Knowledge and Health Seeking Practices on Neonatal Danger Signs and Associated Factors among the Post Natal Mothers at Pumwani Maternity Referral Hospital in Nairobi
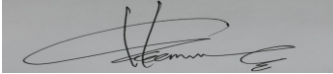
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A Thesis Submitted in Partial Fulfillment of the Requirements for the Award of Degree of Master of Science in Tropical and Infectious Diseases at the University of Nairobi

2023

DECLARATION

I declare and affirm that this dissertation is my original work and has not been submitted to any other institution for the award of any academic degree, diploma, or certificate.

I affirm that I have cited and referenced all sources in this study.

Signed……………………………… Date….8/12/2023

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ACRONYMS AND ABBREVIATIONS

ANC:	Antenatal Clinic
FGD:	Focus Group Discussion
IMNCI:	Integrated Management of Neonatal and Childhood Illnesses
KDHS:	Kenya Demographic and Health Survey
LMICs	Low- and Middle-income countries
MOH:	Ministry of Health
NGO:	Non-Governmental Organization
PMRH:	Pumwani Maternity Referral Hospital
PMTCT	Prevention of mother to Child Transmission
SDG:	Sustainable development Goals
SPSS:	Statistical Package for Social Science
UNICEF:	United Nations Children's Fund
UNIGME:	United Nations Inter-Agency Group for Child Mortality Estimation
U5MR:	Under Five-Mortality Rate
UoN:	University of Nairobi
WHO:	World Health Organization

STUDY DEFINITIONS AND OPERATIONAL TERMS

Neonate: An infant under 28 days of age.

Neonatal Illness: A disturbance of the normal state of an infant's body, organs, and abnormal function under 28 days of age.

Neonatal Sepsis: A blood infection that occurs in an infant younger than 28 days old.

Signs: Objective evidence of disease perceived by the examining practitioner.

ABSTRACT

The majority of neonatal premature deaths are due to avoidable causes. Across the globe, babies are taken care of by their mothers, and as such, ensuring that the mothers have the necessary knowledge of the signs and symptoms of newborn illnesses is extremely important. The lack of knowledge of neonatal danger signs is regarded as a public health concern and a contributing factor to the persistently high neonatal death rate.

Objective: To assess the knowledge of neonatal danger signs, its associated factors, and health-seeking practices among postnatal mothers at Pumwani Maternity Referral Hospital.

Methods: This was a mixed-method cross-sectional study with qualitative and quantitative data. It included a sample of 230 postnatal mothers. Quantitative data was analyzed using R version 4.1.2. Continuous variables were summarized using medians and interquartile ranges (IQR). Frequencies and proportions were applied to summarize categorical variables. The association between independent variables and knowledge of neonatal danger signs was assessed using binary logistic regression. Significance of the results was determined at 5% significance level. Qualitative data was collected through audio recording, transcribed verbatim and analysed through thematic analysis.

Results: The median age of the mothers was 26 years with an interquartile range of 22 to 30 years. Of the 230 mothers, 57% had a secondary school education, 23.4% had primary education and below, and the rest had a college education. The prevalence of sufficient knowledge of neonatal danger signs was 45.7% (95% CI 39.0%, 52.3%). Information about neonatal danger signs after deliver was significantly associated with knowledge of neonatal danger signs, adjusted odds ratio 3.83 (P <0.001, 95% CI 2.11,7.17). A total of 211 (91.7%) of the mothers said they sought care in hospitals when their babies were sick. Others bought drugs from chemists or used herbal medicine. The neonatal danger signs identified by the mothers through the qualitative arm of the study were; convulsions, difficulty in breathing, diarrhoea, yellowing of eyes and body, hotness of body, poor feeding and vomiting.

Conclusion: The majority of the mothers in this study had insufficient knowledge of neonatal danger signs. The danger signs identified in the focused group discussion were; convulsions, difficulty breathing, diarrhea, and jaundice among others. The point at which health information was given was significantly associated with mothers' knowledge of neonatal danger signs.

Recommendations: There is a need for public education on neonatal danger signs among postnatal mothers. Encourage more mothers to attend antenatal clinics, and offer education on neonatal dangers signs before and after delivery. Conduct a multi-site study of the same nature to determine the experiences of mothers in other centers to allow external validity.

CHAPTER ONE: INTRODUCTION

1.1. Background

Being pregnant and having a child can be exciting for many people around the world. However, losing a child during or after delivery can be a very traumatic experience for mothers and families. Neonatal mortality, defined as the death of a newborn within the first 28 days of life, is a major challenge affecting many developing countries (Pathirana et al., 2016).

Approximately 15% of women around the world experience complications during their pregnancy that can be fatal to the mother, baby, or both (WHO & UNICEF, 2017)**.** Safe pregnancies and childbirth, early initiation of breastfeeding, and good quality newborn care practices and support systems are some of the essential measures that can help prevent and reduce neonatal mortality (USAID, 2014). The term neonatal period refers to the first four weeks (28 days) of a child's life after delivery, which is vital for the survival of infants (WHO & UNICEF, 2017).

Neonatal mortality is a worldwide public health concern. In 2020, the World Health Organization (WHO) reported that around 5.3 million children under five years old died globally, with half of these deaths occurring within the neonatal period (UNICEF, 2019b)**.** A newborn child can die in a few minutes if neonatal danger signs are not recognized and treated immediately (WHO & UNICEF, 2017). The newborn period is a stage when children are at risk of dying. In 2018, around 18 fatalities per 1000 live births were reported worldwide. There are wide regional disparities and variations in the chances of survival (UNICEF, 2019b).

Globally an estimated 6700, neonatal deaths occurred every day in 2020 (United Nations Interagency Group for Child Mortality Estimation (UN & IGME), 2021). Newborn mortality in sub-Saharan Africa was the highest, at 27 deaths per 1000 live births, compared to a global average of 18 per 1000 live births (UNICEF, 2019b). These findings underline the need to focus on the neonatal period, particularly the first 24 hours after delivery (UNICEF, 2019a).

In Kenya, many positive efforts were implemented over the years to enhance the quality of life for mothers and babies, such as providing high-quality antenatal care, improved access to facility-based care at delivery, postnatal care for both mothers and babies and care for premature and sick newborns. However, despite these efforts, the country's neonatal mortality rate remains high. The

Kenya Demographic and Health Survey (KDHS) report released in 2022, states that the under 5-mortality rate reduced from 52 to 41 compared to 2014, however, half of these are attributed to neonatal death at 21 per 1,000 live births (*Kenya Demographic and Health Survey (KDHS) 2022 - Kenya National Bureau of Statistics*, n.d.). The postpartum period is recognized as one of the periods when information concerning neonatal danger signs is shared with new mothers; this equips the mothers with the necessary knowledge to detect newborns at risk and seek medical treatment early. However, local uptake of postpartum visits remains low, once discharged home after birth, babies are seen after six weeks for scheduled immunization, and therefore little is known about what happens in these first six weeks (*Kenya Demographic and Health Survey (KDHS) 2022 - Kenya National Bureau of Statistics*, n.d.)**.**

The majority of newborn deaths are caused by intrapartum complications, prematurity, and neonatal sepsis (United Nations Inter-agency Group for Child Mortality Estimation (UN IGME), 2021). However, previous studies have reported that many neonatal deaths related to neonatal danger signs can be prevented through simple, effective health education offered to mothers before, during the pregnancy, and soon after delivery, it is therefore important that parents are provided with the necessary information and resources to improve their child's survival.

To improve newborn survival rates in developing nations, a multi-pronged approach involving political commitment, community engagement, the establishment of well-resourced hospitals capable of providing timely recognition, and the delivery of high-quality healthcare services to small and sick newborns is needed. Community engagement programs are important to clearly understand the patterns and help identify the factors that influence newborn babies (Carlo & Travers, 2016).

The term neonatal danger signs (NDSs) is a set of clinical signs that suggest a high risk of newborn mortality and morbidity as well as the need for prompt medical intervention. NDSs, which are often nonspecific, are used by practitioners in the integrated management of neonatal and child illness, (IMNCI) to identify children who require medical treatment. In IMNCI, documented NDSs are cough, difficulty/fast breathing, lethargy, loss of consciousness, convulsion, fever, hypothermia, poor feeding or inability to breastfeed, persistent vomiting, diarrhoea, yellow palms or soles or eyes, eye discharge/redness, and discharge or pus from the umbilicus (United Nations Inter-agency Group for Child Mortality Estimation (UN & IGME), 2021)**.**

These manifestations are easily identifiable by the mothers; hence, early recognition of newborn danger signs is an essential step in improving neonatal survival. One of the most important strategies for reducing neonatal deaths in developing nations is to improve families' health-seeking practices. Since most mothers are released from the health facility 24 hours following delivery, new mothers and families must recognize the initial signs of newborn illness and get the newborn to the health care facilities for treatment.

This proposal is driven by the following factors: although various research has been conducted to look at the determinants of neonatal death, there is a gap in determining a mother's knowledge of neonatal danger signs. Most of the studies conducted both in sub-Saharan Africa and in high-income countries, focused on one danger sign and they did not take into account other important factors such as obstetric factors (parity and mode of delivery). The majority of studies examined mothers' knowledge after 28 days (toddler and child stages) which is susceptible to recall bias (Carlo & Travers, 2016).

Therefore, the goal of this study is to determine mothers' understanding of neonatal danger signs and associated factors that influence neonatal danger signs, and further explore gaps in mothers' health-seeking practices.

1.3 Problem statements

Neonatal death has been identified as a public health concern worldwide, accounting for more than 48% of all newborn fatalities before their first birthday (United Nations Inter-agency Group for Child Mortality Estimation (UN & IGME), 2021). Every day, over 1800 newborns die around the world, mainly due to mothers' ignorance about neonatal danger signs, The majority of neonatal deaths (80%) occur in low and middle-income countries with almost 50% occurring at home due to a lack of knowledge and failure of recognizing warning signs by mothers about neonatal danger signs (Marzeneb et al., 2020).

In various developing countries such as Kenya, NDSs have been a common health problem. Neonates with several danger signs are more susceptible to developing complications during their early neonatal period, and as a result, the risk of newborn death may be even higher. Despite the importance of mothers' understanding of neonatal danger signs to minimize the risk of newborn

death and improve neonatal quality of life, the prevalence of such knowledge is quite low in many African countries such as Kenya (Kibaru & Otara, 2016). In Uganda, about 14.9% of mothers can recognize two neonatal danger signs (Sandberg et al., 2014). In Ghana, the prevalence is 20.3% (Kuganab-Lem & Yidana, 2014). While in Eastern Ethiopia, it is 9.38%.

To reduce neonatal mortality and morbidity, mothers and immediate caregivers need to recognize suggestive danger signs and prompt notification of healthcare providers for early interventions.

The study will look into the various gaps in the understanding of neonatal danger signs and health-seeking practices among mothers to provide inputs and develop effective and sustainable interventions that can improve neonatal survival.

1.4 Study justification

An estimated 1500 mothers deliver in Pumwani Maternity Referral Hospital every month, some of the mothers delivering in the hospital attended ANC in the hospital while others attended ANC elsewhere, but delivered in PMRH. The hospital also receives referrals from peripheral health facilities across Nairobi. A significant proportion of deliveries at PMRH are secondary to obstetrics complications such as fetal distress, obstructed labour, pre-eclampsia, and gestational diabetes, which are important determinants of neonatal health. However, the mother's level of understanding of newborn danger signs and health-seeking habits remains undetermined.

In addition, it is crucial to identify other factors that may influence the development of neonatal danger signs; this will go a long way in aiding decision-making about the identification and management of neonates with danger signs. This study seeks to analyze the mother's knowledge of newborn danger signs in PMRH and to provide suggestions, recommendations, and effective interventions that can improve neonatal survival. The study's findings will help inform clinicians' decisions regarding the care of neonates in the post-natal wards before releasing them home, as well as actively teaching mothers to recognize signs of neonatal illness.

1.5. Study objective

1.5.1 Broad Objective

1) To assess the knowledge of neonatal danger signs, its associated factors, and health-seeking practices among postnatal mothers at PMRH.

1.5.2 Specific Objectives

1) To assess maternal knowledge of neonatal danger signs among postnatal mothers.
2) To assess factors associated with maternal knowledge of neonatal danger signs.
3) To assess health-seeking practices regarding neonatal illness

CHAPTER TWO: LITERATURE REVIEW

Most newborn babies will have an uncomplicated birth process; however, some will require extra care to live a healthy life. It's critical to educate mothers about neonatal danger signs and advise them how to seek medical attention as soon as they observe any of them (Wardlaw et al., 2014).

2.1 Mother's Awareness of Newborn Danger Signs

Studies have been conducted to determine mothers' knowledge about signs of newborn illness (Darmstadt et al., 2010). A randomized trial was carried out in Bangladesh to compare the reports of mothers concerning their babies' health conditions and assessments performed by community healthcare workers. During the two prenatal visits, Community health care workers were able to promote delivery, newborn care preparation, and recognition of neonatal illness. Using clinical algorithms, Community health workers were able to identify neonates with very severe illnesses, by determining the history of the mother's illness and the presence of clinical signs. The result of the study was then analyzed to identify factors that could affect the development and severity of the disease. The sensitivity, specificity, and positive predictive value of the diagnosis were then compared with the value of the maternal report of illness. The result revealed that maternal reports of any clinical signs had a sensitivity of 24 and specificity of 20%, while those with the positive predictive value of 45% and 54% were found in the districts of Mirzapur and Sylhet. These findings suggest that maternal recognition of newborn illness is poor in these regions (Choi et al., 2010).

Across cross-sectional survey conducted in India sought to assess the mother's knowledge of neonatal danger signs, as well as their attitude toward healthcare-seeking practices. The researchers surveyed mothers in three primary health centres in the Wardha district. They found that over 60% of them were aware of at least one danger sign (Dongre et al., 2009). The majority of the mothers (87.5%) stated that unwell newborns should be taken to the hospital immediately. However, only 41.9% of them get treatment for their condition. The study revealed a gap in mothers' knowledge regarding neonatal danger signs and their healthcare-seeking habits.

A study was carried out in Nigeria that looked into the knowledge of newborn danger signs and mothers' health-seeking practices. It revealed that out of the 376 mothers who participated in the

study, 95.2% stated that they heard at least one danger sign, while 78.7% said they heard three, and 30.3% indicated four. About 0.3% and 2.9% of mothers accurately identified up to six and seven danger signs, respectively. Out of the total respondents, over 270 mothers have already noticed at least one sign of a newborn's health condition in their present babies or older children. Some of the common signs that the mothers mentioned were weakness, fever, and refusal to breastfeed (Ekwochi et al., 2015).

A survey conducted in India on mothers' awareness regarding neonatal care revealed that about 56% of the mothers said that cold and fever are some of the most common danger signs in newborn babies. However, only 4% of the mothers mentioned convulsion and diarrhoea as the least common sign of neonatal danger. The survey also revealed that 24% of the respondents were not aware of the neonatal danger signs. Only 15% of the mothers were able to attain a score of more than 50% when it came to their knowledge of newborn care (R et al., 2014).

In northern India, Shally Awashi and her colleagues conducted a study to examine the perceptions of health workers and caregivers about the signs of a neonatal illness. They found that the majority of them could recognize signs of illness such as fever, diarrhoea, and weakness (Awasthi et al., 2006).

A cross-sectional survey conducted in Kenya reported that about 15.4% of mothers have adequate knowledge about neonatal danger signs, and they were able to recognize the signs of fever, poor feeding, and lethargy. Around 74.8% of postnatal mothers said that fever was a common danger sign, while 5.8% and 40.1% of mothers said that unconsciousness and poor feeding were newborn danger signs. On the other hand, 11.2% of mothers were aware of hypothermia and convulsion (Kibaru & Otara, 2016).

The study, which was conducted in Ethiopia, analyzed the mothers' healthcare-seeking behaviour and knowledge about the signs of neonatal danger. It revealed that 77.1% of them knew about one danger sign, and the most common one was diarrhoea. Other signs of neonatal danger that were commonly mentioned by mothers included fever, difficulty in breathing, and persistent vomiting The study also reported that the most common signs of newborn danger signs that mothers mentioned were convulsion, vomiting, and decreased body temperature. Based on the study's

findings, about 24.2% of the mothers were highly knowledgeable about the signs of neonatal danger, while 59.8% were moderately knowledgeable; however, 16% of mothers did not know anything about these signs (Asfaw, 2019).

The study, which was conducted in the town of Gonddar in Ethiopia, looked into mothers' recognition of neonatal danger signs and other associated factors. It revealed that 80% of the mothers were aware of at least one danger sign. It also revealed that they were aware of other factors that could affect the development and care of their babies. Some of the newborn danger signs commonly identified by mothers were vomiting, diarrhoea, and being unable to feed. Out of the total respondents 110, over 18 percent had good knowledge about these signs (Nigatu et al., 2015).

A study was conducted to analyze the factors that affect t the utilization of essential neonatal care services in Aksum Town, North Ethiopia. It revealed that out of the 423 mothers, about 185, or 43.7%, know the signs of neonatal danger well. Fever was listed as the most frequently mentioned sign, followed by poor suckling (Berhe et al., 2017).

2.2. Associated Factor Influencing Mother's Knowledge of Newborn Danger Signs

Educational status

Women who were educated had a higher level of understanding of newborn risk signs. Research conducted in Ethiopia revealed that out of the one hundred and ten mothers interviewed, 18.2% showed adequate awareness of newborn danger signs (Nigatu et al., 2015).

Similarly, mothers with secondary education and above college level were found to be more informed about neonatal danger signs than mothers with primary education levels (Nigatu et al., 2015).

A study conducted in Fitche town, Oromia region, established a link between women's educational status and understanding of newborn danger signs. The study reported that illiterate women were less aware of newborn danger signs than women who had completed grade ten (Eshetu, 2015).

Occupational status

According to a study conducted in Fitche town, Oromia region, women with household incomes ranging from one thousand four hundred one to two thousand three hundred fifty Ethiopian birr were less aware of neonatal danger signs than women with household incomes greater than two thousand three hundred fifty Ethiopia birr. Monthly household income was found to be related to women's understanding of newborn care (Eshetu, 2015). A cross-sectional research conducted in Axum town, North Ethiopia, found that employed women were three times more aware of newborn danger signs than housewives (Berhe et al., 2017).

Antenatal visits

According to a study conducted in Nakuru, Kenya, mothers who were accompanied to the antenatal clinic by their partners and who read the MCH booklet had a positive influence on maternal knowledge of neonatal danger signs, and this was significant with P values of 0.008 and 0.013, respectively (Kibaru & Otara, 2016). Similar research conducted in North West Ethiopia found that mothers who attended ANC during their previous pregnancy were twice as aware of newborn danger signals compared to mothers who did not attend any Antenatal clinic (Nigatu et al., 2015). According to the findings of a search done in Oromia, women who did not have ANC visits were more educated about newborn danger signs than women who did (Eshetu, 2015).

2.3 Source of information

According to the research conducted in India at maternity hospitals in Madurai, discovered that the source of information had a strong relationship with mothers' understanding of newborn care. The same study found that low knowledge was associated with women who obtained their information from sources other than medical professionals (Volume et al., 2014).

Another research done in Kenya found that obtaining information from healthcare care personnel on newborn danger signals and parity had a favourable effect on mother understanding of neonatal danger signs (Kibaru & Otara, 2016).

According to a survey done in North West Ethiopia, health practitioners were the most often cited source of information (36.7%). Similarly, women who had access to television enhanced their understanding of newborn danger indicators by 3.5 times (Nigatu et al., 2015).

CHAPTER THREE: METHODOLOGY

3.1 Study design

This was a hospital-based mixed-methods study combining both qualitative and quantitative methods. The quantitative aspect was a cross-sectional study. The qualitative aspect was through focused group discussions (FGDs).

3.2 Study Site and Setting

The study was conducted in Pumwani Maternity Referral Hospital (PMRH) postnatal wards. PMRH is a county referral hospital that serves expectant mothers residing in and around Nairobi, as well as receiving referrals from peripheral health facilities across Nairobi County. PMRH is regarded as the biggest maternity hospital in sub-Saharan Africa with an average of 1500 deliveries per month. The facility is equipped with 278 beds, 88 baby cots, and 2 theatres. The facility is located in a low-cost setting with the majority of patients being from a low socioeconomic status.

PMRH offers a wide range of services to expectant mothers and their babies. Some of these include prenatal care, postnatal care, newborn care, comprehensive care, and the prevention of mother-to-child transmission (PMTCT). The facility is managed by the Nairobi City County government, and operated by a team of health personnel. Some of them include obstetricians/gynaecologists, paediatricians, medical officers, clinical officers, nurses, pharmacists, pharmaceutical technologists, physiotherapists, and occupational therapists.

3.3 Study population

The study participants were all mothers with live neonates, in PMRH's postnatal wards during the study period. The participants who took part in the FGDs were recruited from those who participated in the quantitative arm of the study.

3.4 Study period

This study took approximately one month. This was arrived at after examining the flow of the study population in the hospital and determined that one month was enough for the data collection.

3.5 Inclusion Criteria

All mothers with live neonates who were admitted to the PMRH post-natal ward during the period of data collection.

3.6 Exclusion Criteria

1. Mothers who lost their babies.
2. Mothers with babies admitted to the newborn unit because they were already sick
3. Mothers who declined to give informed consent to participate in the study.

3.7 Sample Size Determination

The sample size was determined based on the formula,

$N = (Z \alpha/2)^2 \times P (1-P)/d2$

Where: N = Minimum required for sample size

Z = critical value for normal distribution, at 95% confidence level, which equals 1.96

Z value at $\alpha = 0.05$)

P = the prevalence of characteristics that are expected to be studied in the target population is calculated by taking into account the previous studies. 16 % prevalence will be used based on previous studies. (Kibaru & Otara, 2016)

q – 1-p = 0.84

 d = Level of statistical significance.

Therefore, the sample size was

$$N= \frac{(1.96)2 \ (0.16 \ (0.84)}{(0.05)^2} \quad = 207$$

3.8 Sampling procedure

3.8.1 Sampling procedure for the quantitative study

The study used a convenient sampling method to identify mother-baby pairs, the eligibility criteria determined which mothers were included in the study and participated in the questionnaire interviews until an adequate sample size was obtained.

3.8.2 Sampling procedure for the qualitative study

This aspect of the study involved focused group discussions hence the need to select mothers who were knowledgeable and could take part in the discussion. Based on the preceding statement, purposive sampling was used to recruit for the focused group discussions. The purposive sampling was done based on the responses given under the quantitative aspect.

3.9 Recruitment and consenting procedures

3.9.1 Recruitment and consenting procedures for quantitative data

Once the KNH/UoN research review committee had approved the study and permission to collect data granted by the administration of Pumwani Maternity Hospital, the data collection process was initiated. The principal investigator identified mother and baby pairs in the wards assisted by the research assistant. The research assistant was a clinical officer working in Pumwani Maternity Hospital and was duly trained in the study procedures e.g., consenting process and data collection.

The mothers were approached for consent. The study objectives were explained to them and once they understood, they were requested to give written consent. Those who refused to give consent were not recruited into the study.

3.9.1 Recruitment and consenting procedures for qualitative data

For the qualitative data collection, mothers were identified based on the ease with which they answered the quantitative questions. Those who qualified for the qualitative were requested to participate in the FGDs in the afternoon. Only those who agreed to participate in the FGDs were

recruited for participation in the afternoon. We also ensured that the mothers selected for the focused group discussion were those who were not discharged on that day because of the likelihood of declining participation even after recruitment. The participants in the focused group discussions signed a separate consent form.

3.10 Study variables

Independent variables

Sociodemographic: Age, parity, marital status, level of education, economic activity, household monthly income.

Obstetric factors: Antenatal clinic (ANC) visits, Number of ANC visits, gestational age at the first visit, having a mother-child booklet, educated on neonatal danger signs.

Dependent variables

Knowledge of neonatal danger signs, health-seeking practices.

3.10.1 Data Collection

Data collection was carried out for the quantitative arm in the morning and the qualitative arm in the afternoon. The participants for the qualitative arm were selected from those who participated in the quantitative arm.

3.10.2 Data collection; quantitative data.

Once the mothers had consented, interviewer-guided semi-structured questionnaires were used to collect data. The principal investigator assisted by the research assistant carried out the data collection. Quantitative data was collected on the morning of day two of delivery between 9.30 AM to 11 AM after mothers had had breakfast and breastfed their babies. The questionnaires were used to collect various information about the respondents, such as their socio-demographic factors, mothers' health-seeking behaviours, mothers' knowledge, and obstetric information. The questionnaires were written in English and translated into Kiswahili (See Appendix IV). The choice of timing was informed by the fact that mothers with healthy babies who have delivered normally are discharged on the second day and it was therefore necessary to recruit them before discharge.

3.10.3 Data collection for qualitative data

The mothers identified during the collection of quantitative data through purposive sampling participated in the FGDs in the afternoon of day two of delivery from 2.30 PM to 3.30 PM. Each FGD took about one hour. Six FGDs were conducted with each group comprising eight members. The principal investigator introduced himself as well as the assistant, and the participants were allowed to introduce themselves. The discussion commenced after the introductions. An interviewer-guided tool was used in the FGDs (Appendix VI). The principal investigator moderated the discussion accompanied by one assistant who was taking notes and audio recordings. The seating arrangement was circular so that all participants could see each other. During the FGD, all participants were treated equally and encouraged to express their views openly.

3.11 Data processing and analysis

3.11.1 Data entry and storage

Quantitative data obtained from questionnaires was coded and entered into an excel sheet. The correctness of the entry was ensured by counterchecking each tenth observation in the excel sheet with the corresponding questionnaire. The data was then stored in a password-protected computer.

3.11.2. Data analysis for quantitative

The soft copy data was imported into R version 4.1.2 for analysis. The data was cleaned by removing any duplicate entries or other errors. Continuous variables, e.g., mothers' age were summarized using medians and interquartile ranges. Categorical data e.g., level of education was summarized using frequencies and proportions and presented in tables.

Measuring knowledge

Knowledge was measured using a set of 9 danger signs. Each danger sign identified was awarded one mark. The identified danger signs were then added and divided by 9 then multiplied by 100 to get a percentage. Scores of <60% were considered insufficient knowledge and ≥60 % were considered sufficient knowledge. The cut-offs were assigned based on Bloom's Cutoff Points (Wang et al., 2022).

The level of knowledge of neonatal danger signs among the mothers was presented as a percentage proportion with 95% confidence interval. The association between independent variables e.g., age and mothers' level of education, and the outcome e.g., level of knowledge of neonatal danger signs (sufficient/insufficient) was assessed using binary logistic regression. A multivariable model was fitted to control for potential confounders. Variables for the multivariable model were selected using Akaike's Information Criteria (AIC).

The tests were interpreted at 5% significance level using p values, odds ratios, and confidence intervals for odds ratios. P values less than 0.05 were considered significant, for odds ratios; one means no effect, less than one improves knowledge, and above one reduces the knowledge level. Confidence intervals for odds ratios that include one means the factor is not significant.

3.11.3 Data analysis for qualitative

The audio recordings were transcribed verbatim and written in word as text. Manual thematic analysis was used to generate themes and subthemes after reading the transcripts over and over to synthesize the statements. The main themes were identified followed by the generation of subthemes. The themes and subthemes were then presented in narrative form together with the reports from the mothers in quotation marks.

3.12 Ethical consideration

This study was approved by the Kenyatta National Hospital-University of Nairobi Ethics and Research Committee (KNH-UON ERC) approval number P423/04/2023. Permission to collect data was obtained from Pumwani Hospital Management, through the Research and Training Committee, at Pumwani Maternity Hospital. Permission was also sought from the National Commission for Science, technology and Innovation (NACOSTI) to conduct the study in Pumwani.

Before administering the questionnaires, written informed consent was obtained from the mothers, the purpose of the study was clarified, and confidentiality was maintained with the data collected being accessible to the research team alone. The usage of serial numbers rather than participants'

names preserved their anonymity. Participants were informed of their right to decline participation in the study.

Study results dissemination

Study results were presented to a panel of examiners in the Department of Medical Microbiology and Immunology at the University of Nairobi. The same results will be published in the University of Nairobi repository for public access. A copy of the results will be disseminated to Nairobi City County to inform policy. Pumwani Maternity Hospital will also be given a copy of the results.

CHAPTER FOUR: RESULTS

Phase 1: Knowledge and Health Seeking Practices on Neonatal Danger Signs and Associated Factors among the Post Natal Mothers at Pumwani Maternity Referral Hospital in Nairobi; Quantitative Aspect

Sociodemographic characteristics of the mothers

The median age of the mothers was 26 years with an interquartile range of 23 to 30 years. The majority 41.7% (n = 96) of the mothers were 24 years and below followed by those aged between 25 to 29 years at 29.1% (n = 67). Those aged 30 to 34 years were 15.7% (n = 36) while the rest were aged 35 years and above. Most of the mothers 57.0% (n = 131) had a secondary level education followed by those with primary education and below 23.4% (n = 54). The rest had a college education.

Table 1: Sociodemographic characteristics of the mothers (N = 230)

Indicator	Levels	Frequency/Median
Age in years	Median age (IQR)	26 (22-30)
Age categories	≤24	96 (41.7%)
	25-29	67 (29.1%)
	30-34	36 (15.7%)
	≥35	31 (13.5%)
Level of education	Primary and below	54 (23.4%)
	Secondary	131 (57.0%)
	College	45 (19.6%)
Marital status	Not married	70 (30.4%)
	Married	160 (69.6%)
Employment status	Not employed	143 (62.1%)
	Self-employed	74 (32.2%)
	Formal employment	13 (5.7%)
Family income in Kenya shillings	<10,000	72 (31.3%)
	10,000-20,000	126 (54.8%)
	>20,000	32 (13.9%)
Parity	One	88 (38.3%)
	Two to four	130 (56.5%)
	More than four	12 (5.2%)

IQR-interquartile range

Antenatal clinic history

The majority 99.1% (n = 228) of the mothers who participated in this study had attended antenatal clinics (ANC). Of those who attended antenatal clinics, the majority 83.9% (193) attended the clinics in public hospitals and the rest attended private hospitals.

In terms of ANC attendance, 38.3% (n = 88) of the mothers attended more than four visits, 30.4% (n = 70) attended less than four and four visits equally. The rest had not attended ANC clinics.

Table 2: Antenatal clinic visit history

Characteristic	Description	Frequency (%)
Attended antenatal clinic	Yes	228 (99.1%)
Place attended antenatal clinic	Public hospital	193 (84.6%)
Number of antenatal clinic visits	Less than four	70 (30.4%)
	Four	70 (30.4%)
	More than four	88 (38.3%)
	Did not attend ANC	2 (0.9%)
Gestation at the start of ANC visits in weeks	<16	106 (46.0%)
	16 - 24 weeks	105 (45.7%)
	>24	17 (7.4%)
	Did not attend ANC	2 (0.9%)
Was given the ANC booklet	Yes	222 (96.5%)
	No	8 (3.5%)

ANC-Antenatal clinic

The results also show that the majority 46.0% (n = 106) of the mothers started attending ANC clinics below 16 weeks gestation followed by 45.7% (n = 105) who started between 16 to 24 weeks gestation. The remaining started attending ANC beyond 24 weeks gestation. Of the 230 mothers, the majority 96.5% (n = 222) were given antenatal clinic booklets (Table 2).

Source of information on neonatal danger signs

When asked where they learnt of neonatal danger signs, the majority 93.1% (n = 214) said they learnt from healthcare workers, 3.9% (n = 9) said they got information from the media. The rest of the information is shown in figure 1 below.
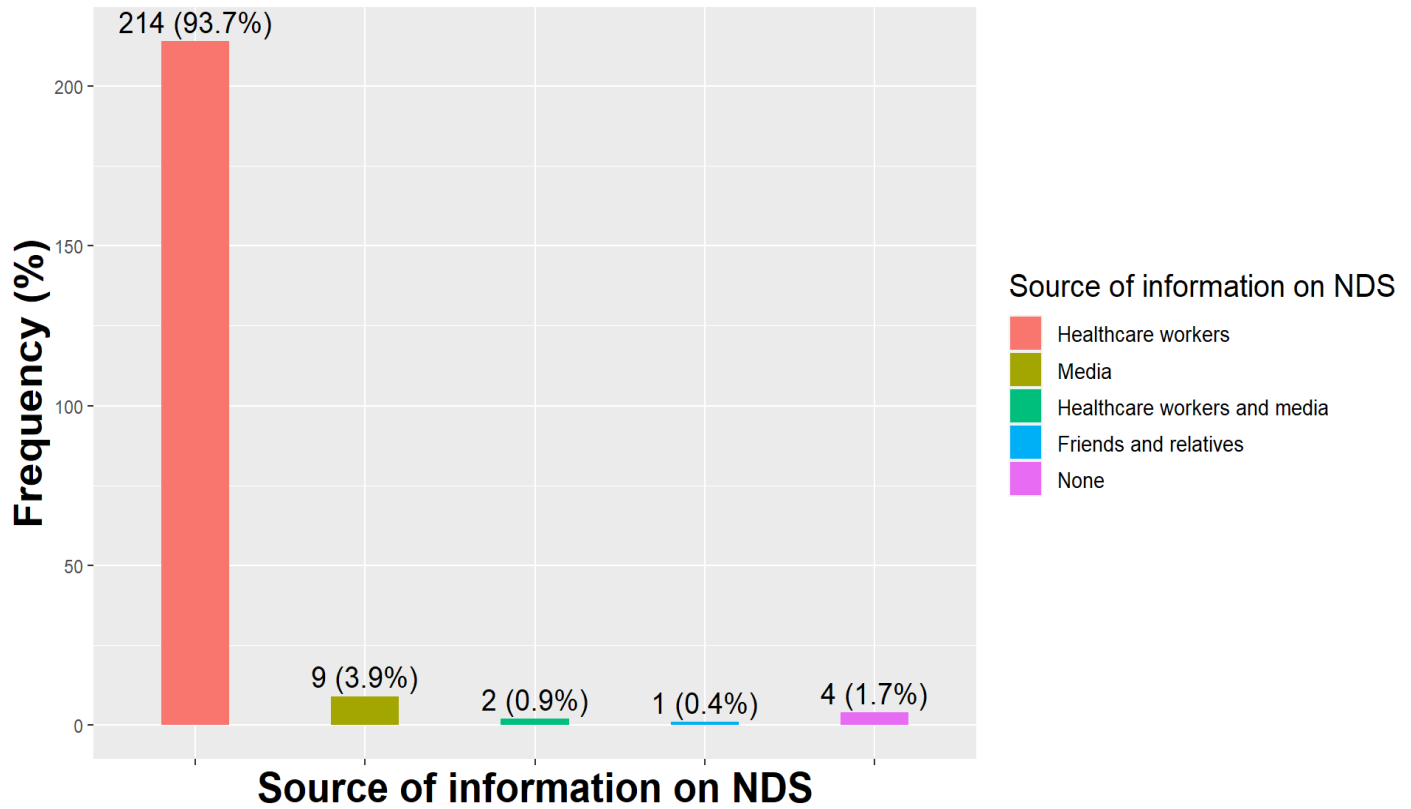
Figure 1: Source of information on neonatal danger signs; NDS -Neonatal Danger Signs

Mothers who were given information on neonatal danger signs

Of the 230 mothers, 147 (63.9%) received information on neonatal danger signs after delivery. Those who received information on neonatal danger signs during antenatal clinic visits were 149 (64.8%) Figure 2.
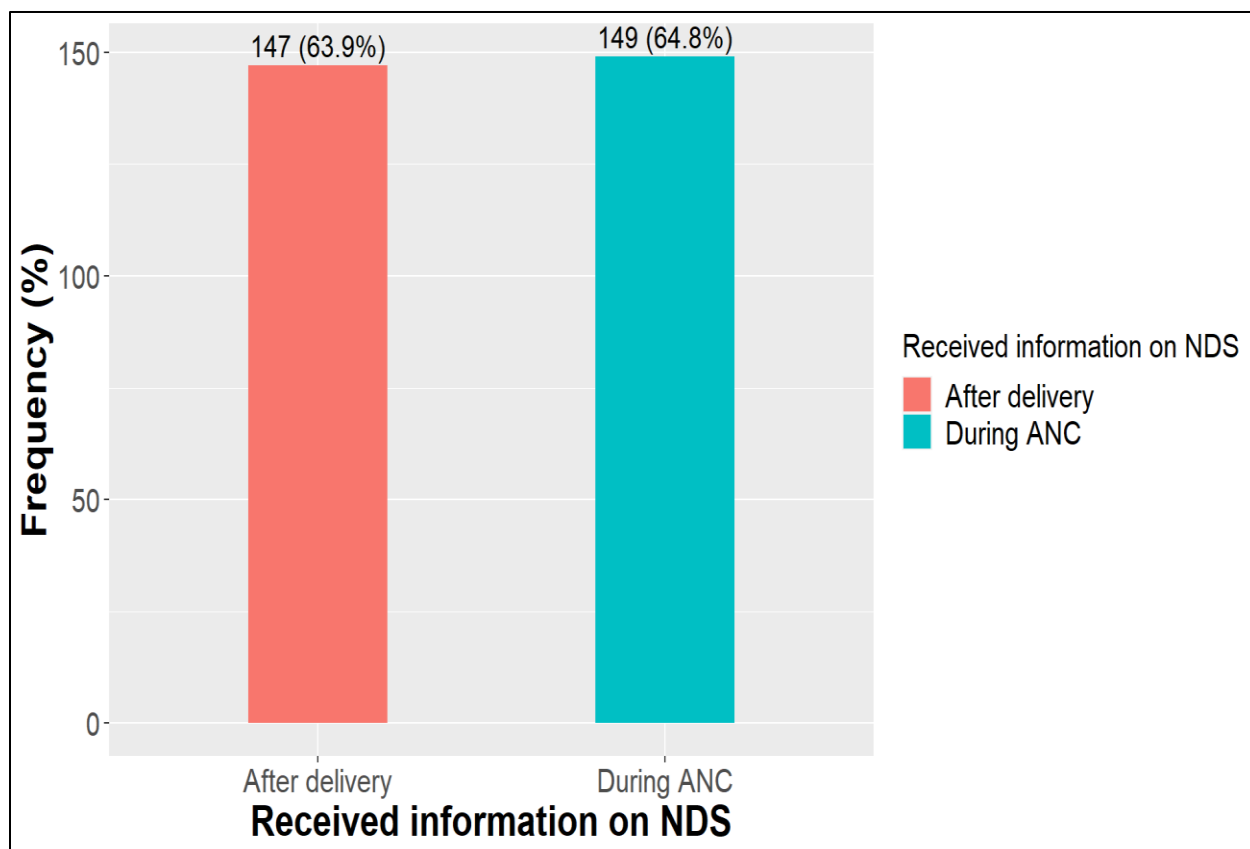
Figure 2: Mothers who were informed about neonatal danger signs; ANC – Antenatal Clinic, NDS – Neonatal Danger Signs

Neonatal danger signs

Regarding neonatal danger signs, mothers were given a list of neonatal danger signs and told to indicate whether it was true or false. Table 4 below shows the frequencies and proportions of mothers who were able to identify neonatal danger signs.

Of the 230 mothers, those who correctly identified neonatal danger signs were; 76.5% (n = 176) for hotness of the body, 30.4% (n = 70) identified convulsions, 71.3% (n = 164) identified yellowness of the body and eyes, 73.0% (168) were able to correctly identify refusal to breastfeed. The others were; 64.8% (n = 149) for difficulty in breathing, 31.7% (n = 73) for hypothermia, 46.5% (n = 107) for umbilical discharge, 37.4% (n = 86) for redness or discharge from the eyes and 61.3% (n = 141) diarrhoea and vomiting (Table 3).

Table 3: Mothers' ability to identify neonatal danger signs (N = 230)

Danger sign	Frequency (N = 230)
Hotness of body	176 (76.5%)
Convulsions	70 (30.4%)
The yellowness of the body and eyes	164 (71.3%)
Refusal to breastfeed	168 (73.0%)
Difficulty in breathing	149 (64.8%)
Hypothermia	73 (31.7%)
Umbilical cord discharge	107 (46.5%)
Redness or discharge from the eyes	86 (37.4%)
Diarrhoea and vomiting	141 (61.3%)

Table 4 below shows the neonatal danger signs identified by the postnatal mothers in the focused group discussion. Of the 9 danger signs provided under the quantitative aspect of the study, the mothers were able to identify all of them except; hypothermia, umbilical cord discharge and redness or discharge from the eyes. These danger signs are outlined below with quotations from the discussion.

Table 4: Mother's knowledge of neonatal danger signs; qualitative aspect

Objective	Neonatal danger signs
Maternal knowledge of neonatal danger signs among postnatal mothers	Convulsions
	Difficulty breathing
	Diarrhea
	Yellowing of body and eyes
	The hotness of the body and irritability
	Poor feeding
	vomiting

Convulsion as a danger sign

Most mothers reported that convulsion is a sign that the neonate is sick. Some mothers were also able to link convulsions and hotness of the body.

"*Convulsion is a sign of neonatal illness. Say if a child gets malaria, it will develop fevers that if not controlled lead to convulsions*". [FGD1M3]

"Convulsions is also another danger sign in babies" [FDG6M3]

Others said that convulsions will occur especially when the baby is not given paracetamol. According to the mother, failure to reduce the fevers will lead to convulsions.

"My experience was convulsions because the child had not been given paracetamol. The fever went up and the child started convulsing. Convulsions occur when the child is not feeling well and develops fevers". [FGD1M1]

Difficulty in breathing and other chest problems

Difficulty in breathing was also identified by several mothers. One of the mothers said that she had observed one of her other children develop chest problems. She said that the chest started making noise and it was followed by difficulty in breathing.

"I know about difficulty in breathing. The chest started making noise and then the child started breathing with a lot of difficulty". [FGD1M2]

"Chest problems in babies e.g., not breathing well". [FGD3M3]

Diarrhea

Some mothers identified diarrhea in neonates as a danger sign. Two mothers also linked diarrhea with a lack of hygiene. This she said will lead to gastrointestinal infections resulting in diarrhea.

"I know diarrhea. Due to lack of hygiene, the child may get stomach infections leading to diarrhea". [FGD1M4]

"Diarrhea especially when you don't breastfeed a child when you are clean". [FGD2M4]

"Diarrhea is an indication that the child is not feeling well". [FGD3M2]

Yellowing of body and eyes (Jaundice)

Some mothers also reported the yellowing of eyes and body as a neonatal danger sign. One mother was able to identify the yellowing as jaundice.

"When a child has jaundice, it is an indication that it is not feeling well". [FGD3M4]

"A child turning yellowish in the eyes is also a danger sign". [FGD1M5]

"A *child's eyes or skin may turn yellow and not breastfeeding well. This will mean that the child is sick*". [FGD4M2]

Hotness of the body and irritability

Neonates with infections tend to have high body temperature. Hotness of the body or hyperthermia was also identified by some postnatal mothers as a danger sign. Hotness of the body was also said to occur with irritability by some of the mothers.

"*Hotness of the body and irritability. These may show that the child is not feeling well*". [FGD1M6]

"*Hotness of the body and diarrhea is an indication that the child is not feeling well*". [FGD3M2]

"*When the body turns yellow and the child has fevers is an indication of sickness in neonates*". [FGD4M3]

Poor breastfeeding

Poor breastfeeding or feeding in general is an indication of sickness in neonates. Some mothers identified poor breastfeeding as a neonatal danger sign. One mother said that babies are supposed to breastfeed normally but become poor when a child is not well.

"*Poor breastfeeding in a baby is a sign that the child is not feeling well. Well babies are supposed to breastfeed normally and if this does not happen then the child may be sick*". [FGD1M7]

"*Another danger sign is when a child is not breastfeeding well*". [FDG5M3]

"*When a child is not breastfeeding well and has fevers*". [FDG6M1]

Vomiting

Vomiting is an indication that a child is sick. Most sicknesses in babies present with vomiting even when the problem does not originate from the gastrointestinal system. Vomiting was also identified in the discussion as a danger sign in neonates.

"A sick child may start vomiting and the temperature goes up". [FGD2M2]

Mothers' knowledge of neonatal danger signs

Based on the mothers' ability to identify the neonatal danger signs in Table 4 above, the overall scores were computed as outlined in the data analysis section. The results are presented in Figure 3 below.
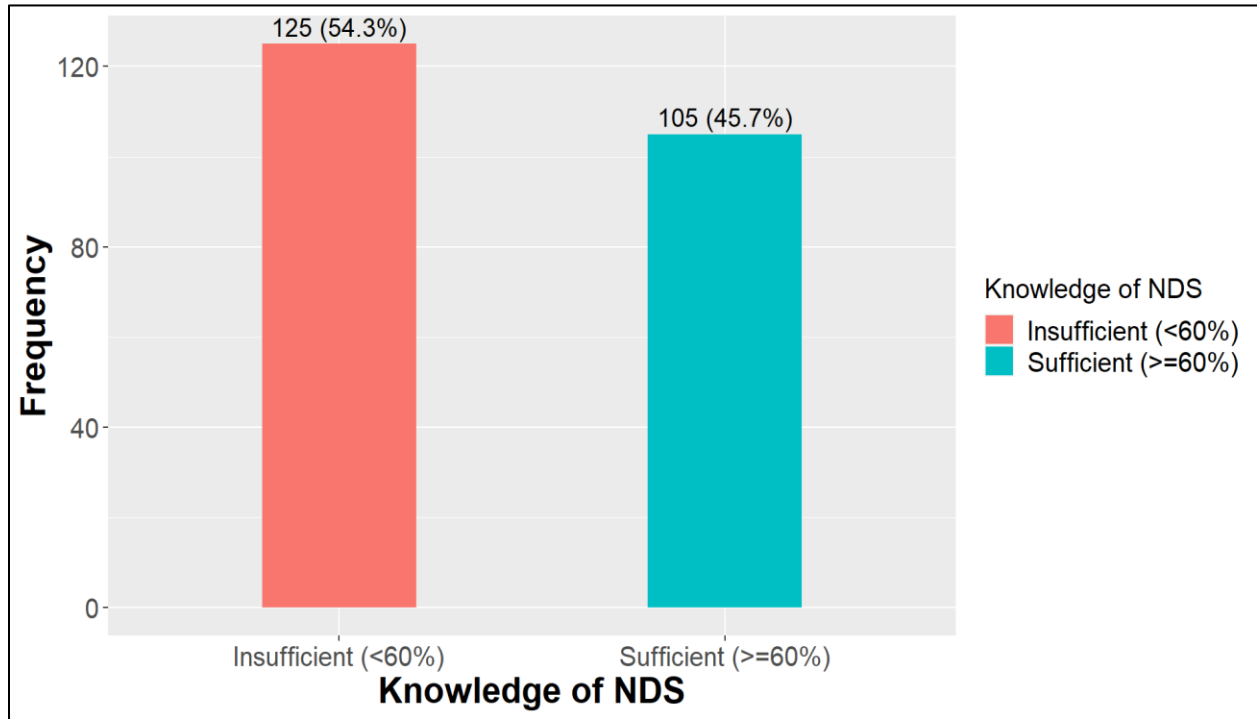
Figure 3: Mothers' knowledge of neonatal danger signs; NDS – Neonatal danger signs

Of the 230 mothers, 45.7% (n = 105) had sufficient. As a result, the prevalence of mothers with good knowledge was 45.7% (95% CI 39.0%, 52.3%). The rest had insufficient knowledge (Figure 3).

Bivariate analysis

Factors associated with maternal knowledge of neonatal danger signs

Not receiving information on neonatal danger signs after delivery was significantly associated with insufficient knowledge of neonatal danger signs (P<0.05) at 5% significance level.

In terms of odds ratios, mothers who had not received information on neonatal danger signs after delivery had significantly higher odds of insufficient knowledge compared to those who were informed about neonatal danger signs after delivery OR 3.94 (95% CI 2.18, 7.12).

One year increase in age of the mother decreased the odds of insufficient knowledge of neonatal danger signs among the mothers by 2%, OR 0.98 (95% CI 0.94,1.02). The odds of insufficient knowledge given that a woman was married were 40% higher than those of married women, OR 1.40 (95% CI 0.79,2.45).

Table 5: Factors associated with maternal knowledge of neonatal danger signs (N = 230)

Factor	Description	Reference category	Knowledge of NDS		COR (95% CI)	P-value
			Insufficient N = 125	Sufficient N = 105		
Age	Age in years		NA		0.98 (0.94,1.02)	0.36
Parity	Two to four	One	70	60	0.93 (0.54,1.58)	0.89
	More than four		6	6	0.80 (0.24, 2.63)	0.72
Marital status	Married	Not married	91	69	1.40 (0.79,2.45)	0.24
Mother's level of education	Secondary	College	73	58	1.10 (0.56, 2.17)	1.00
	Primary and below		28	26	0.94 (0.43, 2.08)	0.86
Attended ANC	No	Yes	2	0	NA	0.50
Facility attended ANC	Private	Public	23	12	1.78 (0.84, 3.78)	0.13
Number of ANC visits	Less than four	Four and above	40	30	1.20 (0.68, 2.12)	0.52
Was issued with an ANC booklet	No	Yes	5	1	4.41 (0.51, 38.33)	0.22
Source of information on neonatal danger signs	Others	Health professionals	11	4	2.48 (0.77, 8.03)	0.12
Informed about NDS after delivery	No	Yes	62	21	3.94 (2.18,7.12)	<0.001

COR - *Crude Odds Ratio*, **CI** – *Confidence interval*

Women who had more than four children were 20% less likely to have insufficient knowledge compared to those who had one child, OR 0.80 (95% CI 0.24, 2.63) while those who had two to four children were 7% less likely to have insufficient knowledge of neonatal danger signs compared to those with one child, OR 0.93 (95% CI 0.54,1.58).

Mothers who attended antenatal clinics in private facilities were 78% more likely to have insufficient knowledge of neonatal danger signs compared to those who attended public facilities, OR 1.78 (95% CI 0.84, 3.78).

The mothers who attended less than four antenatal clinic visits had 20% more odds of insufficient knowledge of neonatal danger signs compared to those who made four or more antenatal clinic visits, OR 1.20 (95% CI 0.68, 2.12).

Mothers who were not issued with an ANC booklet were 4.41 times more likely to have insufficient knowledge of neonatal danger signs 4.41 (95% CI 0.51, 38.33).

The odds of insufficient knowledge for mothers who got information from other sources other than health workers 2.48 times those of mothers who got information from health workers, OR 2.48 (95% CI 0.77, 8.03) Table 5.

Multivariable analysis

Five variables were selected for the multivariable analysis using Akaike's Information Criteria (AIC) i.e., Number of ANC visits, facility where the mother attended the antenatal clinic, whether the mother was issued with an antenatal booklet, source of information on neonatal danger signs and information about NDS after delivery. Of the five factors, being informed about neonatal danger signs after delivery was significantly associated with knowledge of neonatal danger signs (P<0.001).

Holding all the other factors constant, the odds of having insufficient knowledge given a mother was informed about neonatal danger signs after delivery were 3.83 times the odds of those who were not informed, AOR 3.83 (95% CI 2.11, 7.17).

Holding all the other factors constant, the odds of having insufficient knowledge given a mother attended less than four ANC visits were 12% more than those who attended four or more ANC clinics, AOR 1.12 (95% CI 0.63, 2.01).

Holding all the other factors constant, mothers who attended ANC clinics in private hospitals were 86% more likely to have insufficient knowledge compared to those who attended ANC clinics in public hospitals, AOR 1.86 (95% CI 0.88, 4.08).

Holding all the other factors constant, mothers who were not issued with ANC booklets were 3.49 times more likely to have insufficient knowledge compared to those who were issued with ANC booklets, AOR 3.49 (95% CI 0.52, 68.77).

Holding all the other factors constant, mothers who got information on neonatal danger signs from other sources other health care workers were 2.31 times more likely to have insufficient knowledge compared to those who got information from health care workers, AOR 2.31 (95% CI 0.74, 8.74) Table 6.

Table 6: Factors associated with maternal knowledge of neonatal danger signs (N = 230)

Factor	Description	Reference category	Knowledge of NDS		AOR (95% CI)	p-value
			Insufficient N = 125	Sufficient N = 105		
Number of ANC visits	Less than four	Four and above	40	30	1.12 (0.63, 2.01)	0.70
Facility attended ANC	Private	Public	23	12	1.86 (0.88, 4.08)	0.11
Was issued with an ANC booklet	No	Yes	5	1	3.49 (0.52, 68.77)	0.26
Source of information on neonatal danger signs	Others	Health professionals	11	4	2.31 (0.74, 8.72)	0.17
Informed about NDS after delivery	No	Yes	62	21	3.83 (2.11,7.17)	<0.001

AOR – *Adjusted Odds Ratios*

Health-seeking practices regarding neonatal illness

When mothers were asked what they would do if they had a sick child in the house, the majority 91.7% (n = 211) said they would take the child to hospital. Those who said they would buy drugs from the chemist were 7.4% (n = 17). The rest said they would consult the herbalist (Figure 4).
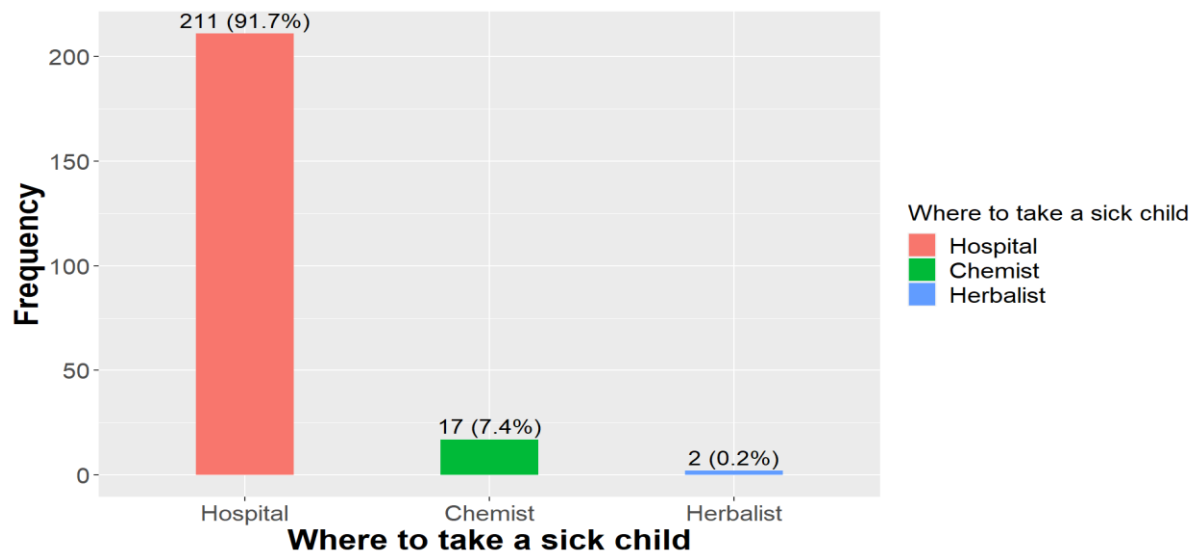
Figure 4: Health-seeking practices regarding neonatal illness

The health seeking practices depicted in figure 4 above were supported by the focused group discussion except buying medicine from the chemist. This information is shown in table 7 below followed by a description of the subthemes and a narration from the mothers.

Health-seeking practices among postnatal mothers

The focused group discussion also sought to understand the health-seeking behaviours among postnatal mothers. Mothers were asked about the actions they took when their babies were not feeling well. This elicited two themes namely: the use of herbal medicine and conventional medicine.

Table 7: Health-seeking practices among postnatal mothers

Objective	Theme	Subthemes
Health-seeking practices regarding neonatal illness	Use of alternative medicine	Herbal medicine
		Homeopathy
	Conventional medicine	Curative medicine
		Preventive medicine

Use of alternative medicine

The use of herbal medicine has been practiced since time immemorial, especially in African communities. People tend to use herbal medicine before they take the sick to the hospital. Herbal remedies also known as alternative medicine are used both in adults and children. Their use in children especially neonates is highly discouraged by health professionals. The two subthemes that emerged under alternative medicine were; herbal remedies and homeopathy

The use of herbal medicine

As mentioned above, the use of herbal medicine is highly discouraged in children and neonates. This is mainly because the active substances in the concoctions are not known and cannot be said to cure specific diseases. Mothers said that they use herbal remedies when their babies are not well.

"*The use of certain herbal medicine when the child has sores in the mouth. You are told that the child does not have to go to hospital and can be treated at home*". [FGD1M3]

"*If a child has a white tongue, you burn some roots then place the ash in the mouth of the child*". [FGD3M2]

Some mothers attributed the use of herbal medicine to pressure from the children's grandparents. They said that sometimes the grandparents don't want the children to be taken to hospital.

"*Sometimes the child's grandparent doesn't want the child to be taken to hospital. So, you will be told to use certain roots instead of going to the hospital*". [FGD2M4]

"*Herbal medicine can cure many diseases hence you are advised not to get the child vaccinated*". [FDG6M4]

Some said that children can also be washed with certain herbs. This is especially when a child has a rash or you want the child's skin to be smooth.

"*Washing the baby with herbs. This is believed to help the baby have good skin or treat baby rash*". [FGD3M3]

"*Use of herbs to wash the baby*". [FDG6M5]

Homeopathy

Some of the responses provided by the mothers were home remedies but were not herbal. These were classified under homeopathies. Quite several mothers provided responses that fell under homeopathies as quoted below.

"*When hospitals are far especially upcountry and you see a child having difficulty in breathing, you take cooking oil and salt, and smear on the chest and by the way it works*". [FGD1M4]

"*If a child is having difficulty in breathing, you take the leaves of onions and crush them. You will then use the crushed onions to smear on the body of the child and it will start breathing normally*". [FGD1M5]

"*When a child is having hiccups, you take a piece of paper and make it a little bit wet the place it on the forehead of the child. That is believed to stop the hiccups*". [FGD1M3]

"*If the child has eye discharge, you boil water with tea leaves and use it to wash the baby's face, the discharge will clear*". [FGD1M2]

Use of conventional medicine

The use of conventional medicine is now practiced across the world. This is the only recommended medicine ministry of health across the world and the World Health Organization. The two subthemes that emerged under the use of conventional medicine were; curative and preventive medicine.

Curative medicine

Curative medicine is crucial in the treatment of many childhood diseases. Some mothers reported that they take their children to hospital when they are sick as shown in the quotes below.

"*When the body gets hot, it means the child is sick and may need medication so I take them to the hospital*". [FDG5M1]

"*In case you notice that a child is sick, you are supposed to rush the child to hospital*". [FDG6M3]

Preventive medicine

Preventive medicine is highly advocated for in the current medical practice. This is believed to curb diseases early enough to reduce dependency on medications. Preventive medicines also help reduce the strain on healthcare resources, especially in low-resource settings. Some mothers reported that they practice preventive medicine when their children are well. One mother reported that the practice of preventive medicine reduces diarrheal diseases.

"*Maintain cleanliness to prevent diarrheal diseases in children*". [FGD2M2]

Another mother reported that she follows the doctor's advice on how to feed the baby. This she said helps prevent diseases though she did not expound.

"*Following the doctors' advice on what the child is supposed to eat helps prevent diseases*". [FGD2M3]

Effect of Level of Education on Health-Seeking Practices

Table 7 below shows the effect of level of education on health-seeking practices. The majority of the participants across all levels of education will choose to go to the hospital if they have a sick child. Only those with primary education and below will choose to visit the herbalist. The results

also show that there is a significant association between the level of education and health-seeking practices (Fisher's exact test p-value<0.05).

Table 8: Effect of level of education on health-seeking practices

		Health seeking practices			
Level of education	**Total**	Hospital	Chemist	Herbalist	**p-value**
Primary and below	54	44 (81.5%)	8 (14.8%)	2 (3.7%)	0.003
Secondary	131	123 (93.9%)	8 (6.1%)	0	
College	45	44 (97.8%)	1 (2.2%)	0	

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

Mothers' knowledge of neonatal danger signs is critical for early detection of illness in babies. This plays a big role in averting complications and improving the health of the babies (Jemberia et al., 2018). The reason for this is that mothers who can identify probable signs and symptoms of sickness in babies are likely to take their children to the hospital for medical attention on time.

Mothers' Knowledge of Neonatal Danger Signs (NDS)

This study revealed that 47.7% (95% CI 39.0, 52.3%) of the postnatal mothers had sufficient knowledge of neonatal danger signs. A study by Yosef et al. with 351 responding mothers reported that 39% of mothers who were interviewed had good knowledge of neonatal danger signs. The finding by Yosef et al. is consistent with our findings (Yosef et al., 2020).

Zhou et al. conducted a study in South West China to determine knowledge of neonatal danger signs and their associated factors among mothers with a sample of 112 mothers. In their study, 48% of the mothers had good knowledge of neonatal danger signs. This finding is in line with the current study (Zhou et al., 2022). In the current study, danger signs such as the hotness of the body, jaundice, refusal to breastfeed, diarrhoea and vomiting, and difficulty in breathing were easily identified by the mothers. Difficulty in breathing was also easily identified in Zhou et al. study.

A study by Jembere et al. found only 11.7% of postnatal mothers had good knowledge of neonatal danger signs (Jemberia et al., 2018). There is a big difference between this finding and ours. This difference could be attributed to the educational difference of the mothers between the two studies. While only 23.4% of the mothers in our study had primary level education and below, Jemberia et al. study had 41.6% of mothers with primary education and below. Mothers' knowledge of neonatal danger signs has been reported to differ with level of education where mothers with higher levels of education identify neonatal danger signs better (Kibaru & Otara, 2016).

A study by Kebede et al. reported that 36.5% (95% CI 33%, 40%) knew of neonatal danger signs (A. A. Kebede et al., 2020). This finding is in agreement with our study. In Kebede's study, 53.9% of the mothers identified fever, 43.7% identified diarrhoea and 37% identified inability to breastfeed. The ability to identify these danger signs was slightly lower than that of the mothers in

our study probably due to differences in the study setting where Kebede's study was conducted in the community while ours was hospital-based.

A study conducted by Bekele et al. on knowledge of neonatal danger signs in the Oromia region of Ethiopia among postnatal mothers reported that 51.7% of the mothers had good knowledge (Bekele et al., 2020). This finding is in line with our results.

A study by Shinde and colleagues reported a 65.6% proportion of postnatal mothers with good knowledge. This finding is slightly higher than that reported in our study (Shinde et al., 2022). The reason for the higher scores in Shinde et al. study is due to a difference in scoring. While our study considered 60% to be sufficient knowledge, Shinde and colleagues considered mothers who answered 3 out of 10 questions to have good knowledge.

In support of the quantitative findings, mothers who took part in the focused group discussion were able to mention most of the danger signs that are used to identify sick neonates i.e., convulsions, difficulty in breathing, diarrhoea, jaundice, fever, poor feeding and vomiting. In Kebede et al. study, the most identified danger signs from the mothers' responses were hotness of body and difficulty in breathing (Z. T. Kebede et al., 2022) which fall under those cited by mothers in the current study.

Factors Associated with Mothers' Knowledge of Neonatal Danger Signs

None of the factors assessed in our study were significantly associated with mothers' knowledge of neonatal symptoms. On the other hand, Yosef and colleagues found the age of the mother, level of education and number of antenatal clinic visits to be significantly associated with mothers' knowledge of neonatal danger signs (Yosef et al., 2020). This difference could be mainly a result of the difference in sample size as higher sample sizes confer a higher power. Despite not being significant, our study established that mothers who attended less than four antenatal clinic visits had lower odds of sufficient knowledge of neonatal danger signs.

Zhou and colleagues found that mothers who attended less than four antenatal clinic visits had poor knowledge of neonatal danger signs (Zhou et al., 2022). Our study showed that attending less than four antenatal clinic visits increased the odds of insufficient knowledge of neonatal danger signs. The findings by Zhou et al. are in line with our study findings. There are campaigns world-wide especially in low to middle-income countries to have more pregnant women to attend

antenatal clinics to improve their health as well as that of their unborn babies (Ahmed & Manzoor, 2019).

Higher educational status increased the odds of knowledge of neonatal danger signs in Kebede et al. and Nigatu et al.'s' study (A. A. Kebede et al., 2020; Nigatu et al., 2015) which is consistent with our findings. Bekele et al. 2020 also reported a significant association between maternal level of education and knowledge of neonatal danger signs (Bekele et al., 2020). The lack of association in our study could attributed to a relatively smaller sample than the referenced studies. Mothers with higher levels of education are likely to have higher levels of exposure to information compared to their counterparts. In addition, people with advanced education understand the implications of good health and are therefore likely to visit hospitals where they get to learn more on health matters compared to those with low levels of education.

Our results also revealed that mothers who made less than four antenatal clinic visits had higher odds of insufficient knowledge of neonatal danger signs though it was not significant. The study by Nigatu et al. also reported that mothers who attended antenatal clinic visits had significant knowledge of neonatal danger signs (Nigatu et al., 2015). In addition, women with higher parity had lower odds of insufficient knowledge of neonatal danger signs. This finding has been corroborated by A. A. Kebede et al. (2020) who reported increasing knowledge of neonatal danger signs with parity. Women with many children have had enough exposure with various childhood illnesses hence good understanding of neonatal danger signs. These women have also attended clinics many times hence adequate exposure to information.

Our study revealed that not being issued with an antenatal clinic booklet increased the odds of insufficient knowledge of neonatal danger signs though the results were not significant. Kibaru and Otara 2016 reported a significant association between being issued with an ANC booklet and good knowledge of neonatal danger signs among 414 postnatal mothers. This study is in support of our findings. The ANC booklet contains information on neonatal danger signs. Therefore, mothers who have access to this booklet and who can read have better chances of knowing about NDS.

Information regarding neonatal danger signs is usually given by health workers. Other than health workers, mothers can also get this information from friends, relatives and the media among other sources. Our study revealed that mothers who received health information from sources other than

health workers had higher odds of insufficient knowledge. This finding is supported by (Welay et al., 2019) who reported a significant association between receiving health information on neonatal danger signs from health workers and good knowledge of neonatal danger signs. Health information provided by the health workers is likely to be detailed, accurate and scientific hence mothers who receive information from other sources may not get enough of what is required.

Our study revealed a significant association between being taught about neonatal danger signs after delivery and knowledge of neonatal danger signs. This finding is supported by Kibaru and Otora 2016 (Kibaru & Otara, 2016). Mothers who were taught about NDS after delivery had recency effect (easy to recall) of information and were therefore more knowledgeable compared to those who were taught during the antenatal clinic. This calls for health information to mothers to be extended beyond delivery for the purpose of reinforcing what has been learnt.

Health-seeking practices regarding neonatal illness

Our study revealed that 91.7% of the mothers took their children to the hospital in case of an illness. It also showed that a few mothers bought drugs from the chemist and others used herbal medicine. Contrary to our findings, a study conducted in Bangladesh among mothers who had had sick babies reported that only 36.5% of the mothers had sought help from qualified professionals (Azad et al., 2023). The disparity between this study can be attributed to a difference in study setting whereby our study was conducted in an urban area while the Bangladeshi study was conducted in a rural setting where hospitals may be far away from where people live. Another possible cause of disparity could be due to respondent bias where mothers in our study could have provided the right response given that they were in the hospital.

Simieneh et al. 2019 reported that 48.8% of the mothers studied sought care in health facilities (Simieneh et al., 2019). This proportion is low compared to the findings of this study. The relatively lower proportion of mothers who had sought care in health facilities could be attributed to the community-based study setting. Having awareness of childhood illnesses, perceived benefits of treatment and the child's age have been reported to influence care-seeking practices (Simieneh et al., 2019). Modern medicine was practised through seeking care in hospitals and prevention e.g., hand hygiene.

Mothers who reported using alternative medicine said they used herbal medicines e.g., crushed herbs and boiled roots while others used homeopathies e.g., cooking oil and onions. The use of traditional, complementary medicine is widely practised in Africa (James et al., 2018). The results of the focused group discussion show that mothers still practice traditional medicine in combination with modern medicine. This was also shown in the quantitative analysis. Few studies in Kenya have dealt with the issue of traditional medicine and the exact plants that are used hence comparison is not supported.

5.2 Study strengths and limitations

Study strengths

- The additional use of the qualitative method strengthened the results by supporting the quantitative findings.
- The study questionnaire was interviewer-administered and this helped prevent the respondents from an answering routine and also offered clarification where the respondents did not understand. This enhanced the consistency of the collected data.
- More data was collected than the projected sample and this served to increase the power of the study.

Study limitations

- This was a single-centre study hence cannot be generalized to populations outside the study area.
- The convenience sampling used in the quantitative methods also impedes the generalization of the results.
- Mothers may have suffered recall bias when asked about neonatal danger signs because of time lapse especially those who were not taught about neonatal danger signs after delivery.
- Crucial information may have been missed from mothers who declined consent.
- This is a cross-sectional study and cannot be used to determine causality.

5.3 Conclusion

1. The majority of the mothers in this study had insufficient knowledge of neonatal danger signs. The neonatal danger signs identified by the mothers in the focused group discussion were; convulsions, difficulty in breathing, diarrhea, jaundice, fever, poor feeding and vomiting.
2. The point at which health information was given was significantly associated with mothers' knowledge of neonatal danger signs.
3. Mothers in this study practised both modern (going to hospitals) and alternative medicine (use of herbs and other home remedies).

5.4 Recommendations

1. There is a need for more public education on neonatal danger signs to improve the current knowledge level of neonatal danger signs among the mothers
2. Encourage more mothers to attend antenatal clinics, and offer education on neonatal dangers signs before and after delivery.
3. Discourage the use of herbal medicine that is not scientifically proven or buying medicines from chemists without the advice of a health professional.
4. Conduct a multi-site study of the same nature to determine the experiences of mothers in other centers and allow external validity.

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APPENDIX I: PATIENT CONSENT INFORMATION AND CONSENT STATEMENT

Study Title: Knowledge and Health Seeking Practices on Neonatal Danger Signs and Associated Factors among the Post Natal Mothers at Pumwani Maternity Referral Hospital in Nairobi.

Principal Investigator \ and institutional affiliation: Somane Hassan: Post-graduate student in the Department of Medical Microbiology.

Co-Investigators and institutional affiliation: D.r Winnie Mutai, Lecturer, Department of Medical Microbiology, University of Nairobi, DR Muthoni Ogolla, Paediatrician, Department of Paediatrics and Child Health, University of Nairobi

Introduction: I would like to tell you about a study being conducted by the above-listed researchers. The purpose of this consent form is to give you the information you will need to help you decide whether or not to participate 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 if you want to be in the study or not. This process is called 'informed consent'. Once you understand and agree to your participation 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 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 his/her withdrawal iii) Refusal to participate in the research will not affect the services your child is entitled to in this health facility or other facilities.

May I continue? YES / NO

Background

Neonatal premature deaths are due to avoidable causes. Across the globe, babies are
taken care of by their mothers, as such, having the necessary knowledge about the sign and
symptoms of newborn illness is extremely important in reducing mortality and morbidity.
Neonatal danger signs (NDS) are a set of clinical markers that can help identify a newborn's risk of mortality and morbidity and the need for prompt medical intervention. The lack of knowledge about the importance of NDS has been regarded as a public health concern and a contributing factor to the persistently high neonatal death rate. Despite the availability of various interventions

and guidelines such as the integrated management of newborn and childhood illness, (IMNCI) and improved access to facility-based deliveries, studies have revealed a gap in mothers' knowledge of NDS, which is very critical in reducing neonatal morbidity and mortality.

Purpose

The purpose of this study is to determine mothers' awareness of new-born danger signs and analyse associated factors that influence health-seeking practices among postpartum Mothers in the Pumwani maternity referral hospital (PMRH).

Study procedures

The research personnel will explain the study to you and once you have understood, I will allow you to sign the informed consent. We will ask you questions that you will be required to respond to based on the study questionnaire. The questionnaire interviews will be researcher administered and will take place in the morning between 9.30 AM to 11 AM. This will include demographic data e.g., your age in years, parity, marital status, and education level. They will also ask you about your antenatal clinic visits and also other questions on neonatal danger signs.

Depending on your responses to the questionnaire questions, you may be selected to participate in a focused group discussion in the afternoon between 2.30 PM to 3.30 PM which is a second arm of this study. This will depend on your availability. The data to be collected will include an understanding of neonatal danger signs and health-seeking practices. Once data collection is complete, we will proceed to data entry, storage, and analysis.

Voluntary participation

Your decision to participate in this study is voluntary. Once you understand and agree to participate, the research personnel will request you to sign your name on this form.

Confidentiality

The data collected will be used solely for this study. 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.

Benefits

There will be no financial benefit for participation. Your participation will not affect or delay the planned treatment of your child. Also, the information you provide will help us better understand the knowledge of mothers on neonatal danger signs and health-seeking behaviour. This will contribute to strengthening communication and teaching mothers about danger signs from pregnancy to delivery.

Risk of Participation

There are no direct risks in this study. We greatly regret any inconvenience caused to you by participating in this study. You will be allowed to attend to your baby at any time if need be.

Right of withdrawal

You may withdraw from the study at any time without necessarily giving any reason for the withdrawal. The refusal or withdrawal from this study will not affect the services your child is entitled to, in this health facility or other facilities.

Consent Form (Statement of Consent) for the quantitative arm

Participant's statement

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counselor. I have had my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I may choose to withdraw at any time. I freely agree to participate in this research study.

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

Participant printed name: _____

Participant signature / Thumb stamp _____ Date _____

Researcher's statement

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

Printed Name: _____ Date: _____ Signature:

In case you have any questions concerning the study, feel free to contact the following persons during official working hours

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APPENDIX II: PATIENT CONSENT INFORMATION AND CONSENT STATEMENT (KISWAHILI TRANSLATION)

Kichwa cha Utafiti: Maarifa na Afya Kuhusu Ishara za Hatari kwa Watoto wachanga na Mambo Husianishwa miongoni mwa Akina Mama wa Waliojifungua katika Hospitali ya Rufaa ya Uzazi ya Pumwani jijini Nairobi.

Mpelelezi Mkuu/ na uhusiano wa kitaasisi: Somane Hassan: Mwanafunzi wa uzamili katika Idara ya Biolojia ya Tiba, Chuo Kikuu cha Nairobi

Wachunguzi-wenza na uhusiano wa kitaasisi: Dk. Winnie Mutai, Mhadhiri, Idara ya Microbiology ya Matibabu, Chuo Kikuu cha Nairobi, DR Muthoni Ogolla, Daktari wa watoto, Idara ya Watoto na Afya ya Mtoto, Chuo Kikuu cha Nairobi.

Utangulizi: Ningependa kukuelezea kuhusu utafiti unaofanywa na watafiti walioorodheshwa hapo juu. Madhumuni ya fomu hii ya idhini ni kukupa taarifa utakayohitaji ili kukusaidia kuamua kama utashiriki au kutoshiriki katika utafiti. Jisikie huru kuuliza maswali yoyote kuhusu madhumuni ya utafiti, nini kitatokea ikiwa utashiriki katika utafiti, hatari na manufaa yanayoweza kutokea, haki zako kama mtu wa kujitolea, na kitu kingine chochote kuhusu utafiti au fomu hii ambacho hakiko wazi. Wakati tumejibu maswali yako yote kwa kuridhika kwako, unaweza kuamua kama ungependa kuwa katika utafiti au la. Utaratibu huu unaitwa 'ridhaa iliyoarifiwa'. Ukishaelewa na kukubali ushiriki wako katika utafiti, nitakuomba utie sahihi jina lako kwenye fomu hii. Unapaswa kuelewa kanuni za jumla zinazotumika kwa washiriki wote katika utafiti wa matibabu: i) Uamuzi wako wa kushiriki ni wa hiari kabisa ii) Unaweza kujiondoa kwenye utafiti wakati wowote bila ya lazima kutoa sababu ya kujiondoa kwake iii) Kukataa kushiriki katika utafiti hautaathiri huduma ambazo mtoto wako anastahili kupata katika kituo hiki cha afya au vituo vingine.

Naweza kuendelea? **NDIO** au **LA**

Usuli

Vifo vya watoto wachanga kabla ya wakati husababishwa na sababu zinazoweza kuepukika. Kote ulimwenguni, watoto wachanga hutunzwa na mama zao, kama vile, kuwa na ujuzi muhimu kuhusu ishara na dalili za ugonjwa wa watoto wachanga ni muhimu sana katika kupunguza vifo na maradhi.

Dalili za hatari kwa watoto wachanga ni seti ya viashirio vya kimatibabu vinavyoweza kusaidia kutambua hatari ya vifo na maradhi ya mtoto mchanga na hitaji la uingiliaji wa matibabu wa haraka. Ukosefu wa maarifa juu ya umuhimu wa hatari umezingatiwa kama suala la afya ya umma na sababu inayochangia kwa kiwango cha juu cha vifo vya watoto wachanga. Licha ya kuwepo kwa afua mbalimbali na miongozo kama vile usimamizi jumuishi wa magonjwa ya watoto wanaozaliwa na kuboreshwa kwa upatikanaji wa uzazi kwa njia ya kituo, tafiti zimefichua pengo katika ufahamu wa kina mama kuhusu hatari hizo, ambayo ni muhimu sana katika kupunguza maradhi na vifo katika watoto wachanga.

Kusudi

Madhumuni ya utafiti huu ni kubainisha ufahamu wa akina mama kuhusu dalili za hatari zinazozaliwa na kuchanganua mambo yanayohusiana yanayoathiri mbinu za kutafuta afya miongoni mwa akina mama waliojifungua katika hospitali ya rufaa ya uzazi ya Pumwani, (PMRH).

Taratibu za masomo

Wafanyikazi wa utafiti watakuelezea utafiti na mara tu utakapoelewa, nitakuruhusu kutia sahihi kibali cha taarifa. Tutakuuliza maswali ambayo utahitajika kujibu kulingana na dodoso la utafiti. Hii itajumuisha data ya demografia kama umri wako kwa miaka, usawa, hali ya ndoa na kiwango cha elimu. Pia watakuuliza kuhusu ziara zako za kliniki katika ujauzito na pia maswali mengine kuhusu dalili za hatari kwa watoto wachanga.

Kutegemea majibu yako kwa maswali ya dodoso, unaweza kuchaguliwa kushiriki katika majadiliano ya kikundi cha mchana ambayo ni sehemu ya pili ya utafiti huu. Hii pia itategemea upatikanaji wako. Baada ya kukusanya data kukamilika, tutaendelea na uwekaji, uhifadhi na uchanganuzi wa data

Kushiriki kwa hiari

Uamuzi wako wa kushiriki katika utafiti huu ni wa hiari. Ukishaelewa na kukubali kushiriki, mfanyikazi wa utafiti atakuomba utie sahihi jina lako kwenye fomu hii.

Usiri

Data iliyokusanywa itatumika kwa madhumuni ya utafiti huu pekee. Tutaweka kila kitu unachotuambia kama siri iwezekanavyo. Tutatumia nambari ya msimbo kukutambua katika hifadhidata ya kompyuta iliyolindwa na nenosiri na tutaweka rekodi zetu zote za karatasi kwenye kabati ya faili iliyofungwa.

Faida

Hakutakuwa na faida ya kifedha kwa ushiriki. Kushiriki kwako hakutaathiri au kuchelewesha matibabu yaliyopangwa ya mtoto wako. Pia, maelezo utakayotoa yatatusaidia kuelewa vyema ujuzi wa akina mama kuhusu dalili za hatari kwa watoto wachanga na tabia ya kutafuta afya. Hii itachangia katika kuimarisha mawasiliano na ufundishaji wa akina mama kuhusu dalili za hatari kuanzia ujauzito hadi kujifungua.

Hatari ya Kushiriki

Hakuna hatari za moja kwa moja katika utafiti huu. Tunajutia sana usumbufu wowote uliosababishwa kwako kwa kushiriki katika utafiti huu. Utaruhusiwa kumhudumia mtoto wako wakati wowote ikihitajika.

Haki ya kujiondoa

Unaweza kujiondoa kwenye utafiti wakati wowote bila kutoa sababu yoyote ya kujiondoa. Kukataa au kujiondoa kwenye utafiti huu hakutaathiri huduma ambazo mtoto wako anastahili kupata, katika kituo hiki cha afya au vituo vingine.

Fomu ya Ridhaa (Taarifa ya Ridhaa)

Kauli ya mshiriki

Nimesoma fomu hii ya idhini au nimesomewa maelezo. Nimepata nafasi ya kujadili
utafiti huu na mshauri wa utafiti. Nimejibiwa maswali yangu kwa lugha ambayo mimi
huelewa. Hatari na faida zimeelezewa kwangu. Ninaelewa kuwa ushiriki wangu katika utafiti huu ni wa hiari na kwamba ninaweza kuchagua kujiondoa wakati wowote. Ninakubali kwa uhuru kushiriki katika utafiti huu.

Ninaelewa kuwa juhudi zote zitafanywa ili kuweka maelezo kuhusu utambulisho wangu wa kibinafsi siri.

Kwa kutia saini fomu hii ya idhini, sijaacha haki zozote za kisheria nilizo nazo kama mshiriki katika utafiti wa utafiti.

Jina la mshiriki lililochapishwa:_____

Sahihi ya mshiriki / mhuri ya kidole gumba _____

Tarehe _____

Kauli ya mtafiti

Mimi, aliyetia sahihi hapa chini, nimeeleza kikamilifu maelezo muhimu ya utafiti huu kwa mshiriki aliyetajwa hapo juu na ninaamini kuwa mshiriki ameelewa na ametoa ridhaa yake akijua.

Jina Lililochapishwa: _____ Tarehe: _____
Sahihi:

Iwapo una maswali yoyote kuhusu utafiti, jisikie huru kuwasiliana na watu wafuatao wakati wa saa rasmi za kazi:

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Barua pepe: muthomiogola@gmail.com

APPENDIX III: QUESTIONNAIRE

Knowledge and Health Seeking Practice on Neonatal Danger Signs and Associated Factors among the Post Natal Mothers at Pumwani Maternity Hospital in Nairobi City County.

Serial No-----------   Date----------------

1. Social Demographic Characteristics of Mother

1. Age in years -----------
2. Parity: a) Para 1 ☐   b) Para 2-4 ☐   c) Multiparous ☐

3. Marital status: a) Single ☐   b) Married ☐   c) Separated ☐

4. Education level: a) No formal education ☐   b) Primary level (KCPE ☐
    c) Secondary level (KCSE ☐   d) College/University level ☐

5. Economic activity: a) None ☐   b) Formal employment ☐   c) Self-employment ☐

6. Average monthly income:

2. Maternal health service and obstetric factors:

Have you attended ANC.? A) Yes ☐   b) No ☐

1. If yes, A place where ANC was attended

     a) Public Health facility ☐   b) Private ☐

2. Number of visits: a) 1 ☐   b) 2 ☐   c) 3 ☐   d) 4 ☐   f) >4 ☐

3. Gestation age at first ANC visit a) ≤3 months ☐ b) 4-6 months ☐   c)>7 months ☐

4. Do you have your mother-child booklet?

    a) Yes ☐   b) No ☐   c) other ☐

5. Were you given any information regarding NDSs?

    a) During your antenatal visits? a) yes ☐   b) No ☐

        If yes, what were you told?

        b) After delivering your baby? a) Y☐   b) No ☐

    If yes, what were you told?

3. Maternal knowledge of neonatal danger signs

Which signs of neonatal illness do you know? (Tick all mentioned)

    a) Hotness of body ☐
    b) Convulsion ☐
    c) Yellowness of the eyes and body ☐
    d) Refusal to breastfeed ☐
    e) Difficulty in breathing ☐
    f) Hypothermia ☐
    g) Umbilical cord discharge ☐
    h) Redness or discharge from eyes ☐
    i) Diarrhea and vomiting ☐
    j) Other ☐

4. Care-seeking practice for neonatal danger signs

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If you found any of the above signs, what would you do next...?

  a. Take the child to the hospital
  b. Buy medicine from the chemist
  c. Use herbal medicine

5. Source of information about neonatal danger signs

A) Health professio[____]   B) Television and Ra[____]   C) Social M[____]

Kiambatisho III: HOJAJI

Hojaji kuhusu Mazoezi ya Kutafuta Maarifa na Afya Kuhusu Ishara za Hatari kwa Watoto wachanga na Mambo Yanayohusiana Miongoni mwa Akina Mama wa Post Natal katika Hospitali ya Wazazi ya Pumwani katika Kaunti ya Jiji la Nairobi.

Hojaji

Nambari ya mfululizo----------- Tarehe-----------------

A. Demografia za Kijamii za Mama

1. Umri -----------

2. Usawa: a) Aya ya 1 b) Aya ya 2-4 c) yenye wingi

3. Hali ya ndoa: a) Mseja b) Kuolewa c) Kutengana

4. Kiwango cha elimu: a) Hakuna elimu rasmi b) Kiwango cha msingi (KCPE)

c) Ngazi ya sekondari (KCSE) d) Ngazi ya Chuo/Chuo kikuu

5. Shughuli za kiuchumi: a) Hakuna b) Ajira rasmi c) Kujiajiri

6. Wastani wa mapato ya kila mwezi:

B. **Huduma ya afya ya uzazi na mambo ya uzazi:**

   Umehudhuria ANC? A) Ndiyo b) Hapana

1. Kama ndiyo, Mahali ambapo ANC ilihudhuriwa

a) Kituo cha Afya ya Umma b) Dhamira c) Binafsi

2. Idadi ya matembezi: a) 1 b) 2 c) 3 d) 4 f) >4

3. Umri wa ujauzito katika ziara ya kwanza ya ANC a) ≤miezi 3 b) Miezi 4-6 c)>miezi 7

4. Je, una kijitabu cha mama na mtoto wako?

a) Ndiyo b) Hapana c) nyingine

5. Je, ulipewa taarifa zozote kuhusu NDS?

a) Wakati wa ziara zako za ujauzito? a) ndio b) Hapana

Kama ndiyo, uliambiwa nini?

b) Baada ya kujifungua mtoto wako? a) Ndiyo b) Hapana

Kama ndiyo, uliambiwa nini?

C. Maarifa ya mama kuhusu dalili za hatari kwa mtoto mchanga

Ni dalili gani za ugonjwa wa neonatal unazojua? (Weka alama zote zilizotajwa)

a) joto la mwili

b) Degedege

c) Unjano wa macho na mwili

d) Kukataa kunyonyesha

e) Ugumu wa kupumua

f) Hypothermia

g) Kutokwa na kitovu

h) Wekundu au kutokwa na maji machoni

i) Kuhara na kutapika

j) Nyingine

4. Mazoezi ya kutafuta huduma kwa dalili za hatari kwa watoto wachanga

Ikiwa utapata ishara yoyote hapo juu, utafanya nini baadaye...?

    a. Utapeleka mtoto hospitalini

    b. Utanunua dawa kwa chemist

    c. Utampa dawa ya kienyeji

5. Chanzo cha habari kuhusu dalili za hatari kwa watoto wachanga

A) Taaluma ya afya. B) Televisheni na Redio. C) Mitandao ya kijamii

APPENDIX IV: FOCUSED GROUP DISCUSSION CONSENT FORM

My name is Somane Hassan a postgraduate student in Tropical and Infectious Diseases.

I am requesting you to participate in a focused group discussion. The purpose of this study is to find out mothers' knowledge regarding neonatal danger signs and perceptions and practices that impact neonatal illness. The information learned in the focus group is for academic purposes. It will also be availed to PMRH to improve maternal and neonatal care.

Participation is not mandatory, and you are allowed to stop at any time.

Although the focus group will be tape-recorded, your responses will remain anonymous and no names will be mentioned in the report.

There is no right or wrong answer to the focus group questions. We want to hear many different viewpoints and would like to hear from everyone. We hope you can be honest even when your response may not be in agreement with the rest of the group. In respect of each other, we ask that only one individual speaks at a time in the group and that responses made by all participants be kept confidential.

Consent Form (Statement of Consent) for focused group discussion

Participant's statement

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counselor. I have had my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I may choose to withdraw at any time. I freely agree to participate in this research study.

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

Participant printed name: _____

Participant signature / Thumb stamp _____ Date _____

Researcher's statement

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

Printed Name: _____ Date:_____ Sign

APPENDIX V: FOCUS GROUP DISCUSSION CONSENT FORM (KISWAHILI)

Mimi daktari Somane Hassan Abdi ni mwanafunzi wa shahada ya juu, chuo kikuu cha Nairobi.

Umeombwa kuhusika katika uafiti unaochunguza ujuzi wa kina mama kuhusu dalili za magonjwa ya watoto walio chini ya mwezi moja. utafiti huu utafanyika kwa njia ya majadiliano.

Umuhimu wa utafiti huu ni kujua kama akina mama wanelewa dalili za wagonjwa ya watoto walio chini ya umri wa mwezi moja.

Unaweza kuhusika ou kutohusika bila adhari zozote. Majadialiano yetu yatanakiliwa katika kanda ou kifaa. Jina lako halitatumika, hivyo basi hutajulikanana wazi wazi.

Majibu yote ni sawa. Tungependa kusikia maoni tofauti tofauti na kwa hivyo tunatumai kila mmoja atatoa maoni yake. Tutaongea mtu moja baada ya mwingine. Maoni yatakayotolewa hapa tusiyazungumze na wenzetu kula nje, yawe ni ya siri.

Nimeelewa maelezo haya na nimekubali kuhusika.

Fomu ya Ridhaa (Taarifa ya Ridhaa)

Kauli ya mshiriki

Nimesoma fomu hii ya idhini au nimesomewa maelezo. Nimepata nafasi ya kujadili

utafiti huu na mshauri wa utafiti. Nimejibiwa maswali yangu kwa lugha ambayo mimi

huelewa. Hatari na faida zimeelezewa kwangu. Ninaelewa kuwa ushiriki wangu katika utafiti huu ni wa hiari na kwamba ninaweza kuchagua kujiondoa wakati wowote. Ninakubali kwa uhuru kushiriki katika utafiti huu.

Ninaelewa kuwa juhudi zote zitafanywa ili kuweka maelezo kuhusu utambulisho wangu wa kibinafsi siri.

Kwa kutia saini fomu hii ya idhini, sijaacha haki zozote za kisheria nilizo nazo kama mshiriki katika utafiti wa utafiti.

Jina la mshiriki lililochapishwa:_____

Sahihi ya mshiriki / mhuri ya kidole gumba _____

Tarehe _____

Kauli ya mtafiti

 Mimi, aliyetia sahihi hapa chini, nimeeleza kikamilifu maelezo muhimu ya utafiti huu kwa mshiriki aliyetajwa hapo juu na ninaamini kuwa mshiriki ameelewa na ametoa ridhaa yake akijua.

Jina Lililochapishwa: _____ Tarehe: _____

Sahihi:

APPENDIX VI: FOCUS GROUP DISCUSSION NORMS

The group will be asked to suggest ground rules. After brainstorming, the following will be included in the list.

- ➢ We want you to do the talking. Everyone should participate; I may call on you if I have not heard from you in a while.
- ➢ Information provided in the focus group shall be kept confidential. We will tape recording the group. We want to capture everything you have to say. We do not identify anybody by name in our reports. You will remain anonymous.
- ➢ There are no right or wrong answers. Every person's experience and opinion are important, speak up whether you agree or disagree. We want to hear a wide range of opinions.
- ➢ Stay with the group and please do not have side conversations.
- ➢ Turn off cell phones if possible. If you must answer, leave quietly and take the shortest time possible.
- ➢ Helping is my assistant. Her name is Jacinta she will be taking notes and be here to assist me if I need any help.

- ➢ After these clarifications, the group will be asked any questions which will be addressed before starting the discussion.
- ➢ Once the questions are answered, the tape recorder will be turned on, and the discussion will begin

Let us begin, let us find out some more about each other by going around the table one at a time.

Tell us your first name and where you live. I will start.

Let us get started.

- ➢ **We will now start our recording**

Today we are here to talk about neonatal danger signs. What comes to mind when you think about neonatal danger signs?

- ➢ How it comes about
- ➢ Why it happens

What are some of the health conditions in a mother during pregnancy that will result in a neonate with poor health outcomes?

What conditions would let you know that a newborn is sick?

Which conditions require emergency consultation?

Which beliefs and practices influence the newborn's health and how?

➢ Cultural beliefs
➢ Cultural practices

Mothers will be given enough time to think and answer the questions. Probes will be used to make sure that all issues are addressed. We will move on when we start to hear repetitive information.

Once all the questions are addressed, the discussion will be summarized.

That concludes our focus group discussion. Thank you so much for coming and sharing with us your views and opinions. We have a short evaluation form that we would like you to fill out if you have time. If you have additional information that you did not get to say in the focus group, please feel free to write it on this evaluation form.

APPENDIX VII: FOCUS GROUP DISCUSSION GUIDE

Title: Mother's Knowledge, health-seeking practice and associated factors regarding neonatal illness.

The purpose of the study is to conduct evaluative research to determine:

> ➢ Mother's knowledge of signs of neonatal illness
> ➢ Explore health-seeking practices associated with neonatal illness.

Before the discussion begins, the informed consent process will be conducted.

Introduction

> ➢ Welcome participants and introduce myself.
> ➢ Explain the general purpose of the discussion and why the participant was chosen.
> ➢ Discuss the purpose and process of the focus group.
> ➢ Explain the purpose and presence of phones for recording.
> ➢ Outline general ground rules and discussion guidelines.
> ➢ Address the issue of confidentiality.
> ➢ Inform the group that the information discussed is going to be analyzed as a whole and that participants' names will not be used in the discussion.

Welcome to this focus group discussion. My name is **Somane Hassan.** I am a postgraduate student in tropical and infectious diseases at the University of Nairobi. The purpose of the study is to find out mothers' knowledge regarding neonatal danger signs, health-seeking practices, and associated factors.

Neonatal danger signs are a major health problem in our country; I am requesting you participate because you are the primary caregivers of neonates. Your participation in this activity is purely voluntary. All your views will be kept confidential. Should there be any issues you do not want to discuss, let us know and we will go to the next one. You can discontinue your participation at any time. The information that we will gather from this discussion is for academic purposes. This information will also be availed to PMH to improve the delivery of maternal and neonatal care.

Explanation of the process

The moderator will explain the focus group discussion process*:*

In a focus group discussion,

> ➢ We learn from you.
> ➢ We are not trying to achieve consensus,
> ➢ We are gathering information.

The focus group discussion will last about one hour.

We will have snacks. You are free to help yourself.

APPENDIX VIII: ETHICAL REVIEW APPROVAL

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Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/282

10th July, 2023

Dr. Hassan Abdi Somane
Reg No.W64/31974/2019
Institute of Tropical and Infectious Diseases(UNITID)
Faculty of Health Sciences
University of Nairobi

APPROVED
10 JUL 2023

Dear Dr. Somane

ETHICAL APPROVAL-RESEARCH PROPOSAL: KNOWLEDGE AND HEALTH SEEKING PRACTICES ON NEONATAL DANGER SIGNS AND ASSOCIATED FACTORS AMONG THE POST NATAL MOTHERS AT PUMWANI MATERNITY REFERRAL HOSPITAL IN NAIROBI   (P423/04/2023)

This is to inform you that KNH-UoN ERC has reviewed and approved your above research proposal. Your application approval number is **P423/04/2023.** The approval period is 10th July 2023 –9th July 2024.

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by KNH-UoN ERC.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KNH-UoN ERC 72 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected 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.
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to KNH-UoN ERC.

Protect to discover

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

Yours sincerely,

DR. BEATRICE K.M. AMUGUNE
SECRETARY, KNH- UoN ERC

c.c.   The Dean, Faculty of Health Sciences, UoN
The Senior Director, CS, KNH
The Chairperson, KNH- UoN ERC
The Assistant Director, Health Information Dept., KNH
The Director, Institute of Tropical and Infectious Diseases (UNITID), UoN
Supervisors: Dr. Winnie Mutai, Dept. of Medical Microbiology, UoN
Dr. Muthoni Ogola, Dept. of Paediatrics and Child Health, UoN

Protect to discover

APPENDIX IX: NACOSTI APPROVAL

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 991391

Date of Issue: 26/July/2023

RESEARCH LICENSE

This is to Certify that Dr.. Somane Hassan Abdi of University of Nairobi, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: Knowledge and health-seeking practices on neonatal Danger Signs and Associated Factors among the postnatal mothers at Pumwani Maternity Hospital for the period ending : 26/July/2024.

License No: **NACOSTI/P/23/28107**

991391

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY &
INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document,
Scan the QR Code using QR scanner application.

See overleaf for conditions

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The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was the established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
    i. Endanger national security
    ii. Adversely affect the lives of Kenyans
    iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
    iv. Result in exploitation of intellectual property rights of communities in Kenya
    v. Adversely affect the environment
    vi. Adversely affect the rights of communities
    vii. Endanger public safety and national cohesion
    viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
8. The License does not give authority to transfer research materials.
9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

APPENDIX X: APPROVAL BY PUMWANI MATERNITY HOSPITAL

INTERNAL MEMO

TO   **: HEAD OF CLINICAL SERVICES– PM&RH**

REF   : PMH/MS/76/0370/2023

DATE   : 27TH JULY 2023

RE: APPROVAL TO CONDUCT RESEARCH BY DR. SOMANE HASSAN ABDI

This is to notify your department that the above named officer has been cleared to conduct research in Pumwani Maternity and Referral Hospital having submitted the research proposal and ethical approval from approved institution.

The title of the research is **"Knowledge and health seeking practices on neonatal danger signs and associated factors among post-natal mothers at Pumwani Maternity Referral Hospital in Nairobi."**.

Please accord him necessary assistance.

DR. JUSTINE MANANI
DEPUTY MEDICAL SUPERINTENDENT