressful. You may feel some discomfort when we talk about your family or child. 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 counselling testing and health information.We will refer you to a hospital for care and support where necessary. Also, the information you provide will help us better understand how delivering a stillbirth affect the psychological wellness of women. This information is a contribution to science and can aid policy formulation at KNH.

WILL BEING IN THIS STUDY COST YOU ANYTHING?

No, you will not be charged for participating in this study

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

You will not receive any monetary benefits from participating in the study. However, money spent as part of this study will be reimbursed by the principal investigator.

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 counsellor. 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 have (define specimen) preserved for later study: Yes No

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

Participantprinted 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 has 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 Dr Victoria Awuoche_____ at _____ at any time
Witness Printed Name) Name _____
Contact information _____
Signature /Thumb stamp: _____ Date; _____

Appendix 3. Informed consent (Kiswahili)

PREVALENCE OF POSTPARTUM DEPRESSION AT THE POSTNATAL CLINIC OF KENYATTA NATIONALAND REFERAL HOSPITAL

Mchunguzi Mkuu \ na ushirika wa kitaasisi: DR VICTORIA AWUOCHE, UNIVERSITY OF NAIROBI

Utangulizi: Ningependa kukuambia juu ya utafiti unaofanywa na mtafiti aliyeorodheshwa hapo juu. Madhumuni ya fomu hii ya idhini ni kukupa habari utakayohitaji kukusaidia kuamua ikiwa utashiriki katika utafiti huo. Jisikie huru kuuliza maswali yoyote juu ya madhumuni ya utafiti, nini kinatokea ikiwa unashiriki katika utafiti, hatari na faida zinazowezekana, haki zako kama kujitolea, na chochote kingine juu ya utafiti au fomu hii ambayo haijulikani wazi. Wakati tumejibu maswali yako yote kukuridhisha, unaweza kuamua kuwa kwenye somo au la. Utaratibu huu unaitwa 'idhini ya habari' Mara tu utakapoelewa na kukubali kuwa kwenye utafiti, nitakuomba utie sahihi jina lako kwenye fomu hii. Unapaswa kuelewa kanuni za jumla ambazo zinatumika kwa washiriki wote katika utafiti wa matibabu: i) Uamuzi wako wa kushiriki ni wa hiari kabisa ii) Unaweza kujiondoa kwenye utafiti wakati wowote bila kutoa sababu ya kujiondoa kwako iii) Kukataa kushiriki utafiti hautaathiri huduma unazostahiki katika kituo hiki cha afya au vituo vingine. Tutakupa nakala ya fomu hii kwa kumbukumbu zako.

Naweza kuendelea? NDIO LA

Utafiti huu umeidhinishwa na Itifaki ya Kamati ya Maadili na Utafiti ya Hospitali ya Kitaifa ya Kenyatta-Chuo Kikuu cha Nairobi Nambari P688 / 12/202, ambayo itakuwa ikitathmini kuenea kwa unyogovu baada ya kuzaa katika kliniki ya baada ya kuzaa ya hospitali ya kitaifa na ya rufaa ya Kenyatta.

MAFUNZO YATAKUWA NINI?

Watafiti walioorodheshwa hapo juu wanawahoji watu ambao wamejifungua katika KNH na wanahudhuria au kuhudhuria utunzaji wa baada ya kuzaa hospitalini, ama kwa kuzaa watoto wachanga au kujifungua kawaida. Kusudi la mahojiano ni kujua ikiwa wanawake waliozaliwa wakiwa wamekufa wana uwezekano mkubwa wa kupata unyogovu wa baada ya kuzaa ikilinganishwa na wanawake ambao walikuwa na kuzaliwa kwa kawaida. Washiriki katika utafiti huu wataulizwa maswali juu ya utoaji wao wa hivi karibuni, tabia, na historia ya shida ya matibabu ya magonjwa. Washiriki Kutakuwa na takriban washiriki 288 katika utafiti huu waliochaguliwa bila mpangilio. Tunaomba idhini yako kuzingatia kushiriki katika utafiti huu.

NINI KITATOKEA UKIAMUA KUWA KATIKA UTAFITI HUU WA UTAFITI?

Ikiwa unakubali kushiriki katika utafiti huu, mambo yafuatayo yatatokea: Utahojiwa na mhojiwa aliyefundishwa katika eneo la kibinafsi ambapo unahisi raha kujibu maswali. Mahojiano hayo yatachukua takriban dakika 20. Mahojiano yataangazia mada kama vile umri wako, idadi ya watoto unao, na hali yako ya kujifungua hapo awali. Pia tutakuuliza maswali mazito ili kubaini ikiwa una unyogovu baada ya kuzaa au la. Baada ya mahojiano kumaliza, utapitia ushauri wa kisaikolojia ikiwa inahitajika na kuruhusiwa kwenda nyumbani kwa

burudani yako mwenyewe. Tutauliza nambari ya simu ambapo tunaweza kuwasiliana nawe ikiwa ni lazima. Ikiwa unakubali kutoa anwani yako ya mawasiliano, itatumika tu na watu wanaofanya kazi kwa utafiti huu na hawatashirikiwa na wengine kamwe. Sababu ambazo tunaweza kuhitaji kuwasiliana na wewe ni pamoja na: ufafanuzi wa data ya utafiti na kujua unaendeleaje baada ya ujauzito wako mzuri au usiofanikiwa.

KUNA ATHARI ZOZOTE, ZINAZIDHARAU HASARA ZINAZOHUSIANA NA UTAFITI HUU?

Utafiti wa kimatibabu una uwezo wa kuanzisha hatari za kisaikolojia, kijamii, kihemko, na kimwili. Jitihada inapaswa kuwekwa kila wakati ili kupunguza hatari. Hatari moja ya kuwa katika utafiti ni kupoteza faragha. Tutaweka kila kitu unatuambia kama siri iwezekanavyo. Tutatumia nambari ya nambari kukutambulisha kwenye hifadhidata ya kompyuta inayolindwa na nywila na tutaweka rekodi zetu zote za karatasi kwenye kabati la faili lililofungwa. Walakini, hakuna mfumo wowote wa kulinda usiri wako ambao unaweza kuwa salama, kwa hivyo bado inawezekana mtu anaweza kugundua kuwa ulikuwa kwenye utafiti huu na angeweza kupata habari kukuhusu. Pia, kujibu maswali kwenye mahojiano inaweza kuwa mbaya kwako. Ikiwa kuna maswali ambayo hautaki kujibu, unaweza kuyaruka. Una haki ya kukataa mahojiano au maswali yoyote yanayoulizwa wakati wa mahojiano. Inaweza kuaibisha kwako kujibu maswali kadhaa ambayo tunaweza kuuliza. Tutafanya kila tuwezalo kuhakikisha kuwa hii inafanywa kwa faragha. Kwa kuongezea, wafanyikazi wa utafiti na wahojiwa ni wataalamu wenye mafunzo maalum katika mitihani / mahojiano haya. Pia, kuchukua mimba yako iliyopotea inaweza kuwa ya kufadhaisha. Unaweza kuhisi usumbufu wakati tunazungumza juu ya familia yako au mtoto. Ikiwa kuna jeraha, ugonjwa au shida zinazohusiana na utafiti huu, wasiliana na wafanyikazi wa utafiti mara moja kwa nambari iliyotolewa mwishoni mwa waraka huu. Wafanyakazi wa utafiti watakutibu kwa hali ndogo au kukuelekeza inapobidi.

KUNA FAIDA ZOZOTE ZINAKUWA KATIKA UTAFITI HUU?

Unaweza kufaidika kwa kupata upimaji wa ushauri wa bure na habari ya afya. Tutakupeleka kwa hospitali kwa matunzo na msaada pale inapobidi. Pia, habari unayotoa itatusaidia kuelewa vizuri jinsi kujifungua mtoto aliyekufa kunaathiri afya ya kisaikolojia ya wanawake. Habari hii ni mchango kwa sayansi na inaweza kusaidia uundaji wa sera katika KNH.

JE, KUWA KWENYE UTAFITI HUU KUKUgharimia chochote?

Hapana, hautatozwa kwa kushiriki katika utafiti huu

JE, UTARUDISHA KWA PESA YOYOTE ILIYOTUMIWA KWA SEHEMU YA UTAFITI HUU?

Hautapokea faida yoyote ya kifedha kutokana na kushiriki katika utafiti. Walakini, pesa zilizotumiwa kama sehemu ya utafiti huu zitarudishwa na mpelelezi mkuu.

NINI KAMA UNA MASWALI BAADAYE?

Ikiwa una maswali zaidi au wasiwasi juu ya kushiriki katika utafiti huu, tafadhali piga simu au tuma ujumbe mfupi kwa wafanyikazi wa utafiti kwa nambari iliyotolewa chini ya ukurasa huu. Kwa habari zaidi juu ya haki zako kama mshiriki wa utafiti unaweza kuwasiliana na Katibu / Mwenyekiti, Hospitali ya Kitaifa ya Kenyatta-Chuo Kikuu cha Maadili na Kamati ya Utafiti ya Nairobi Nambari ya simu 2726300 Ext. Barua pepe 44102 uonknh_erc@uonbi.ac.ke. Wafanyakazi wa utafiti watakulipa malipo yako kwa nambari hizi ikiwa simu ni ya mawasiliano yanayohusiana na utafiti.

CHAGUO ZAKO ZINGINE NI NINI?

Uamuzi wako wa kushiriki katika utafiti ni wa hiari. Uko huru kukataa kushiriki katika utafiti na unaweza kujiondoa kutoka kwa utafiti wakati wowote bila udhalimu au kupoteza faida yoyote.

FOMU YA MAJALIZO (TAARIFA YA MAJIBU)

Taarifa ya mshiriki Nimesoma fomu hii ya idhini au nikasomewa habari. Nimekuwa na nafasi ya kujadili utafiti huu wa utafiti na mshauri wa utafiti. Nimejibiwa maswali yangu kwa lugha ambayo ninaelewa. Hatari na faida zimeelezewa kwangu. Ninaelewa kuwa ushiriki wangu katika utafiti huu ni wa hiari na kwamba ninaweza kuchagua kujiondoa wakati wowote. Ninakubali kwa hiari kushiriki katika utafiti huu wa utafiti. Ninaelewa kuwa juhudi zote zitafanywa kutunza habari kuhusu kitambulisho changu binafsi kuwa siri.

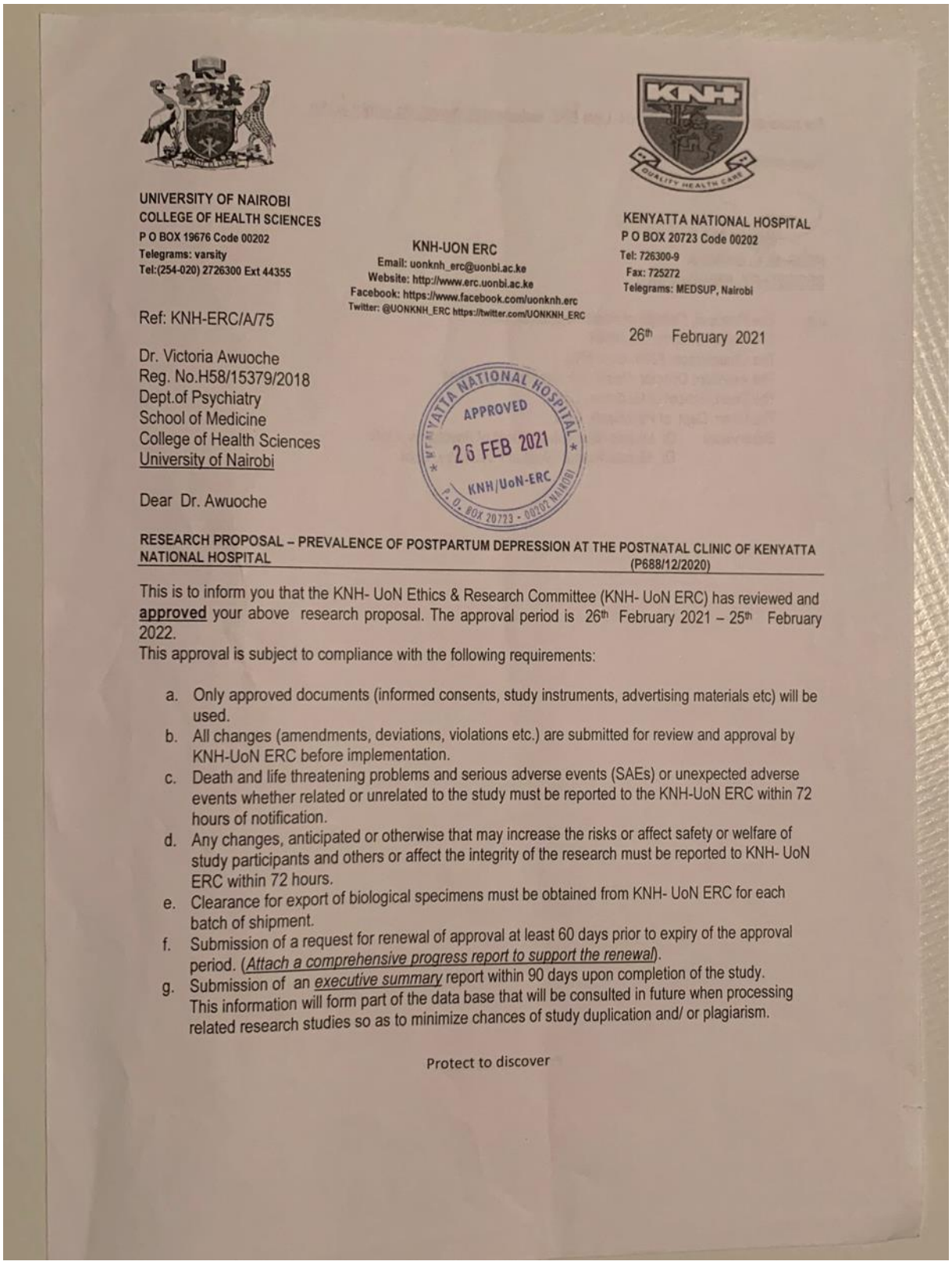
Kwa kusaini fomu hii ya idhini, sijatoa haki yoyote ya kisheria ambayo ninayo kama mshiriki katika utafiti wa utafiti. Ninakubali kushiriki katika utafiti huu: Ndio Hapana

Ninakubali kuwa (fafanua kielelezo) kilichohifadhiwa kwa masomo ya baadaye: Ndio Hapana

Ninakubali kutoa habari ya mawasiliano kwa ufuatiliaji: Ndio Hapana

Jina la mshiriki aliyechapishwa: _____
Saini ya mshiriki / Stempu ya kidole gumba _____Tarehe _____
Kauli ya mtafiti mimi, aliyesainiwa chini, nimeelezea kwa ukamilifu maelezo muhimu ya utafiti huu kwa mshiriki aliyetajwa hapo juu na anaamini kwamba mshiriki ameelewa na kwa hiari na kwa hiari ametoa idhini yake.
Jina la Mtafiti: _____Tarehe: _____ Saini _____
Jukumu katika utafiti: _____ [i.e. wafanyikazi wa utafiti ambao walielezea fomu ya idhini ya habari.]
Kwa habari zaidi wasiliana na Dkt Victoria Awuoche_____ kwa _____ wakati wowote
Jina Lililochapishwa kwa Shahidi) Jina _____
Maelezo ya mawasiliano _____
Saini / stempu ya Thumb: _____ Tarehe; _____

Appendix 4. ERC Approval



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Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/75

26th February 2021

Dr. Victoria Awuoche
Reg. No.H58/15379/2018
Dept.of Psychiatry
School of Medicine
College of Health Sciences
University of Nairobi

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

Dear Dr. Awuoche

RESEARCH PROPOSAL – PREVALENCE OF POSTPARTUM DEPRESSION AT THE POSTNATAL CLINIC OF KENYATTA NATIONAL HOSPITAL (P688/12/2020)

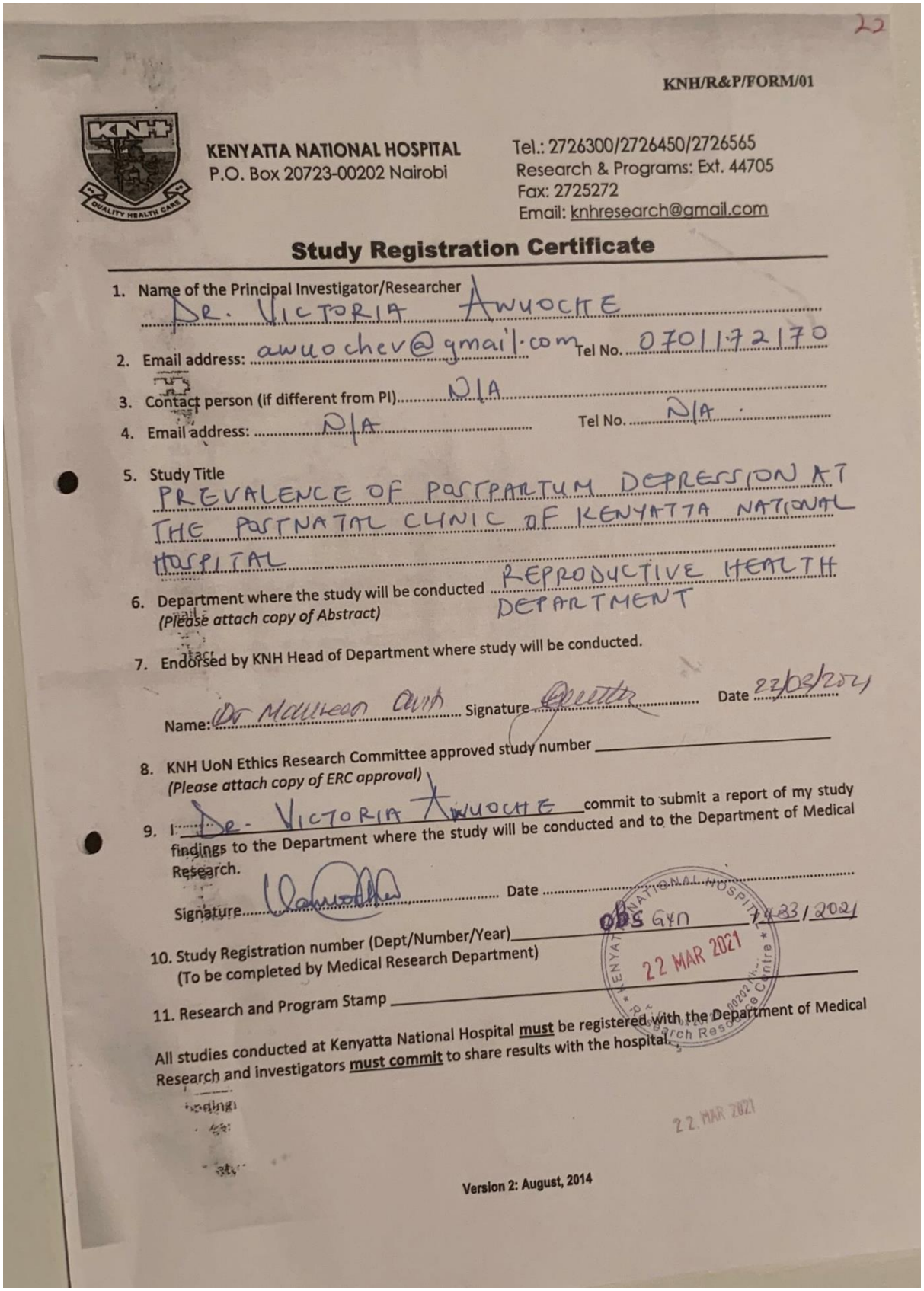
This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 26th February 2021 – 25th February 2022.

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.

Protect to discover

Appendix 5. Kenyatta National Hospital Approval/ Registration Certificate



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KNH/R&P/FORM/01

KENYATTA NATIONAL HOSPITAL
P.O. Box 20723-00202 Nairobi

Tel.: 2726300/2726450/2726565
Research & Programs: Ext. 44705
Fax: 2725272
Email: knhresearch@gmail.com

Study Registration Certificate

1. Name of the Principal Investigator/Researcher Dr. VICTORIA AWUOCHE
2. Email address: awuochev@gmail.com Tel No. 0701172170
3. Contact person (if different from PI) N/A
4. Email address: N/A Tel No. N/A
5. Study Title PREVALENCE OF POSTPARTUM DEPRESSION AT THE POSTNATAL CLINIC OF KENYATTA NATIONAL HOSPITAL
6. Department where the study will be conducted REPRODUCTIVE HEALTH DEPARTMENT *(Please attach copy of Abstract)*
7. Endorsed by KNH Head of Department where study will be conducted.

   Name: Dr Mathenge Ann Signature [signature] Date 22/03/2021

8. KNH UoN Ethics Research Committee approved study number _____ *(Please attach copy of ERC approval)*
9. I Dr. VICTORIA AWUOCHE commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Medical Research.

   Signature [signature] Date 14/03/2021

10. Study Registration number (Dept/Number/Year) ODS GYN
    (To be completed by Medical Research Department)
11. Research and Program Stamp KENYATTA NATIONAL HOSPITAL * Research Service Centre * 22 MAR 2021

All studies conducted at Kenyatta National Hospital **must** be registered with the Department of Medical Research and investigators **must commit** to share results with the hospital.

22 MAR 2021

Version 2: August, 2014

Appendix 6 Kenyatta National Hospital Department of Obstetrics and Gynaecology Approval

KENYATTA NATIONAL HOSPITAL
P.O. BOX 20723, 00202 Nairobi

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OFFICE OF HEAD OF DEPARTMENT, OBSTETRICS & GYNAECOLOGY
EXT.43370

KNH/HOD-OBS&GYN/07/VOL.11/

Date: 22nd March, 2021

Dr. Victoria Awuoche
Reg. No.H58/15379/2018
Dept. Of Psychiatry
School of Medicine
College of Health Sciences
University Of Nairobi

RE: RESEARCH PROPOSAL – PREVALENCE OF POSTPARTUM DEPRESSION AT THE POSTNATAL CLINIC OF KENYATTA NATIONAL HOSPITAL

This is to inform you that the department has given you permission to conduct the above study which has been approved by ERC.

Liaise with Senior Assistant Chief Nurse - Incharge Labour ward In-charge in Obstetrics and Gynaecology to facilitate your study.

You will be expected to disseminate your results to the department upon completion of your study.

Dr. Maureen Owiti
HOD-OBSTETRICS & GYNAECOLOGY

Cc.
Incharge - Labour Ward
HOD – Health Information