KNOWLEDGE AND ATTITUDE OF POSTNATAL MOTHERS ON ESSENTIAL NEWBORN CARE PRACTICES AT MARSABIT COUNTY REFERRAL HOSPITAL

Dr. Guyatu Dida (MBCHB - KU)

H58/6668/2017

A dissertation submitted in partial fulfillment for the degree of Masters in Medicine (Pediatrics and Child Health),

University of Nairobi

2020

DECLARATION

This dissertation is my original work and has not been presented for the award of a degree in any other University or published elsewhere.

Dr Guyatu Dida
M.B.Ch.B. (Kenyatta University)

Signature…  Date…18/11/2020……..

Dr Lucy Mungai
Department of Paediatrics and Child Health
University of Nairobi

Signature…  Date…18/11/2020……..

Professor Dalton Wamalwa
Professor, Department of Paediatrics and Child Health
University of Nairobi

Signature……...… Date…….

ACKNOWLEDGEMENTS

I wish to thank all those who assisted me in my research work. Special thanks go to the following:

- My supervisors, Dr. Lucy Mungai, and Professor Dalton Wamalwa for their guidance, support and encouragement throughout the study period.
- My family for their encouragement and support.
- All the study participants who took part in this study.

ABSTRACT

INTRODUCTION: Annually 2. 6 million neonates lose their lives within first month of life globally. 1 million of them die within first 24 hours of life. 80% of the deaths that occur in neonatal period are secondary to preventable causes: prematurity, asphyxia, sepsis, jaundice and anemia. Low and middle income economies carry the heaviest burden and Sub-Saharan Africa has the highest rate accounting to 38% of global neonatal deaths. Kenya's neonatal mortality has been falling gradually from 39.3 deaths per 1000 live births in 1963 to 20.9 deaths per 1000 live births in 2017. To achieve international and national goals of ending preventable deaths of this population, further effort is needed. The WHO developed essential new-born care package (ENCP) which have proved to improve neonatal outcomes thereby reducing neonatal deaths. Identification of discrepancies in Knowledge and attitude early in the neonatal period has been linked to better neonatal Outcomes.

OBJECTIVES: To assess the postnatal mother's knowledge and attitude on ENCP at Marsabit County Referral Hospital and to determine socio demographic factors associated with Poor maternal knowledge on ENCP.

METHODOLOGY: A cross-sectional study was conducted on postnatal mothers of neonates at Marsabit County Referrall Hospital. The study subjects were interviewed using structured pretested questionnaires. A scoring system was used for closed ended questions. For open ended questions responses were summarized and descriptive statistics carried out. During analysis for factors associated with poor maternal knowledge on ENC the median score was used as a cut off to distinguish between adequate knowledge and inadequate knowledge. A five-point Likert scale was used to evaluate maternal attitude on various aspects of ENCP. Statistical analysis was performed using Stata version 15.1 (StataCorp, College Station, TX, USA).

RESULTS: One hundred and seventy two (172) postnatal mothers were enrolled. 149 (87%) of the postnatal mothers knew their babies required vaccination after delivery, 93 (54%) knew vaccines prevent diseases while, 7 (4.1%) believed vaccines could be harmful to their babies. Regarding eye care, 51 (30%), 69 (40%), 51 (30%) of mothers were aware of eye discharge, reddening of the eye and swollen eye respectively as signs of eye infection. 10 (56%) of the mothers agreed other substances other than prescribed drugs could be applied to baby's eye when there is discharge.

Regarding thermoregulation, 147 (85%) and 23 (13%) of the postnatal mothers interviewed recognized warm clothing and kangaroo mother care as modes of thermoregulation and 111 (65%) of the mothers knew the baby should not be washed within 24 hours of delivery and 39 (23%) thought the baby could be washed minutes after delivery.

143 (83%) of the mothers knew the cord should be left uncovered, 124 (72%) of the mothers knew the code should be kept clean and dry.

143 (83%) of the mothers knew about the exclusive breastfeeding for 1st 6 months, 171 (99%) of the mothers fed their babies on colostrum, 147 (85%) of the mothers knew the baby should be breastfed minutes after delivery. 165 (96%) of the mothers knew about breastfeeding on demand.

A total of 160 (93%) of the mothers were aware of any danger signs of the neonate's serious illness. The mothers were able to consistency identify all the listed signs as important in suggesting neonate's serious illness.

Multivariate analysis showed that secondary education was associated with lower risk of having poor knowledge compared to primary education or no education. Multiparity as compared to primiparity was also associated with reduced risk of poor knowledge on ENCP adjusted risk ratio of 0.58.

CONCLUSION: Knowledge gaps were noted in thermoregulation, eye care and immunization. The postnatal mothers had a negative attitude towards immunization but positive attitude towards other components of newborn care. Secondary education as compared to primary education and no formal education and multiparity as compared to primiparity was linked to reduced risk of poor knowledge on ENCP.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

AAP - American Academy of Paediatrics

ANC - Antenatal Care

BCG - Bacille Calmette Guerin

DPT - Diptheria Pertussis Tetanus

ENCP - Essential newborn care practices

EPI - Expanded Program on Immunization

HCWs - Health care workers

KDHS - Kenya Demographic and Health Survey

KMC - Kangaroo Mother Care

MCRH - Marsabit County Referral Hospital

MDG - Millennium Development Goals

NMR - Neonatal mortality rate

OPV - Oral Polio Vaccine

WHO - World Health Organisation

DEFINITIONS

Attitude: It refers to a person's opinion about something especially if it reflects on their behavior.

Essential Newborn Care: A set of simple interventions recommended by the World Health Organization on newborn care practices that include thermoregulation, clean delivery and cord care, breastfeeding, initiation of breathing and resuscitation, eye care, immunization and care of pre-term/low birth weight**.**

Knowledge: Refers to theoretical or and practical understanding of a subject.

Neonate: A newborn from first day of life to the 28^{th} day of life

Significant congenital anomalies: This refers to structural or functional birth defects in the major organ system in the newborn that prevent a mother from practicing the essential newborn care such as cleft lip palate, cerebral palsy.

1. BACKGROUND

1.1. INTRODUCTION

Neonatal period is a vulnerable period in a child's life. In 2017, 2.5 million newborns died, which is approximately 47% of all under-five's deaths. Majority of these fatalities (75%) occurred within first week of neonatal life. One million newborns died on the first day of life and approximately another one million died during the next six days(1). According to (UNICEF 2017) neonatal mortality rate (NMR) in Kenya was 20.9 deaths per 1,000 live births.

The NMR of Kenya has progressively dropped from 33 deaths per 1000 live births in 2003 to 22 deaths per 1000 live births in 2014(2); See **figure 1** (below) for details. However, the percentage of under-five mortality that occurs during neonatal period is increasing as under-five mortality is decreasing. See **figure 1**.

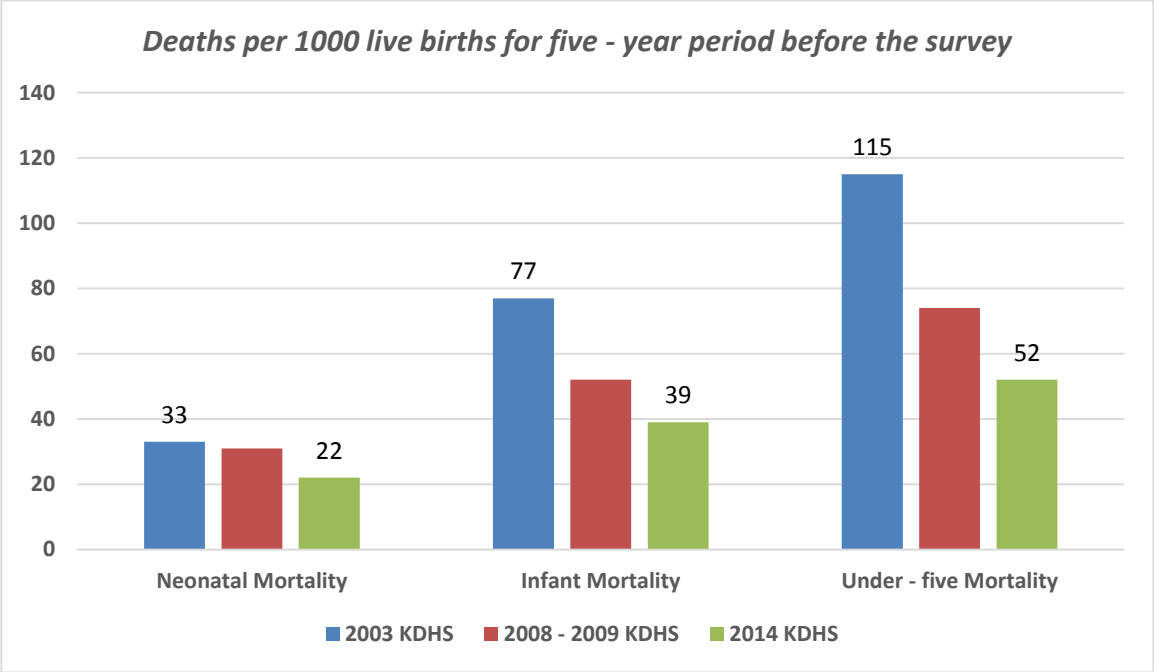

Figure 1 Deaths per 1000 live births for five - year period before the survey(3)**.**

Sustainable development goal number 3 (SDG3) targets to reduce NMR to twelve deaths per thousand live births by 2030 this exceed Kenya's current NMR. Globally two thirds of neonatal mortalities can be averted if effective health care measures are applied during child birth and during first seven days of life(4).

The causes of newborn deaths in Kenya according to (UNICEF 2015) are; birth asphyxia 31.6%, prematurity 24.6%, sepsis 15.8%, congenital anomalies 13.8%, acute respiratory infection 6.7%, injuries 1.1%, tetanus 0.9%, diarrheal disease 0.3%, pertussis 0.2% and HIV/AIDS 0.1%. (5). See **figure 2**.

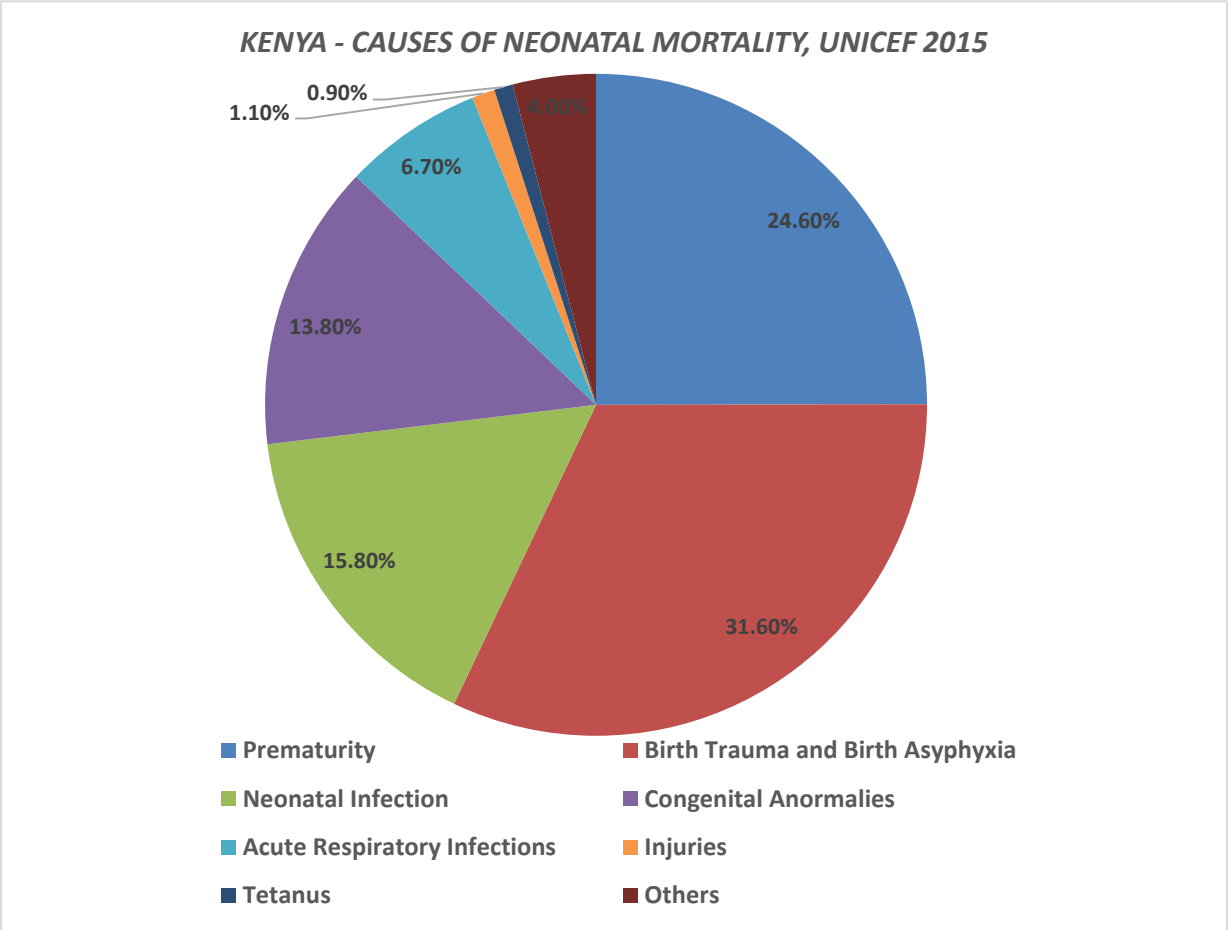

Figure 2 KENYA - Causes of neonatal mortality, UNICEF 2015.

1.2. LITERATURE REVIEW

Seventy five percent (75%) of newborn deaths occur within the first week of life, with close to 50% of all newborn deaths occurring within 24 hours of delivery(6). In 2016 majority of neonatal deaths were caused by prematurity, complications during delivery, infections and birth defects. It is therefore recommended that neonates get postnatal care immediately, within the first twenty four hours of delivery(5).

However, in Kenya not all deliveries occur in health facilities. According to KDHS 2014 report, only 61.2% of deliveries occurred in health facilities and only 51% of postnatal mothers who delivered at home seek postpartum care within 24 hours of delivery. Women who get MLCC provided by qualified midwives have better neonatal outcomes. They are 16% less likely to lose their baby and 24% less likely to suffer pre-term birth.(2).

According to MIYCN KAP report of December 2017 in Marsabit County only 48.9% of deliveries occurred at a health facility. Most of the births that occur at home were conducted by TBAs. North horr (82.1%) and Laisamis (74.5%) had the highest percentage of women delivering at home with support of TBAs. Saku sub county had (91.6%) of women delivering at health facilities assisted by skilled birth attendants.(7). See **figure 3**

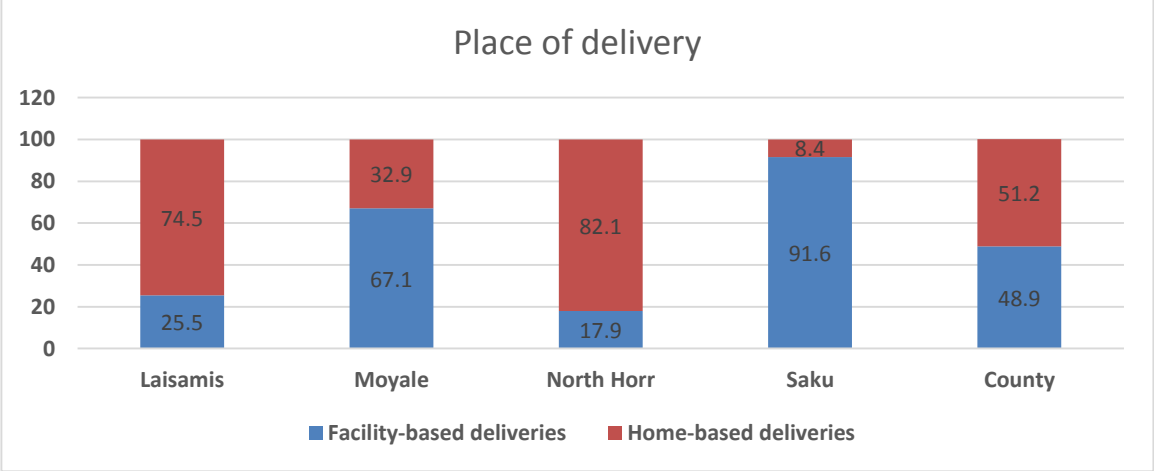

Figure 3 Place of delivery by Sub - county

World health organization(WHO) has introduced essential newborn care practices(ENCP) to help decrease newborn mortality and morbidity by interventions during prepartum, partum and postpartum period: thermoregulation, code care, eye care, exclusive breastfeeding, immunization, identification of danger signs and care of preterm/LBW neonates (8).

1.2.1. THERMOREGULATION

Thermoregulation is a mechanism of the body to maintain\regulate its core internal temperature. Hypothermia at birth is a universal problem. The core and skin temperature of a term newborn can reduce at a rate of up to 0.1-0.3 degrees Celsius per minute if no intervention is done after birth. The fast reduction in temperature is majorly because of physical characteristics of the neonate and surrounding conditions of the delivery area. A wet neonate with a large surface-to-volume ratio moving into a cooler and drier extra uterine environment loses heat by conduction, convection, radiation and evaporation See **figure 4**.

World health organization describes mild hypothermia as a core body temperature of 36^0C - 36.4^0C, moderate hypothermia as 35.9^0C – 32^0C, severe hypothermia as less than 32^0C. (9). The Epicure study pointed out that for newborns less than twenty six weeks' gestation with a temperature of less than 35^0 degrees Celsius on admission to a newborn unit was exclusively associated with death.

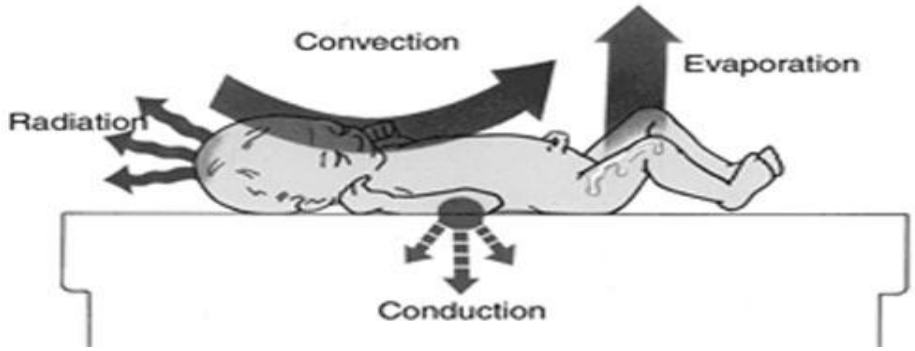

Figure 4 Mechanisms of heat loss from a newborn baby's skin

The four mechanisms of heat loss from newborn's skin which includes convection, conduction, radiation and evaporation (10).

In a study done in Bangladesh by Majumder et al Majority (70.6%) of postnatal mothers had knowledge on thermoregulation but only 8.1% knew about kangaroo mother care and 71.6% knew about baby's first bath.(11).

In a similar study done by Maseka et al at Juba Hospital in South Sudan among postnatal mothers, 33% identified kangaroo care and 90% warm clothing as a mode of thermoregulation. In the same study 94.1% of the postnatal mothers recognized hyperthermia as a danger sign as opposed to only 41.4% who recognized hypothermia as a danger sign.(12). Such disparities in knowledge on

danger signs has been noted by Waiswa et al in a study done in Uganda to have a significant impact on neonatal mortality and morbidity(13).

In Kenya in a study done among 380 postnatal mothers at Kenyatta National hospital by Amollo et al, 7% of mothers identified Kangaroo care, 4% warm room and 93% warm clothing as a mode of thermoregulation. Similar to the study done in south Sudan, almost all mothers recognized hyperthermia as a danger sign unlike hypothermia where by less than 50% of the study participants recognized it as danger sign.(14)

To prevent hypothermia and its subsequent adverse effect WHO has introduced warm chain principle. The principle constitutes: keeping of newborns in skin to skin contact with the mother immediately after birth, drying and wrapping of the baby with dry cloth/towel after delivery, keeping neonate warm during procedures, early initiation of breastfeeding, postponing of baby's first bath for the first 24 hours, keeping newborns warm during transportation, and dressing them in appropriate clothing and bedding all the time.

1.2.2. CLEANLINESS AND UMBILICAL CORD CARE

Cord care is a multi-step process involved in managing of umbilical cord after birth of a newborn. WHO advocates for clean and dry cord care for neonates born at home and health care centers in countries with low NMR. In areas with high NMR of >30 deaths per 1000 live births the WHO recommends daily application of 4% chlorohexidine during the first week of life(15).

In Kenya it is recommended that cord care is done with daily 4% chlorohexidine solution application to the umbilical cord stump for one week. Approximately 130 million children are delivered annually, out of these estimated 4 million die within neonatal period and infections cause 1.5 million of these deaths.

Exposure of newly cut umbilical cord to pathogens introduced via instruments used for delivery, the birth attendant and unsterile environment can lead to localized infection that can lead to life threatening infections (16).

A study done by Afolaranmi et al in Nigeria found that 61.7% of the study participants knew about concept of standard code care and 57.1% affirmed that tying, cutting and cleaning the cord with methylated spirit were essential processes involved in good code care. (17).

In a similar study done by Obimbo et al among 307 postnatal mothers in KNH, 91% of the respondents knew the importance of hygiene while cutting the cord and only 28% knew the

importance of hygienically tying the cord. In the same study regarding postnatal cord care only 40% of the study participants had good knowledge on cord care while 66% had good postnatal cord care practice. After multi variant analysis variables such as high social economic status and acquisition of knowledge from HCWs rather than other sources were linked significantly to good maternal knowledge, attitude and practice (KAP) of cord care.(18).

Tetanus Toxoid given during pregnancy prevents against neonatal tetanus. Maternal immune globin G antibodies are transported by placenta to foetal circulation where it confers protection.

1.2.3. EXCLUSIVE BREASTFEEDING

WHO defines exclusive breastfeeding as giving an infant strictly breast milk for the first six months of life, no water and food except prescribed medications and supplements.(19) . To gain optimum growth and development a child should exclusively breastfeed for six months. Thereafter, infants should be started on nutritionally adequate and safe complimentary feeds as they continue to breastfeed for up to 2 years.(20).

The global breastfeeding score card highlighted that only 40% of children less than 6 months are exclusively breastfed and out of 194 countries assessed only 23 had 60% and above exclusive breastfeeding rates.(21).

In Kenya according to KDHS 2014 61% of children are exclusively breastfed. On average Kenyan children are exclusively breastfed for 4.3 months and breastfed for 21 months.(3).

In Marsabit County 99.1% of children have been breastfed. 92.9% of the women had knowledge on early initiation of breastfeeding. 14.7% of children received prelacteal feeds. Exclusive breastfeeding rate was at 75.7% according to maternal young child and infant nutrition study done by UNICEF in December 2017.(7).

1.2.4. IMMUNIZATION

Immunization is a process by which a person becomes fortified against an infectious agent by vaccination. According to world health organization vaccinations have been shown to control and eliminate potentially fatal infectious diseases and are estimated to prevent 5 million deaths yearly between 2010 and 2015.(22).

WHO formed expanded program on immunization in 1974 to unfold immunization programs globally. In 1977, the goal was to make immunization against poliomyelitis, tuberculosis, diphtheria, pertussis, tetanus and measles available to every child in the world by 1990.(23).

In Kenya the Ministry of health formed the Kenya Expanded program on Immunization (KEPI) in 1980. The goal was to provide vaccination against the then fatal diseases of childhood: poliomyelitis, tuberculosis, diphtheria, pertussis, tetanus and measles to all children in the country before their first birthday.(24).

In a study done in Niger State in Nigeria in 2017, it was found that considerable knowledge on immunization was significantly linked to high rates of complete immunization in children.(25). Low level of education, advanced maternal age and lack of knowledge on immunization was significantly linked to low immunization rates in Mathare according to a study done by Kamau et al.(26).

In another study done in Kenya at KNH by Amolo et al all the mothers were aware of the importance of vaccination to their children. No mother was aware of hepatitis B vaccine at birth. Routine hepatitis B vaccines are not given at birth in public Hospitals and it could explain their lack of knowledge on it. Most postnatal mothers could not match the vaccine and disease it prevented. This indicated that there is poor dissemination of information from health care workers to mothers regarding immunization.

1.2.5. EYE CARE

Neonatal conjunctivitis can lead to blindness when caused by N.gonorrhoea and C.tracomatis. In developing countries N.gonorrhoea causes 20-75% and C-tracomatis causes 15-35% of cases brought to medical attention according to World health organization.

Infections are transmitted to the child from mother's birth canal during delivery. The symptoms present 2-5 days after delivery with eye discharge, swelling, Redding of the eye. In ideal set up mothers should be screened for sexually transmitted disease but this is not the case in developing countries which also bare the greatest rate of neonatal conjunctivitis.(16).

In 1881, Dr Crede introduced eye prophylaxis with 2% silver nitrate solution. This led to reduction of incidences of gonococcus conjunctivitis from 10% to 0.3%. However, in the recent years C. tracomatis has become more frequent than Gonorrhea in many parts of the world and due to this 2% silver nitrate prophylaxis has been controversial in addition to this, silver nitrate has been

criticized as being a cause of chemical conjunctivitis.(27). The use silver nitrate has been abandoned by many countries for these reasons and its use replaced by 1% tetracycline ointment or 0.5% erythromycin.

In a study done at a Nairobi hospital where no eye prophylaxis against neonatal conjunctivitis was given, the occurrence of neonatal conjunctivitis was 23.2% in every 100 live births, and incidence of gonococcus was 3.6 per 100 live births and chlamydial ophthalmia was 8.1 per 100 live births.(28).

In a study done by Amolo et al in KNH it was found that 81.6% of the postnatal mothers identified eye discharge as a sign of infection, 48.7% recognized reddening of the eye as a sign of eye infection and 33.4% identified swollen eyes as a sign of eye infection. In the same study 6.6% of the postnatal mothers agreed to administration of other substances like breast milk, saliva, water and oil into the eye as opposed to 91% of them who disagreed to administration of any substance other than those prescribed in to the eyes(14).

1.2.6. DANGER SIGN RECOGNITION

World health organization in 2013 recommended particular danger signs that should be evaluated in all neonates. The danger signs include: inability to breastfeed, convulsions, drowsiness/unconscious, hyperthermia/hypothermia, tachypnea, grunting and severe chest wall indrawing, no movement at all or no spontaneous movement and jaundice. The Ministry of health in Kenya has combined the mother and child information in one booklet, which has information on danger signs for both the mother during pregnancy and the child. The booklet is given to the mother during antenatal clinic visits.

Early detection of neonatal danger signs is important in averting preventable neonatal deaths, which according to world health organization make up to 75% of all neonatal deaths. In a study done in Woldia general hospital, Ethiopia among postnatal mothers 46.7% of the mothers were not provided with information on danger signs as recommended by WHO during their antenatal clinic visits by health care providers. 88.3% of the mothers identified less than six neonatal danger signs.(29).

Simiyu et al in a study done at Kenyatta National hospital's pediatric ward, found out that within first 24 hours of admission 41% of neonatal deaths occur with majority of these deaths (83.5%)

occurring in the first week of admission. It was noted that parents delayed in seeking medical attention and brought in the children at terminal stages of the disease.(30).

2. CONCEPTUAL FRAMEWORK

Several factors affect delivery of essential newborn care practices (ENCP). The factors could be maternal and neonatal social-demographic factors, obstetric factors, source of health information, maternal health facilities and culture. The conceptual frame work below summarizes the factors that have been associated with postnatal mother's knowledge and attitude on essential new born care practices.

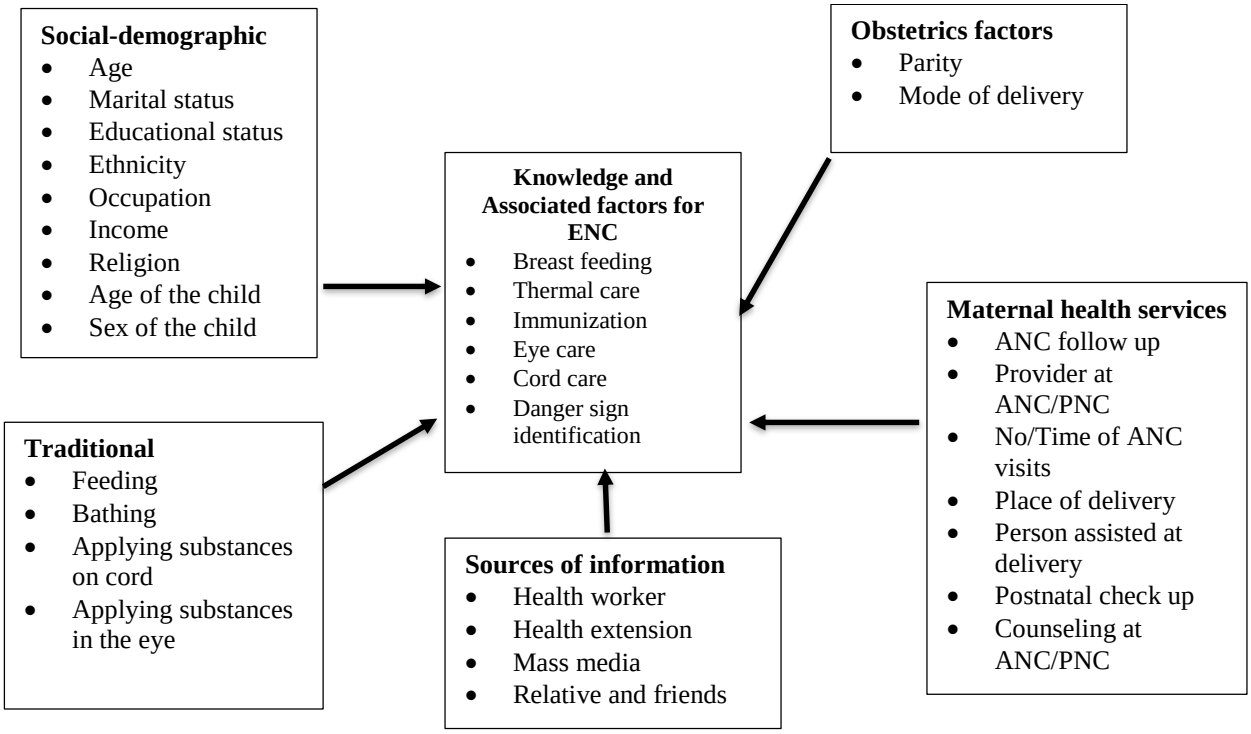

Figure 5 Conceptual frame work for factors that affects essential newborn care.

3. STUDY JUSTIFICATION AND UTILITY

Maternal knowledge and attitudes towards ENCP and recognition of danger signs are linked to neonatal outcomes. Previous studies have shown mothers do not have sufficient knowledge on ENCP and this has significant impact on neonatal mortality and morbidity(14)(31).

Identifying knowledge and attitude gaps of postnatal neonatal mothers regarding ENCP early in neonatal period will help health care providers to make appropriate interventions at an opportune time which will improve neonatal outcomes and eventually reduce neonatal mortality.

Data regarding postnatal mother's knowledge and attitude on ENCP at hospital discharge is lacking in Marsabit county referral hospital.

4. STUDY QUESTION

What is the level of knowledge and attitudes on ENCP among postnatal mothers in Marsabit County Referral hospital?

5. OBJECTIVES

5.1. Primary Objective

To evaluate knowledge and attitude of postnatal mothers regarding ENC in Marsabit County Referral hospital.

5.2. Secondary Objectives

To determine social demographic factors associated with maternal knowledge on ENC (factors include age, education, parity, social economic status and residence).

6. METHODOLOGY

6.1. Study design

A hospital based descriptive cross-sectional study

6.2. Study site

The study was carried out in Marsabit County Referral Hospital (MCRH) postnatal ward. It is the only county referral hospital in the county and it serves a population estimated at 353,258 persons in 2016. It is located in Saku Sub County which has a population estimated at 56419 people in

2016. MCRH has a bed capacity of 86 beds. The hospital has an annual average outpatient of 35,000 while average admission is 3750. The postnatal, antenatal and maternity share a ward. This has a bed capacity of 30 beds. On an average there are 10 deliveries per day. The ward has 10 registered nurses, 2 medical officers and 1 obstetrics/gynecologist consultant.

6.3. Study population

The population consisted of postnatal mothers admitted in MCRH postnatal ward during the study period.

6.4. Inclusion criteria

a. Postnatal mothers of neonates in MCRH.

b. Postnatal mothers who have signed informed consent.

6.5. Exclusion criteria

a. Postnatal mothers whose newborns had adverse congenital anomalies which could interfere with practice of essential newborn care

b. Postnatal mothers whose neonates died immediately after birth.

c. Postnatal mothers who had still births.

6.6. Sample size will be determined Using Fischer's formula

$$n = \frac{[Z_{1-\alpha}]^2 p(1-p)}{d^2}$$

$$n = \frac{[1.96]^2 \times 0.50 \times 0.50}{0.075^2} = 172$$

n' = sample size with finite population correction

$Z_{1-\alpha}$ = statistic for 95% level of confidence = 1.96

p = population proportion, (in the absence of previous studies in similar setting, an assumption of 50% prevalence was made

d = margin of error = ±7.5%

6.7. Sampling method

Postnatal mothers were selected using consecutive sampling. Medical records were used to determine the number of postnatal mothers in the ward. The investigator identified those who met the eligibility criteria from the medical records and got an informed consent. This process was repeated until desired sample size was achieved.

6.8. Recruitment and process of obtaining consent

The eligible postnatal mothers were identified from the medical records. The principal investigator or research assistant approached them and explained to them the purpose of the study and the study method. Equally, predesigned written consent was obtained.

6.8.1. Flow chart of recruitment procedure

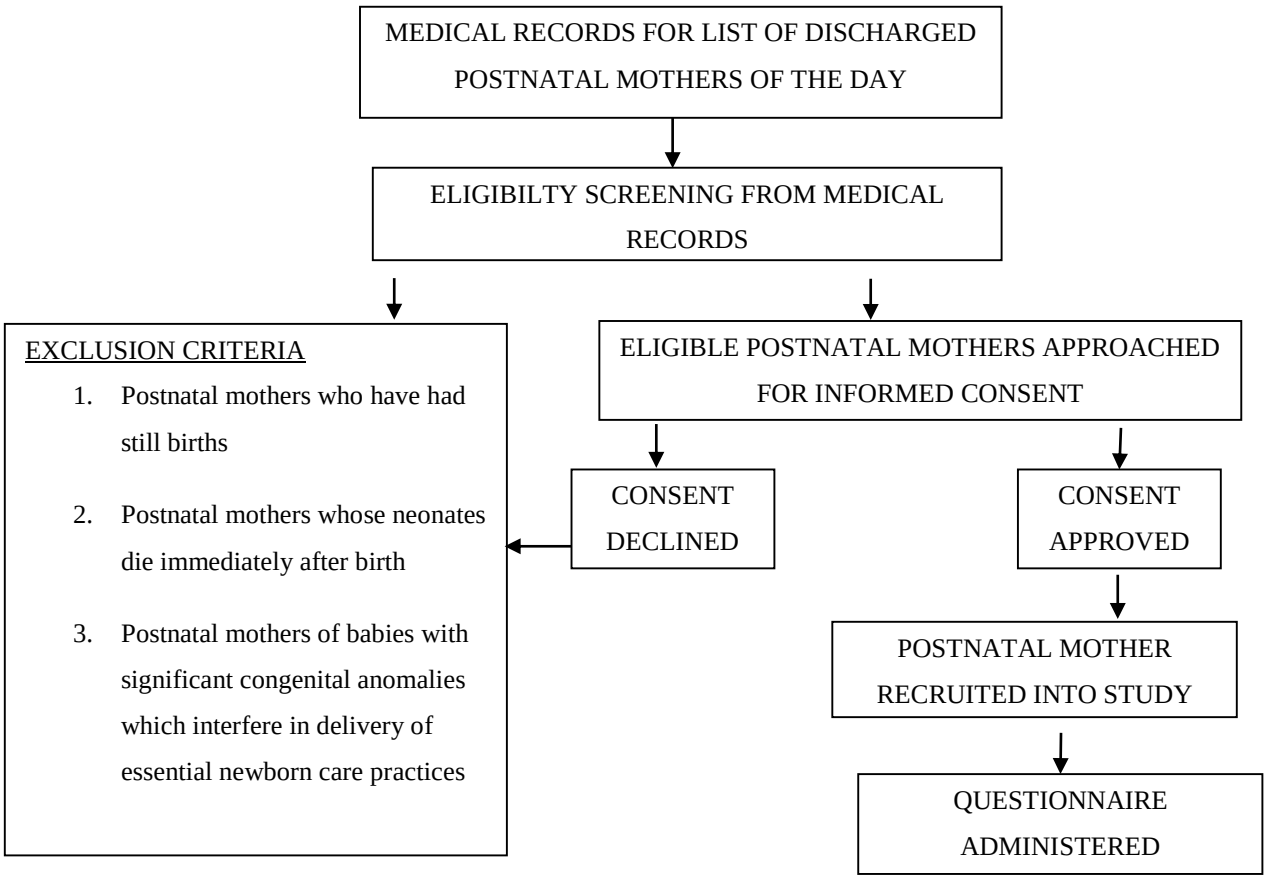

Figure 6 Flow chart of recruitment procedure

6.9. Data collection

Data was collected by the primary researcher and a research assistant who was identified from the medical practitioners already working in MCRH. The research assistant was trained by the primary researcher until he/she demonstrated competency in the use of the data collection tool and data entry. Data collection was done approximately 12 to 24 hours after delivery. Once the study participants have been identified, they were approached by the researcher's. The purpose of the

study and the procedure was explained to them. Once they understood a written consent was obtained and enrolled. Data was collected using a structured pretested questionnaire. The questionnaire was adopted from WHO tool(32),accordingly from previous studies(14)(12).The questionnaire was administered to the study participant by either of the two researchers who read out the questions and filled in their responses. There were questions in the questionnaire that tackled the following:

a. Antenatal and birth history of the neonate
b. Socio demographic characteristics of the parents.
c. Postnatal mother's knowledge on ENCP.
d. Postnatal mother's attitude on various aspects of ENCP was assessed using a five-point likert scale. The ratings were: (Strongly agree, Agree, Neutral, and Disagree and strongly disagree.)

6.10. Data management and analysis

Data was collected and stored in Epidata software. Statistical analysis was performed using Stata version 15.1 (StataCorp, College Station, TX, USA).

Study participants characteristics and knowledge of newborn care were summarized as proportions and either using mean (sd) or median (IQR) depending with the distribution of the data. To identify sociodemographic characteristics associated with poor knowledge of newborn care, responses to 16 questions asked to assess knowledge of newborn care were coded as;

a) 1 = correct response consistent with WHO essential newborn care guidelines and
b) 0 = incorrect response inconsistent with WHO essential newborn care guidelines.

The responses from the 16 questions were summed and their median (IQR) range computed. Because there is no standard score for classifying satisfactory knowledge, we grouped mothers with scores below the median as having poor knowledge and those with score of median and above as having satisfactory knowledge as had previously been done(14)(33).

Since the proportion of mothers with poor knowledge of newborn care (the dependent variable) was >10%, we used log-binomial regression analysis and transformed the regression coefficient into risk ratios (RR)(34). We performed univariate regression analysis and reported the crude RR and their 95% confidence intervals (CI). To avoid variables selection bias, a backward step-wise approach was used to select independent variables to include in the multivariate regression model.

Independent variables were retained in the multivariate model if they had a P-value <0.10. Statistical significance was assumed at a P-value<0.05. Akaike information criterion (AIC) and area under the receiver operating characteristic curves (AUC) were used to assess the multivariate regression model's goodness of fit.

DISSEMINATION OF RESULTS

The findings of the study will be distributed to University of Nairobi, Department of Paediatrics, Kenyatta National Hospital and copies made available in the University of Nairobi library. The results will be made available to policy makers and health workers within the hospital and university to facilitate improvement of health services.

ETHICAL CONSIDERATION

The study was carried out after approval of KNH/UoN ethics and research committee and Marsabit county ethics and research committee/Marsabit County Referral Hospital.

Written consent was taken after clearly explaining to the mothers the research procedure and purpose of the study. The consent was provided in both English and Kiswahili languages depending on which of the languages the mothers are proficient in.

Any information which was important in the care of the neonates gathered in the process of data collection was communicated accordingly to the primary doctor/nurse.

No invasive procedures were done and no tissue specimens were collected in the process of collecting data.

Participation in the study was voluntary and the mothers were free to decline or withdraw from the study without any penalty. No follow up interviews were done.

CONFIDENTIALITY

Data codes were used on research tool instead of patient's identifiers to protect the patient's confidentiality.

The questionnaires were filled within Marsabit County Referral Hospital postnatal wards. Data was stored in Epidata with a password hence was not accessible to unauthorized persons

CONTROL OF ERRORS AND BIASES

a. The questionnaire was pretested on a sample population to ensure validity of the questionnaire before commencement of the study. Study tools were revised accordingly.

b. A research assistant was trained by the principal investigator and provided with standard operating manual to guide in filling the questionnaire which ensured uniformity.

c. Data collected were assessed on a daily basis to ensure completeness. Questionnaires incorrectly or incompletely filled were rejected if the mother had left the health facility or re-interviewing of the mother was done to correct errors. Data were then entered into a pre-programmed computer on a weekly basis. The data entered were crosschecked against the questionnaire to ensure validity of the entries.

Significance of the study

This study investigated the postnatal mother's level of knowledge and their attitude regarding essential newborn care practices. A similar study has not been done in Marsabit County. The results will be submitted to MCRH. The identification of knowledge and attitude gaps early in neonatal period will enable HCWs to intervene and educate the mothers appropriately and in timely manner. The results can also inform policy making and there by improve neonatal outcomes.

RESULTS

From October 2018 to January 2019, we recruited 172 postnatal mothers, median (IQR) age: 25 (22 to 30) years. The median age (IQR) of the fathers was: 31 (28 to 37) years. One hundred and forty eight (86%) mothers were married, and 95 (55%) were formally employed. Of the 95 mothers employed, 33 (34%) were in small scale business, 21 (22%) were professionals and 16 (17%) were in agriculture. Fifty five (31%) of the mothers had no formal education, 28 (16%), 26 (15%), 12 (7.0%), 25 (15%) and 26 (15%) had incomplete primary, complete primary, incomplete secondary, complete secondary and tertiary education respectively (**Table 1**). A total of 109 (63%) mothers were muslim.

Table 1. Socialdemographic characteristics of mother.

Characteristics	Results (N=172)
Mother age in years; Median (IQR)	25 (22 to 30)
Father age in years; Median (IQR)	31 (28 to 37)
Marital status – N (%)	
Single	5 (2.9)
Separated	4 (2.3)
Divorced	15 (8.7)
Married	148 (86)
Mother's occupation– N (%)	
Employed	95 (55)
Unemployed	77 (45)
Mother's type of employment– N (%) (subset = 95)	
Professional	21 (22)
Domestic services	5 (5.3)
Skilled manual	13 (14)
Unskilled manual	7 (7.4)
Agriculture	16 (17)
Small scale business	33 (34)
Mother's level of education– N (%)	
No formal education	55 (31)
Primary incomplete	28 (16)
Primary complete	26 (15)
Secondary incomplete	12 (7.0)
Secondary complete	25 (15)
Tertiary	26 (15)
Mother's religion– N (%)	
Islam	109 (63)
Christian	59 (34)
Others	4 (2)

IQR-Interquartile range.

The median (IQR) gestation age and birth weight were; 40 (39 to 40) weeks and 3.1 (2.9 to 3.5) kg respectively. Only 5 (2.9%) of the neonates were born low birth weight (birth weight <2.5kg). Eighty eight (51%) of the neonates were female.

A total of 165 (96%) mothers attended antenatal clinic during the pregnancy, of which 134/165 (81%) had attend four and above ANC visits as recommended by WHO (**Table 2**). The mean (sd) age of the pregnancy when the mother started ANC visits was 4.6 (1.5) months. One hundred and

fifty seven (91%) mothers had received tetanus injections during this pregnancy (**Table 2**). A total of 110 (64%) of the mothers had a spontaneous Vertex delivery while 60 (35%) had Caesarean section birth.

Table 2. Antenatal and birth history.

Antenatal and birth history	**N (172)**
Gestational age at delivery (weeks); Median (IQR)	40 (39 to 40)
Neonate's birth weight in kilograms; Median (IQR)	3.1 (2.9 to 3.5)
Neonate's sex– N (%)	
Male	77 (45)
Female	95 (55)
Mother's parity– N (%)	
One	51 (30)
Two	32 (19)
Three	40 (23)
Four	18 (10)
≥ five	31 (18)
Attended antenatal clinic during this pregnancy– N (%)	165 (96)
Number of ANC visits attended– N (%)	
Two	8 (4.9)
Three	23 (14)
≥ Four	134 (81)
Pregnancy age at the first ANC visit (months); Mean (sd)	4.6 (1.5)
≤ three months	30 (18)
4 to 6 months	116 (70)
≥ 7 months	19 (12)
Received tetanus injections during this pregnancy– N (%)	157 (91)
Method of delivery– N (%)	
Spontaneous Vertex delivery	110 (64)
Caesarean section	62 (36)
Days in hospital before discharge – N (%)	
≤ One day	41 (24)
Two to three days	68 (40)
Four to six days	46 (27)
≥ 7 days	17 (10)

IQR-Interquartile range, sd-Standard deviation, ANC-antenatal care

Eighty seven (51%) of the mothers received education on newborn care. The education received were; 51 (59%) on breastfeeding, 11 (13%) on thermoregulation, 12 (14%) on cord care, 6 (6.9%) on eye care and 5 (5.8%) on immunization (**Table 3** and **Figure 7**). Nurses, 72 (83%) were the

commonest health care professionals who provided the information. Eighty (47%) of the mothers received education after delivery mostly from nurses, 54 (68%). Breastfeeding 44 (55%), thermoregulation 10 (13%) and cord care 10 (13%) were the three top most education provided after delivery (**Table 3**).

Table 3. Education on newborn care.

Education on newborn care	**N =172**
Received education on newborn care practices during pregnancy– N (%)	87 (51)
Information about newborn care provided – N (%)	
Breastfeeding	51 (59)
Cord care	12 (14)
Eye care	6 (6.9)
Thermoregulation	11 (13)
Immunization	5 (5.8)
Danger signs in newborn	2 (2.3)
Care of Low birth weight	0
Health care provider giving the information– N (%)	
Doctor	9 (10)
Nurses	72 (83)
Family	6 (6.9)
Received newborn care education after delivery	80 (47)
Information after delivery provided by:– N (%)	
Doctor	20 (25)
Nurses	54 (68)
Family	6 (7.0)
Information after delivery provided – N (%)	
Breastfeeding	44 (55)
Cord care	10 (13)
Eye care	8 (10)
Thermoregulation	10 (13)
Immunization	7 (8.8)
Danger signs in newborn	0
Care of Low birth weight	1 (1.3)

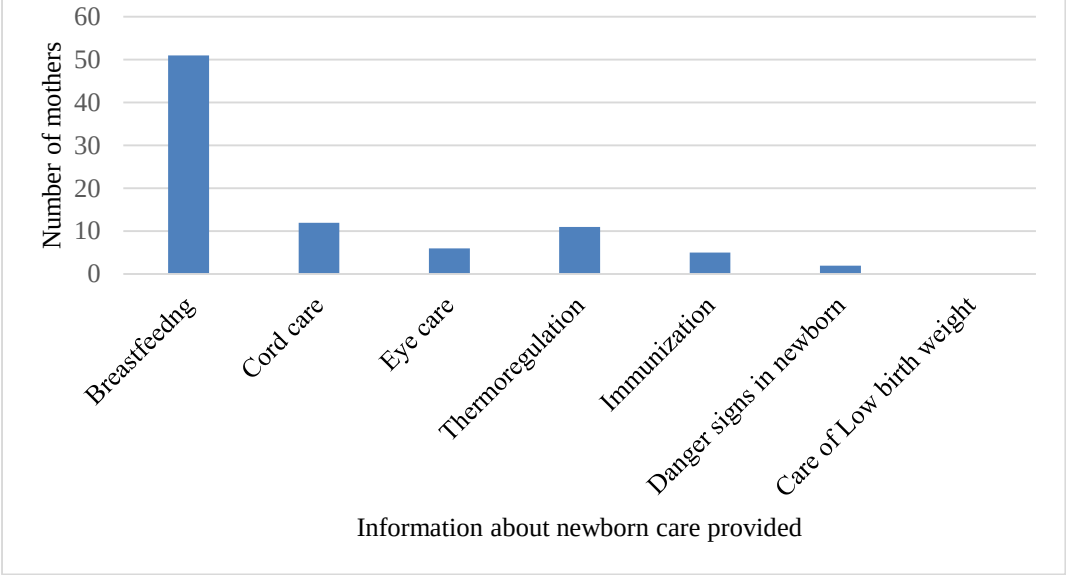

Figure 7 information provided to mothers about newborn care.

Level of knowledge and attitude of postnatal mothers on ENCP

A total of 147 (85%) of the mothers were aware to wrap the baby in a cloth to keep him/her warm. Thirty nine (23%) mothers reported the baby should be bathed minutes after delivery, 4 (2.3%), 111 (65%) and 21 (12%) in hours, days and did not know respectively (**Table 4**). Twenty one mothers (12%) thought the baby should be nursed in a separate room. One hundred and eleven (65%) mothers disagreed that babies with normal birth weight lost heat faster than low birth weight babies. One hundred and thirty eight (80%) mothers knew babies should not be bathed in cold water (**Table 4**).

Table 4. Thermoregulation Knowledge.

THERMOREGULATION KNOWLEDGE	N=172
How to keep your baby warm after delivery– N (%)	
Skin to skin contact	23 (13)
Wrapped the baby in cloth	147 (85)
Others	2 (1)
How long it takes before baby's first birth after delivery– N (%)	
Minutes	39 (23)
Hours	4 (2.3)
Days	111 (65)
Don't Know	18 (10)
Baby should be nursed in separate room– N (%)	21 (12)
ATTITUDE	
Babies with normal birth weight lose heat faster than low birth weight babies – N (%)	
Agree	20 (12)
Neutral	41 (24)
Disagree	111 (65)
The baby can be bathed in cold water– N (%)	
Agree	33 (19)
Neutral	1 (0.6)
Disagree	138 (80)

Majority of postnatal mothers knew about keeping baby wrapped in warm clothing but few of them had knowledge on kangaroo mother care.35% of the mothers also did not have the correct knowledge on when to give the baby first bath.

One hundred and forty three (83%) mothers were aware that the umbilical stump should be uncovered, only 17 (9.9%) did not know. More than 90% of the mothers were aware of how to clean a soiled umbilical stump; 37% using clean water, 51% using alcohol/spirit and 2.9% using chlorohexidine (**Table 5**). Forty eight (28%) mothers reported substances should be applied after cleaning the umbilical stump, of which 10/48 (21%) thought surgical spirit could be applied, 4 (8.3%) alcohol and 5 (10%) chlorohexidine. A total of 159 (92%) mothers agreed that dirty umbilical cord could cause infection and 161 (94%) disagreed that previously used razor blade could be washed and used to cut the cord (**Table 5**).

Table 5. Cleaning and Cord Care Knowledge.

CLEANLINESS AND CORD CARE KNOWLEDGE	N=172
Should the umbilical stump of the baby be covered – N (%)	
Covered	12 (7.0)
Uncovered	143 (83)
Don't know	17 (9.9)
How should soiled umbilical stump be cleaned– N (%)	
Clean with water	63 (37)
Apply alcohol/spirit	87 (51)
Chlorohexidine	5 (2.9)
Others	17 (10)
Substances should be applied after cleaning umbilical stump– N (%)	48 (28)
Material to be applied on the umbilical stump– N (%)	
Surgical spirit	10 (21)
Alcohol	4 (8.3)
Chlorohexidine	5 (10)
Others	29 (60)
ATTITUDE	
Previously used razor blade can be washed and used to cut the cord– N (%)	
Agree	11 (6.4)
Neutral	0
Disagree	161 (94)
A dirty umbilical cord can cause infection in your baby– N (%)	
Agree	159 (92)
Neutral	5 (2.9)
Disagree	8 (4.7)

Only 10 (5.8%) of the mothers did not know how soon after birth, breastfeeding should start. A total of 152 (88%) women were aware that any fluid/feeds should not be given to baby before breastfeeding for the first time. One hundred and sixty five (96%) of the mothers were aware that the baby should be breastfed on demand and 171 (99%) thought the colostrum should be fed to the baby (**Table 6**). Only one mother reported she would throw away the colostrum milk because it would create a bond between mother and child. A total of 142 (83%) were aware the baby should be exclusively breastfed for six months (**Table 6**). A total of 164 (95%) mothers agreed that the baby should be breastfed at night.

Table 6. Breastfeeding Knowledge.

BREASTFEEDING KNOWLEDGE	**N=172**
How soon after delivery should breastfeeding start– N (%)	
Minutes	147 (85)
Hours	15 (8.7)
Don't know	10 (5.8)
Should any fluid/feeds be given to baby before breastfeeding for the first time– N (%)	
Yes	15 (8.7)
No	152 (88)
Don't know	5 (2.9)
How often should the baby be breastfed– N (%)	
On demand	165 (96)
According to timetable	7 (4.1)
How long should you exclusively breastfeed your baby (months): mean (sd)	5.9 (0.6)
<6 months	30 (17)
6 months	142 (83)
What should you do with the first milk (colostrum) that came from your breast– N (%)	
Fed the baby	171 (99)
Threw it away	1 (0.6)
ATTITUDE	
Your baby should be breastfed at night– N (%)	
Agree	164 (95)
Neutral	0
Disagree	8 (4.7)
Your baby should be given other feeds/fluids aside from breast milk– N (%)	
Agree	19 (11)
Neutral	5 (2.9)
Disagree	148 (86)
If you feel your baby should get other feeds, what would you give– N (%) Subset n = 19	
Water	2 (11)
Cows/goat milk	13 (68)
Sugar/glucose water	3 (16)
Other	1 (5.3)

In total, 149 (87%) of the mothers were aware that the baby requires vaccination at birth. Although 93 (54%) of the mother were aware the vaccine is meant to prevent diseases, the remaining 46% did not know the role of vaccine to the baby after birth. Despite 54% of women being aware of the role of vaccine after birth, only 38 (22%) and 13 (7.6%) knew that BCG and OPV vaccines should be administered at birth (**Table 7**). Thirty six (21%) and 65 (38%) of the mothers knew that BCG

and OPV protects children against tuberculosis and polio respectively. Majority of the mothers did not know the role of BCG; 135 (78%) and OPV; 107 (62%) in child health (**Table 7**). Only 7 (4.1%) agreed that vaccine could be harmful, of which 5/7 (72%) reported the harm as adverse drug reaction.

Table 7. Immunization Knowledge.

IMMUNIZATION KNOWLEDGE	**N=172**
Does the baby require any vaccination at birth– N (%)	
Yes	149 (87)
No	23 (13)
Why do we give vaccines to the baby after birth– N (%)	
To prevent diseases	93 (54)
Don't know	79 (46)
What vaccines should your baby receive at birth? – N (%)	
BCG	38 (22)
OPV	13 (7.6)
Don't know	120 (70)
Others	1 (0.6)
What disease does BCG vaccine protect your baby from? – N (%)	
Tuberculosis	36 (21)
Don't know	135 (78)
Others	1 (0.6)
What disease does OPV vaccine protect your baby from? – N (%)	
Polio	65 (38)
Don't know	107 (62)
ATTITUDE	
What is the benefit of vaccines – N (%)	
Prevent diseases	115 (67)
Don't know	57 (33)
Can vaccines be harmful to your baby– N (%)	
Agree	7 (4.1)
Neutral	81 (47)
Disagree	84 (49)
If you agree, how do they harm your baby? – N (%)	
Adverse drug reaction	5 (72)
Paralysis	1 (14)
Infection of the injection site	1 (14)

Fifty one (30%), 69 (40%), 51 (30%) mothers of the neonates, were aware of eye discharge, reddening of eye and swollen eye as signs of eye infection respectively. However, only 18 (10%) of the mothers agreed substances could be applied to the baby eye with 13 (7.6%) being neutral while 141 (82%) disagreed that substance could be applied to baby's eye when there is a discharge (**Table 8**). More than half; 10 (56%) of the mothers who agreed that substances could be applied to the baby eye, reported that they would apply breast milk.

Table 8. Eye Care Knowledge

EYE CARE KNOWLEDGE	**N=172**
Aware of any signs of eye infection to the baby– N (%)	
Eye discharge	51 (30)
Reddening of eye	69 (40)
Swollen eye	51 (30)
Other	1 (0.6)
ATTITUDE	
Substances can be applied the baby's eye if you note discharge, reddening or swelling – N (%)	
Agree	18 (10)
Neutral	13 (7.6)
Disagree	141 (82)
If you agree, what would you apply to your baby's eye? – N (%)	
Breast milk	10 (56)
Others	8 (44)

A total of 160 (93%) of the mothers were aware of any danger signs of the neonate's serious illness. The mothers were able to consistency identify all the listed signs as important in suggesting neonate's serious illness (**Table 9**). One hundred and forty three (83%), 169 (98%) and 168 (98%) of the mother considered; Yellowish discoloration of eyes, palms, soles, Umbilicus red, discharging pus, surrounding skin red and Eyes swollen, sticky, red or draining pus as important signs of serious illness. None of the mothers considered: Yellowish discoloration of eyes, palms, soles, Baby stops breastfeeding, Abnormal jerking movement of limbs and eyes, Difficulty in breathing, Fever, Abdominal distension, Diarrhea and Vomiting as non-important signs of serious illness. Additionally, few mothers were not sure/neutral about most of the danger signs of serious illness. The danger signs that mothers were not sure/neutral were: Yellowish discoloration of eyes, palms, soles-29 (17%), Baby stops breastfeeding- 20 (12%), Baby cold to touch -48 (28) and Abnormal jerking movement of limbs and eyes-14 (8.0%) **Table 9** and **Figure 8**.

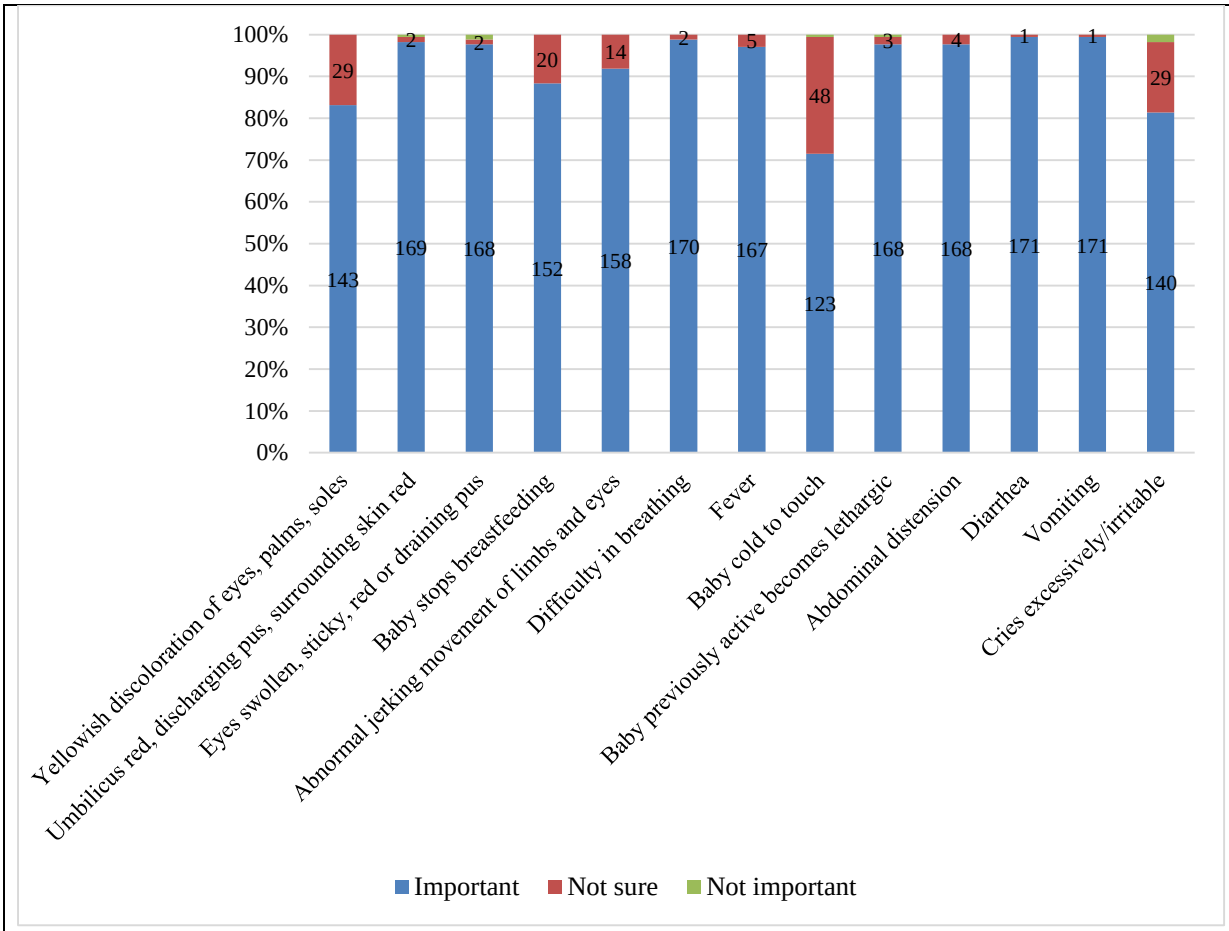

Figure 8 Knowledge on Danger signs in Neonate.

Table 9. Knowledge on Danger signs in Neonate.

Signs considered to suggest serious illness in a newborn	**N=172**
Yellowish discoloration of eyes, palms, soles– N (%)	
Important	143 (83)
Neutral	29 (17)
Not important	0
Umbilicus red, discharging pus, surrounding skin red– N (%)	
Important	169 (98)
Neutral	2 (1.2)
Not important	1 (0.6)
Eyes swollen, sticky, red or draining pus– N (%)	
Important	168 (98)
Neutral	2 (1.2)
Not important	2 (1.2)
Baby stops breastfeeding– N (%)	
Important	152 (88)

Neutral	20 (12)
Not important	0
Abnormal jerking movement of limbs and eyes– N (%)	
Important	158 (92)
Neutral	14 (8.0)
Not important	0
Difficulty in breathing– N (%)	
Important	170 (99)
Neutral	2 (1.2)
Not important	0
Fever– N (%)	
Important	167 (97)
Neutral	5 (2.9)
Not important	0
Baby cold to touch– N (%)	
Important	123 (72)
Neutral	48 (28)
Not important	1 (0.6)
Baby previously active becomes lethargic– N (%)	
Important	168 (98)
Neutral	3 (1.7)
Not important	1 (0.6)
Abdominal distension– N (%)	
Important	168 (98)
Neutral	4 (2.3)
Not important	0
Diarrhea– N (%)	
Important	171 (99)
Neutral	1 (0.6)
Not important	0
Vomiting– N (%)	
Important	171 (99)
Neutral	1 (0.6)
Not important	0
Cries excessively/irritable– N (%)	
Important	140 (81)
Neutral	29 (17)
Not important	3 (1.7

Factors associated with poor maternal knowledge on newborn care

The range of the maternal knowledge on newborn care score was from 8 to 16 with a median (IQR) of 13 (12 to 14) **Figure 9**. Sixty three (37%) mothers had scores less than median score and therefore were classified as having poor knowledge on newborn care. **One hundred and nine (63%) had satisfactory knowledge on newborn care.**

In the univariate analysis, being a Christian compared to Islam was positively associated with poor knowledge of newborn care; crude risk ratio 1.53 (95% CI 1.04 to 2.25).

Those with higher level of education were less likely than primary/no education to have poor knowledge and multipara were less likely than primipara to have less knowledge (**Table 10)**. Three variables were selected in the backward step-wise method; education level, parity and mode of delivery, and included in the multivariate log-binomial regression model. In the multivariate regression model; secondary education compared to primary or no education was associated with reduced risk of poor knowledge of newborn care; adjusted risk ratio 0.33 (95% CI 0.14 to 0.77). Multiparas compared to primiparas was also associated with reduced risk of poor knowledge of newborn care; adjusted risk ratio 0.58 (95% CI 0.35 to 0.96) **Table 11**.

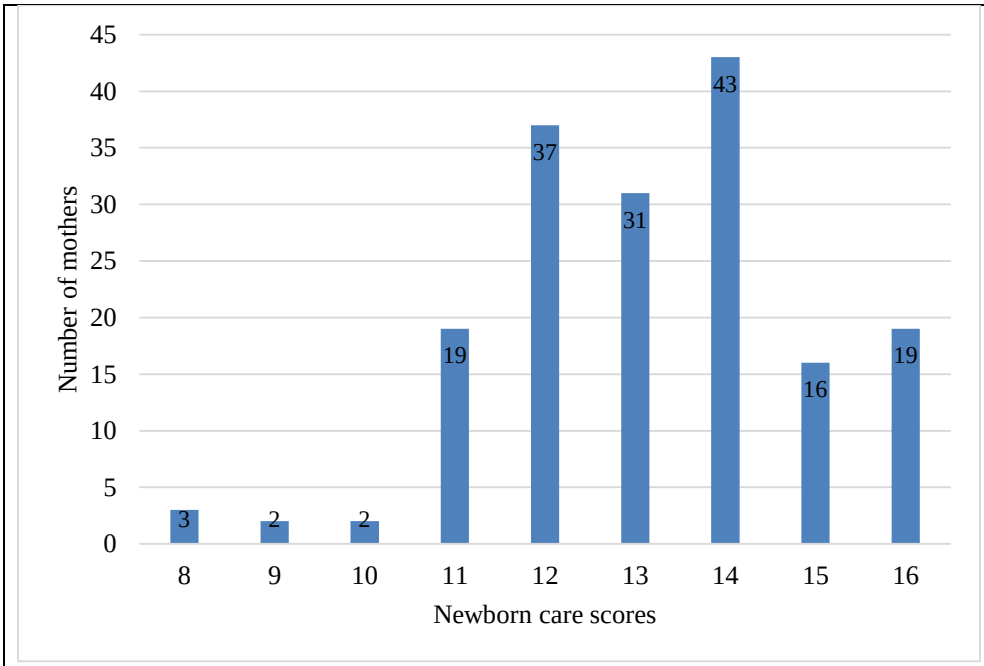

Figure 9 Distribution of Maternal Knowledge on newborn care Scores.

Table 10. Univariate analysis of factors associated with knowledge of newborn care.

	Poor knowledge (N=63)	**Satisfactory knowledge (N=109)**	**Crude RR (95% CI)**	**P-value**
Maternal age (years)				
≤ 24 years	30 (40)	45 (60)	Reference	
≥ 25 years	33 (34)	64 (66)	0.85 (0.57, 1.26)	0.42
Marital status				
Married	54 (36)	94 (64)	Reference	
Not married	9 (38)	15 (62)	1.03 (0.59, 1.80)	0.92
Mother's occupation				
Employed	34 (36)	61 (64)	Reference	
Unemployed	29 (38)	48 (62)	1.05 (0.71, 1.56)	0.80
Mother education level				
Primary and below	51 (47)	58 (53)	Reference	
Secondary school	6 (16)	31 (84)	0.35 (0.16, 0.74)	0.006
Tertiary	6 (23)	20 (77)	0.49 (0.24, 1.02)	0.06
Mother's religion				
Islam	35 (31)	78 (69)	Reference	
Christian	28 (47)	31 (53)	1.53 (1.04, 2.25)	0.03
Gestation age (weeks) Median (IQR)	40 (39, 40)	39 (39, 40)	1.12 (0.93, 1.34)	0.23
Birth weight (kg), Median (IQR)	3.2 (3.0, 3.5)	3.1 (2.9, 3.5)	1.27 (0.75, 2.14)	0.38
Mother's parity				
Primiparas	26 (51)	25 (49)	Reference	
Multiparas	37 (31)	83 (69)	0.60 (0.41, 0.88)	0.009
Number of ANC Visits				
O to 3	14 (41)	20 (59)	Reference	
≥ 4	49 (36)	89 (64)	0.86 (0.54, 1.37)	0.53
Gestation age when starting ANC				
0 to 3 months	14 (47)	16 (53)	Reference	

4 to 6 months	41 (34)	80 (66)	0.73 (0.46, 1.15)	0.17
≥ 7 months	7 (37)	12 (63)	0.79 (0.39, 1.59)	0.51
Mode of delivery				
Spontaneous vertex	43 (38)	69 (62)	Reference	
Caesarean section	20 (33)	40 (67)	0.87 (0.57, 1.33)	0.52
Receive tetanus injections				
No	6 (40)	9 (60)	Reference	
Yes	57 (36)	100 (64)	0.91 (0.47, 1.74)	0.77

Poor knowledge; < median score, satisfactory knowledge; ≥ median score, ANC-antenatal care, RR-Risk ratios, CI; Confidence interval, P-values from the univariate log-binomial regression models.

Table 11. Multivariate analysis of factors associated with knowledge of newborn care

	Adjusted RR (95% CI)	P-value
Mother education level		
Primary and below	Reference	
Secondary school	0.33 (0.14, 0.77)	0.01
Tertiary	0.48 (0.21, 1.13)	0.09
Mother's parity		
Primiparas	Reference	
Multiparas	0.58 (0.35, 0.96)	0.03
Mode of delivery		
Spontaneous vertex	Reference	
Caesarean section	0.79 (0.46, 1.34)	0.38
Multivariate model goodness of fit.		
AIC	247.0	
AUC (95% CI)	0.70 (0.63, 0.78)	

Only variables picked by the backward step-wise method were included in the multivariate log-binomial regression model, RR-Risk ratios, CI; Confidence interval, P-values from the multivariate log-binomial regression models, AIC: Akaike information criterion, AUC: area under receiver operating characteristics curve.

DISCUSSION

Essential newborn care practices has been shown to reduce mortality and morbidity in neonates(35). To reduce neonatal mortality and morbidity, mothers need to be equipped with the right knowledge regarding essential newborn care practices. Table 3 shows that Education on ENCP was provided in both antenatal and postnatal period at 51% and 47% respectively. Amollo et al in KNH, showed that 80.8% of the mothers received antenatal education, which is significantly higher than our findings(14). Weina et al in Laos demonstrated that antenatal education in pregnant mothers resulted in sustained improvement in knowledge of newborn care in postnatal period(36).

Health care workers provided most of education on ENCP to mothers in both antenatal and postnatal periods. Nurses provided 83% of education on ENCP during antenatal period and 63% during postnatal period. This is consistent with KDHS 2014 which stated that 92% of women in Kenya relied on health care workers for antenatal care(2). Our findings are also consistent with findings by Amolo et al in KNH where by health care providers provided most education to mothers during antenatal period(14). This implies that mothers from our set up rely majorly on health care providers for education on newborn care.

Six components of ENCP namely; eye care, cord care, thermoregulation, immunization, breastfeeding and knowledge on danger signs were investigated. Most education provided was on breastfeeding 59% during antenatal period and 55% during postnatal period. Education on other aspects of essential newborn care was markedly low in both antenatal and postnatal period where by less than 15% of the mothers received education on other aspects of ENCP. This result is similar to finding by Amolo et al where by 75.2% of the mothers received education on breast feeding during antenatal period and 68.2% during postnatal period. While less than 10% of the mothers received education on all other aspects of essential newborn care practices(14).

The postnatal mothers interviewed had good knowledge on exclusive breastfeeding, colostrum feeding and breast feeding on demand. This is similar to studies done earlier in Marsabit county and in KNH(37)(14). Almost all mothers in this study fed colostrum to their babies. This finding differs from findings of a study done in Pakistan where 44.8% of postnatal mothers did not feed colostrum to their babies (33). 85% of the study participants knew that breastfeeding should start immediately after delivery. Deepika et al in a study done in India demonstrated that when women

do not breastfeed within the first hour of delivery the odds of the neonate dying increases by nearly threefold(38).

In contrast to 85% of mothers knowing about wrapping the baby in warm clothing as a mode of thermoregulation only 13% recognized Kangaroo mother care as a mode of thermoregulation. This low level of knowledge on KMC was also noted by Meseka et al in Juba (12). This could be explained by low levels of education on thermoregulation in both antenatal and postnatal period. Of note, was also that only 2 mothers were taught on care of low birth weight new borns in antenatal period which could also contribute to their lack of knowledge on KMC. Stacey A et al in a study estimating association of KMC and neonatal outcomes found that among LBW newborns, KMC as compared to conventional care was associated with 36% lower mortality(39). Such significantly low levels of knowledge on important components of newborn care could translate to increased newborn mortality and morbidity especially among low birth weight infants. Therefore, more education on KMC is required to prevent hypothermia in newborns.

Umbilical cord if not hygienically cared for is a potential source of infection in a new born.

83% of the mothers interviewed in the study knew that the umbilical cord should be left uncovered. 62% of the mothers knew about clean and dry cord care as recommended by WHO in countries with low neonatal mortality rates, however in Kenya cord care with 4% chlorohexidine until the cord drops off is the recommended practice. This finding sharply differs from the findings of the study done by Amolo et al in KNH where only 4 mothers recognized dry cord care as a mode of cord care(14). 28% of the mothers thought that substances could be applied to the cord. 60% of the mothers who thought substances could be applied thought they could apply traditional herbs, baby powder and traditionally prepared oils to the cord stump to hasten healing. This shows knowledge gaps that existed among the postnatal mothers regarding cord care despite delivering in a hospital setting. 31% of the mothers interviewed agreed with WHO recommendation of cleaning a soiled umbilical cord with water, majority of the mothers (51%) thought that surgical spirit should be used to clean a soiled umbilical cord. Amolo et al also found similar results where by 67.2% of the mothers thought that surgical spirit should be used to clean a soiled umbilical stump and 26.1% of the mothers agreed with WHO organization recommendation of cleaning a soiled cord with water. These Variations in opinion among the mothers is due to lack of consensus among health care providers on best cord care practice. A Cochrane meta-analysis showed no significant advantage of using antiseptics/antibiotics over keeping the cord clean and dry in high

income settings(40). For the first week of life, WHO recommends daily 4% chlorohexidine application to the cord in neonates born at home in settings with NMR of greater than 30 in 1000 live births, in settings with low NMR it recommends clean and dry cord care(41).

Education on danger signs was markedly low in both antenatal and postnatal periods. Despite this, more than 80% of the mothers recognized all danger signs as important except hypothermia. While 97% of the neonatal mothers recognized fever as an important sign of sick child, 72% recognized hypothermia as an important sign. This disparity was also noted by Amollo et al in a study done in KNH(14). Waiswa et al demonstrated that if disparities of knowledge on ENC is not addressed it has significant impact on neonatal mortality and morbidity(31).

87% of the postnatal mothers knew their babies required vaccination at birth. 54% of the mothers did not know the role of vaccinations. Contrary to our study, F. Bajunirwe et al in a study done in rural Uganda found out that 93.5% of the women were aware that childhood immunizations prevent diseases(42). In the same study F.Bajunirwe et al also demonstrated that women who are not aware vaccines prevent diseases were more likely to have an under-vaccinated child(42). Majority of the study participants did not match polio vaccine and BCG with the diseases they prevent. This is comparable to study done by Amolo et al where majority of the mothers could not match BCG and polio with diseases it prevents(14). This could be due to poor provision of education on immunizations during antenatal and postnatal period.

Less than 50% of the postnatal mothers recognized signs of opthalmia neonatorum namely: swollen eye, red eye and eye discharge. This is similar to study done by Amolo et al in KNH who also found out that postnatal mothers had poor knowledge on identification of signs of opthalmia neonatorum(14) . This could be due to poor provision of education regarding eye care in both antenatal and postnatal period to the mothers.

Having secondary level of education and above as compared to primary level of education or no formal education was linked positively to good knowledge on ENCP. This is similar to studies done by Tirhas et al and Misgna HG et al in Ethiopia.(43),(44). Unlike our study, a Ugandan study showed no significant relationship between maternal level of education and knowledge on ENCP(45).

Multiparity as compared to primiparity was associated positively with good knowledge on ENCP. Similar to our study, a study done in Addis ababa Ethiopia also linked multiparity as compared to primiparity to good knowledge on ENCP(46).

STRENGHTS OF STUDY

This study being a cross sectional study was a quick and easy way to find out the knowledge gaps and negative attitudes that existed among postnatal mothers and factors associated with them.

The knowledge gaps and negative attitudes identified in this study will be used by policy makers to improve quality of programs involved in education of mothers on ENCP.

Study limitations

1. The study was conducted in Marsabit County Referral Hospital so it will not be a representative of postnatal mothers who deliver outside Marsabit County Referral Hospital.
2. There is no universal standard scoring system to define satisfactory knowledge and unsatisfactory knowledge. Similar studies done in the past used the median as cut off level to distinguish between poor knowledge and satisfactory knowledge which was applied in this study.

Benefits of the study

The results of the study will be shared with Marsabit County Referral Hospital and Marsabit County Ministry of Health. The findings will help in future policy making and improvement of neonatal outcomes by educating the mothers on newborn care practices during ANC visits.

During the study mothers who are noted to be having inadequate knowledge regarding newborn care practices were educated on them at the end of the interview.

CONCLUSION

1. Maternal education on ENC was unsatisfactory regarding all aspects of ENCP except breast feeding.
2. Knowledge gaps existed among post natal mothers with regards to eye care, cord care, thermoregulation and immunization.
3. Postnatal mothers had a positive attitude towards cord care, eye care, thermoregulation and breastfeeding while they had negative attitude towards immunization.
4. Postnatal mothers most likely to have poor knowledge on essential newborn care practices included primiparous women and mothers who had no formal education or primary level education.

RECOMMENDATIONS

1. Vulnerable groups like primiparous mothers and mothers with no formal education and primary level education should be identified and given special attention during education on ENCP.
2. Education on aspects of ENCP namely; eye care, cord care, immunization, danger signs recognition, care of low birth weight and thermoregulation should be emphasized during both antenatal and postnatal periods.

CONFLICT OF INTEREST

There were no conflicts of interest in this study.

REFERENCES

1. World Health Organisation. newborns-reducing-mortality. In. Available from: https://www.who.int/news-room/fact-sheets/detail/newborns-reducing-mortality
2. KDHS. Kenya Demographic and Health Survey 2014. Cent Bur Stat [Kenya] Kenya Demogr Heal Surv [Internet]. 2014;iii–372. Available from: https://dhsprogram.com/what-we-do/survey/survey-display-451.cfm%0Ahttp://www.dhsprogram.com/pubs/pdf/FR151/FR151.pdf%0Ahttps://dhsprogram.com/pubs/pdf/fr308/fr308.pdf%0Ahttps://dhsprogram.com/publications/publication-FR308-DHS-Final-Reports.cfm
3. KDHS. Kenya. Cent Bur Stat [Kenya] Kenya Demogr Heal Surv. 2014;
4. Lawn J, Mongi P, Cousens S. Africa ' s newborns – counting them and making them count.
5. Unicef. Kenya Maternal and Newborn Health Disparities. 2016;1–8. Available from: https://data.unicef.org/wp-content/uploads/country_profiles/Kenya/country profile_KEN.pdf
6. World Health Organisation. Newborns: reducing mortality [Internet]. Fact sheet No.333 on neonatal mortality. [cited 2019 May 9]. Available from: https://www.who.int/news-room/fact-sheets/detail/newborns-reducing-mortality
7. UNICEF. Maternal , Infant and Young Children Nutrition Knowledge Attitude and Practices Baseline Survey for Marsabit County [Internet]. 2018. Available from: www.nutritionhealth.or.ke
8. world health organization. Newborn Health. 2017.
9. S.Waldron. Neonatal thermoregulation 1. 2007;3:1–6. Available from: www.infantjournal.co.uk
10. World Health Organisation. Thermal Protection of the Newborn:a Practical guide 1997. WHO_RHT_MSM_97.2.pdf;sequence=1. 1997.
11. Majumder S, Najnin Z, Ahmed S, Bhuiyan SU. Knowledge and attitude of essential newborn care among postnatal mothers in Bangladesh. J Heal Res. 2018;32(6):440–8.
12. Meseka LA. Knowledge and Practices on Essential Newborn Care Among Postnatal Mothers At Juba Teaching Hospital South Sudan Dissertation Submitted in Partial Fulfilment for the Degree of Masters in Medicine , Paediatric and Child Health University

of Nairobi. Nairobi, Kenya; 2015.

13. Okuga M, Waiswa P, Mandu R, Wachira J, Hanson C, Manzi F. Illness recognition and care-seeking for maternal and newborn complications in rural eastern Uganda. 2017;36.
14. Amolo L, Irimu G, Njai D, Wasunna A. Knowledge and Attitude of Postnatal Mothers on Essential Newborn Care Practices At Kenyatta National Hospital. BMC open [Internet]. 2013; Available from: tropical-paediatrics-congress.com/wp-content/uploads
15. Stewart D, Benitz W, Fetus CON. Umbilical Cord Care in the Newborn Infant. 2019;138(3).
16. World Health Organisation. WHO_FRH_MSM_96.13(1).pdf [Internet]. 1996. Available from: https:///apps.who.int/iris/handle/10665/63076
17. Afolaranmi TO, Hassan ZI, Akinyemi OO, Sule SS, Malete MU, Choji CP, et al. Cord Care Practices: A Perspective of Contemporary African Setting. Front Public Heal. 2018;6(January):9–11.
18. Obimbo ,E;Musoke,RN;Were F. Knowledge , attitudes and practices of mothers and knowledge of health workers regarding care of the newborn umbilical cord. 1999;
19. Lyell GJ. WHA Global Nutrition Targets 2025 : Breastfeeding Policy Brief. 2012;
20. Jeewon R. Importance of Exclusive Breastfeeding and Complementary Feeding among Infants Importance of Exclusive Breast Feeding and Complementary Feeding Among Infants. 2017;(August).
21. Scorecard GB. Tracking Progress for Breastfeeding Policies and Programmes BREASTFEEDING IS ONE OF THE MOST EFFECTIVE INVESTMENTS A COUNTRY CAN MAKE. 2017;
22. world health organization. WHO's VISION AND MISSION IN IMMUNIZATION AND VACCINES [Internet]. 2015. Available from: WWW.WHO.IT
23. Drain PK. " Vaccine Preventable Diseases and Immunization Programs ." 2012;(May).
24. ministry of health. Immunization Manual for Health Workers [Internet]. Available from: www.mchip.net.files
25. Phillips Edomwonyi Obasohan, Anosike, Bernard Ubannache EBM. Determinants of Full Immunization Coverage and Reasons for its Failure for Children in Bida Emirate Area, Niger State, Nigeria. Merit Res J Med Med Sci. 2015;3(10):476–83.
26. Kamau N, Esamai F. Determinants of immunization coverage among children in Mathare.

2001;(October 2015).

27. Schaller UC, Klauss V. Public Health Classics Is Credé ’s prophylaxis for ophthalmia neonatorum still valid? Bull World Health Organ. 2001;79(3):262–3.
28. Laga M, Nzanze H, Brunham R, Maitha G, D’Costa L., Mati JK, et al. EPIDEMIOLOGY OF OPHTHALMIA NEONATORUM IN KENYA. Lancet [Internet]. 1986 Nov 15;328(8516):1145–9. Available from: https://doi.org/10.1016/S0140-6736(86)90544-1
29. Jemberia MM, Mirkena HB, Tegegne AE, Gishen DM, Reta MA, Berhe ET. Low level of knowledge about neonatal danger signs and its associated factors among postnatal mothers attending at Woldia general hospital, Ethiopia. Matern Heal Neonatol Perinatol. 2018;4(1):1–8.
30. Simiyu DE. Morbidity and mortality of neonates admitted in general paediatric wards at Kenyatta National Hospital. East Afr Med J [Internet]. 2003;80(12):611–6. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15018416
31. Waiswa P, Peterson SS, Namazzi G, Ekirapa EK, Naikoba S, Byaruhanga R, et al. The Uganda Newborn Study (UNEST): an effectiveness study on improving newborn health and survival in rural Uganda through a community-based intervention linked to health facilities - study protocol for a cluster randomized controlled trial. 2012;1–16.
32. WHO. Postnatal Care for Mothers and Newborns Highlights from the World Health Organization 2013 Guidelines. WHO Libr Cat Data World [Internet]. 2015;(April):1–8. Available from: http://www.mcsprogram.org/
33. Memon J, Holakouie-naieni K, Majdzadeh R, Yekaninejad MS. Knowledge , attitude , and practice among mothers about newborn care in Sindh ,. 2019;0:1–9.
34. Mcnutt L, Wu C, Xue X, Hafner JP. Estimating the Relative Risk in Cohort Studies and Clinical Trials of Common Outcomes. 2003;157(10):940–3.
35. Hoang thi Ttan PM. Early Essential Newborn Care Is Associated With Reduced Adverse Neonatal Outcomes in a Tertiary Hospital in Da Nang, Viet Nam: A Pre- Post-Intervention Studa21906378e4aef @ www.ncbi.nlm.nih.gov [Internet]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6537584/
36. Weiner EA, Billamay S, Partridge JC, Martinez AM. Antenatal education for expectant mothers results in sustained improvement in knowledge of newborn care. J Perinatol. 2011;92–7.

37. Name F. COUNTY GOVERNMENT OF MARSABIT COUNTY PUBLIC SERVICE BOARD OF MARSABIT Our Tel : + 254-069-22102257 , Fax : + 254-20-2102136 , e-mail : jobs@marsabitcpsb.go.ke.
38. Phukan D, Ranjan M, Dwivedi LK. Impact of timing of breastfeeding initiation on neonatal mortality in India. 2018;1–10.
39. Missmer SA, Kajeepeta S. Kangaroo Mother Care and Neonatal Outcomes : A Meta-analysis. 2015;(December).
40. Zupan J, Garner P, Aaa O, Zupan J, Garner P, Aaa O. Topical umbilical cord care at birth (Review). 2004;
41. WHO. Implementing the World Health Organization Revised Recommendations on Cord Care. 2018;2(January):4–7.
42. Vonasek BJ, Bajunirwe F, Jacobson LE, Twesigye L. Do Maternal Knowledge and Attitudes towards Childhood Immunizations in Rural Uganda Correlate with Complete Childhood Vaccination ? 2016;1–16.
43. Tirhas, Belachew F. Knowledge and practice of Essential Newborn Care among postnatal mothers in Mekelle City, North Ethiopia A population-based survey.
44. Misgna HG, Gebru HB, Birhanu MM. Knowledge , practice and associated factors of essential newborn care at home among mothers in Gulomekada District , Eastern. BMC Pregnancy Childbirth [Internet]. 2016;1–8. Available from: http://dx.doi.org/10.1186/s12884-016-0931-y
45. Sandberg J, Pettersson KO, Asp G, Kabakyenga J, Agardh A. Inadequate Knowledge of Neonatal Danger Signs among Recently Delivered Women in Southwestern Rural Uganda : A Community Survey. 2014;9(5).
46. Gulema H. Level of Knowledge and Associated Factors of Postnatal Mothers ' towards Essential Newborn Care Practices at Governmental Health Centers in Addis Ababa , Ethiopia. 2018;2018.

APPENDIX 1: QUESTIONNAIRE

Study identification number.....Date.....

A. SOCIODEMOGRAPHIC CHARACTERISTICS OF MOTHER

Tick appropriate response

1. Mother's age in years.....

2. Marital status

Single	Separated	Divorced	Married

3. Father's age in years.....

4. Mother's occupation

Employed	Unemployed

5. If employed,

Professional	Domestic Services	Skilled manual	Unskilled manual	Agriculture	Small scale business

6. Mother's level of education

No formal education	Primary incomplete	Primary complete	Secondary incomplete	Secondary complete	Tertiary

7. Mother's religion

Islam	Christian	Atheist	Other(specify)

B. ANTENATAL AND BIRTH HISTORY

Tick appropriate response

1. Neonate's gestation in weeks.....

2. Neonate's birth weight in kilograms.....

3. Neonate's sex

Male	Female

4. Mother's parity.....

5. Did you attend antenatal clinic during this pregnancy?

Yes	No (skip to Q 8)

6. How many ANC visits did you attend? .....

7. How far along was your pregnancy when you first attended ANC (in months)? .....

8. Did you receive tetanus injections during this (or your previous) pregnancy?

Yes	No	Don't know

9. How did you deliver?

	Spontaneous vertex delivery
	Caesarean section

10. How long after delivery where you discharged?

Hours	Days

C. EDUCATION ON NEWBORN CARE

1. Did you receive any education on newborn care practices during this pregnancy?

Yes	No(go to Q4)

2. What information were you provided on?

	Breastfeeding
	Cord care
	Eye care
	Thermoregulation
	Immunization
	Danger signs in newborn
	Care of the low birth weight
	Other (specify)

3. Who provided you with the information?

	Doctor
	Nurses
	Family
	Media(e.g. pamphlets, brochures, magazines)
	Traditional Birth Attendant
	Peers/ friends
	Other(specify)

4. Have you received any newborn care education since you delivered this baby?

Yes (go to Q 5)	No(proceed to next section)

5. Who provided you with the information?

Doctor	Nurse / Midwife	Family	Other (specify)

6. What information were you provided on?

	Breastfeeding
	Cord care
	Eye care
	Thermoregulation
	Immunization
	Danger signs in newborn
	Care of the low birth weight
	Other (specify)

D. THERMOREGULATION KNOWLEDGE

1. How should you keep your baby warm after delivery?

Skin to skin contact	Wrapped the baby in a cloth	Other(specify)

2. How long should you take before you give your baby the first bath after delivery?

Minutes	Hours	Days	Don't know

3. Should your baby be nursed in a separate room from you after delivery?

Yes	No	Don't know

ATTITUDE

4. Babies with normal birth weight lose heat faster than low birth weight babies.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

6. Your baby can be bathed in cold water.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

E. CLEANLINESS AND CORD CARE KNOWLEDGE

1. Should the umbilical stump of your baby be covered with a cloth/bandage or uncovered?

Covered	Uncovered	Don't know

2. If the umbilical stump is soiled with baby's urine or faeces how would you clean it?

Clean with water	Clean with saliva	Apply alcohol or spirit	chlorohexidine	Other(specify

3. After cleaning your baby's soiled umbilical stump, should any substances be applied to it?

Yes	No	Don't know

4. If yes, what material should be applied on your baby's umbilical stump?

Surgical spirit	Alcohol	Saliva	Cow dung	Chlorohexidine	Others specify

ATTITUDE

5. A previously used razor blade can be washed and used to cut the cord.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

6. A dirty umbilical cord can cause infection in your baby.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

F. **BREASTFEEDING KNOWLEDGE**

1. How soon after delivery should you take to breastfeed your baby?

Minutes	Hours	Don't know

2. Should you (or anyone else) give any fluid/feeds to your baby before breastfeeding for the first time?

Yes	No	Don't know

3. How often should you breastfeed your baby?

	On demand(when baby cries/looking for breast)
	According to timetable
	Other (specify)

4. How long should you exclusively breastfeed your baby (in months)? .....

5. What should you do with the first milk (colostrum) that came from your breast?

	Fed the baby(go to question 7)
	Threw it away (go to question 6)
	Other (specify)- (go to question 6)

6. Why wouldn't you give your baby the first milk? .....

…….

ATTITUDE

7. Your baby should be breastfed at night.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

8. Your baby should be given other feeds/fluids aside from breast milk.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

9. If you feel your baby should get other feeds, what would you give?

Water	Cows/goat milk	Sugar/glucose water	Other (specify)

G. IMMUNIZATION KNOWLEDGE

1. Does your baby require any vaccination at birth?

Yes	No	Don't know

2. Why do we give vaccines to the baby after birth?

To prevent diseases	Don't know	Other (specify)

3. What vaccines should your baby received at birth?

BCG	OPV	Don't know	Other (specify)

4. What disease does BCG vaccine protect your baby from?

Tuberculosis	Don't know	Other (specify)

5. What disease does OPV vaccine protect your baby from?

Polio	Don't know	Other (specify)

ATTITUDE

6. What is the benefit of vaccines?.....

.....

7. Can vaccines be harmful to your baby?

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

7. If you agree, how do they harm your baby? .....

H. EYE CARE KNOWLEDGE

1. Are you aware of any signs that would make you know your baby has an eye infection?

Eye discharge	Reddening of eye	Swollen eye	Other (specify)

ATTITUDE

2. Substances (aside from those prescribed by a doctor) can be applied to your baby's eye if you note discharge, reddening or swelling.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

3. If you agree, what would you apply to your baby's eye?

Breast milk	Cow dung	Saliva	Other (specify)

I. DANGER SIGNS IN NEONATE

1. Are you aware of any signs that will tell you your baby has serious illness?

…….....**.....**

2. Which of the following signs would consider to suggest serious illness in a newborn*?*

In a scale of 5 in order of perceived importance by the mother

	Very Important	Important to some extent	Not sure	Not really important	Not important at all
Yellowish discoloration of eyes, palms, soles					
Umbilicus red, discharging pus, surrounding skin red					
Eyes swollen, sticky, red or draining pus					
Baby stops breastfeeding					
Abnormal jerking movement of limbs and eyes					
Difficulty in breathing					
Fever					
Baby cold to touch					
Baby previously active becomes lethargic					
Abdominal distension					
Diarrhea					
Vomiting					
Cries excessively/irritable					

Thank you for your participation!

APPENDIX 2: MASWALI

Nambari ya kitambulisho cha kusoma..... Tarehe.....

A. CHANZO ZA SAYANSI ZA KIUME ZA MAMA

Jibu majibu sahihi

1. Umri wa mama katika miaka.....

2. Hali ya ndoa

Pekee	Tengwa	Taliki	Aliyeoa

3. Umri wa baba katika miaka.....

4. Kazi ya mama

Ajiriwa	wasio na kazi

5. Ikiwa ameajiriwa,

Utaalamu	Huduma za Nyumbani	Ujuzi mwongozo	Mwongozo usio na ujuzi	Kilimo	Biashara ndogo ndogo

6. Kiwango cha elimu cha mama

Hakuna elimu rasmi	Elimu ya Msingi haujakamilika	Elimu ya Msingi kamili	Sekondari haijakamilika	Sekondari imekamilika	elimu ya juu

7. Dini ya mama

Uislamu	Mkristo	mkanamungu	Nyingine (taja)

B. HISTORIA YA UJAUZITO NA KUZAA

Jibu majibu sahihi

1. Ujauzito wa Mtoto mchanga katika wiki.....

2. Uzito wa kuzaliwa wa Mtoto mchanga katika kilo.....

3. Jinsia ya Mtoto mchanga

Mwanaume	Kike

4. Uko na watoto wangapi .....

5. Je! Ulihudhuria kliniki ya ujauzito wakati huu wa ujauzito?

Ndio	Hapana (ruka hadi Q 8)

6. Ulihudhuria ziara ngapi za kliniki ya ujauzito? .....

7. Je! Mimba yako ilikuwa umbali gani ulipohudhuria kliniki ya kwanza ya ujauzito (kwa miezi)

8. Ulipokea sindano za tetanasi wakati huu wa ujauzito (au wako wa zamani)?

Ndio	Hapana	Sijui

9. Ulijifungua aje?

	Uwasilishaji wa moja kwa moja wa kawaida
	Upasuaji

10. Muda gani baada ya kujifungua ulipata ruhusa ya kurudi nyumbani ?

Masaa	Siku

C. MAFUNZO JUU YA UTUNZAJI WA WATOTO WACHANGA

1. Ulipata elimu yoyote juu ya mazoea ya utunzaji mpya wakati wa ujauzito huu?

Ndio	Hapana (nenda kwa Q4)

2. Ulipewa habari gani?

	Kunyonyesha
	Utunzaji wa kamba ya kitovu
	Utunzaji wa macho
	Mchakato ambao unaruhusu mwili wako kudumisha joto la ndani salama
	Chanjo
	Dalili za hatari katika watoto wachanga
	Utunzaji wa uzito wa chini wa kuzaliwa
	Nyingine (taja)

3. Nani aliyekupa habari hiyo?

	Daktari
	Wauguzi
	Familia
	Vyombo vya habari (kwa mfano, vipeperushi, brosha, majarida)
	Mkunga
	Rika / marafiki
	Nyingine (taja)

4. Je! Umepokea elimu yoyote ya utunzaji mpya tangu ujifungue mtoto huyu?

Ndio (nenda kwa Q 5)	Hapana (endelea sehemu inayofuata)

5. Nani aliyekupa habari hiyo?

Daktari	wauguzi / Mkunga	Familia	Zingine (Taja)

6. Ulipewa habari gani?

	Kunyonyesha
	Utunzaji wa kamba ya kitovu
	Utunzaji wa macho
	Mchakato ambao unaruhusu mwili wa mtoto kudumisha joto la ndani salama
	Chanjo
	Dalili za hatari katika watoto wachanga
	Utunzaji wa uzito wa chini wa kuzaliwa
	Nyingine (taja)

D. UFAHAMU WA MCHAKATO AMBAO UNARUHUSU MWILI WA MTOTO KUDUMISHA JOTO LA NDANI SALAMA

1. Je! Unapaswa kumfanya mtoto wako joto vipi baada ya kujifungua?

Ngozi kwa ngozi	Alimfunga mtoto kwa kitambaa	Nyingine (taja)

2. Unapaswa kuchukua muda gani kabla ya kumuogesha mtoto wako ya baada ya kuzaa?

Dakika	Masaa	Siku	Sijui

3. Je! Mtoto wako anapaswa kumlea katika chumba tofauti na wewe baada ya kujifungua?

Ndio	Hapana	Sijui

MTAZAMO

4. Watoto walio na uzani wa kawaida hupoteza joto haraka kuliko watoto wenye uzito wa chini.

Kubali sana	Kubali	Wala hawakubaliani wala hawakubaliani	Kutokubali	Sikubaliani kabisa

6. Mtoto wako anaweza kuoshwa katika maji baridi.

Kubali sana	Kubali	Wala hawakubaliani wala hawakubaliani	Kutokubali	Sikubaliani kabisa

E. UFAHAMU WA UNADHIFU NA UTUNZAJI WA KITOVU

1. Je! Shina la kitovu la mtoto wako linapaswa kufunikwa kitambaa / bandeji au kufunuliwa?

Imefunikwa	Imefunuliwa	Sijui

2. Ikiwa shina la kitovu limechafuliwa na mkojo wa mtoto au kinyesi unawezaje kuisafisha??

Safisha na maji	Safisha na mate	Tumia Alcohol ama spirit	chlorohexidine	Nyingine (taja)

3. Baada ya kusafisha shina la kitovu wa mtoto mchanga, vitu vyovyote vinaweza kutumika kwake?

Ndio	Hapana	Sijui

4. Ikiwa ndio, ni nyenzo gani inayopaswa kutumika kwenye kisiki cha kitovu ya mtoto wako?

Surgical spirit	Alcohol	Mate	Kinyesi la ng'ombe	Chlorohexidine	Nyingine (taja)

MTAZAMO

5. Wembe iliyotumiwa hapo awali inaweza kuoshwa na kutumiwa kukata kitovu.

Kubali sana	Kubali	Wala hawakubaliani wala hawakubaliani	Kutokubali	Sikubaliani kabisa

6. Kitovul kichafu kinaweza kusababisha maambukizi kwa mtoto wako.

Kubali sana	Kubali	Wala hawakubaliani wala hawakubaliani	Kutokubali	Sikubaliani kabisa

F. **MAARIFA YA KUNYONYESHA**

1. Ni mara ngapi baada ya kuzaa unapaswa kuchukua kunyonyesha mtoto wako?

Dakika	Masaa	Sijui

2. Je! Unapaswa (au mtu mwingine yeyote) kumpa mtoto wako maji / malisho kabla ya kunyonyesha kwa mara ya kwanza?

Ndio	Hapana	Sijui

3. Je! Unapaswa kunyonyesha mtoto wako mara ngapi??

	Kwa mahitaji (wakati mtoto analia / anatafuta matiti)
	Kulingana na ratiba
…… ….	Nyingine (taja)

4. Unapaswa kunyonyesha mtoto wako hadi lini (kwa miezi)? .....

5. Unapaswa kufanya nini na maziwa ya kwanza (colostrum) ambayo yalitoka kwenye matiti yako?

	Kulisha mtoto (nenda swali la 7)
	Kuiondoa (nenda swali la 6)
	Nyingine (taja) - (nenda kwa swali la 6)

6. Kwa nini hautampa mtoto wako maziwa ya kwanza?.....

.....

MTAZAMO

7. Mtoto wako anapaswa kunyonyesha usiku.

Kubali sana	Kubali	Wala hawakubaliani wala hawakubaliani	Kutokubali	Sikubaliani kabisa

8. Mtoto wako apewe lishe / vinywaji vingine kando na maziwa ya mama.

Kubali sana	Kubali	Wala hawakubaliani wala hawakubaliani	Kutokubali	Sikubaliani kabisa

9. Ikiwa unahisi mtoto wako anapaswa kupata malisho mengine, ungetoa nini?

Maji	Ng'ombe / maziwa ya mbuzi	Maji ya sukari / sukari	Nyingine (taja)

G. MAARIFA KUHUSU CHANJO

1. Je! Mtoto wako anahitaji chanjo yoyote wakati wa kuzaliwa?

Ndio	Hapana	Sijui

2. Kwa nini tunampa chanjo kwa mtoto baada ya kuzaliwa?

Ili kuzuia magonjwa	Sijui	Nyingine (taja)

3. Ni chanjo gani mtoto wako anapokea wakati wa kuzaliwa?

BCG	OPV	Sijui	Nyingine (taja)

4. Chanjo la BCG inalinda mtoto wako kutoka maradhi gani?

Tuberculosis	Sijui	Nyingine (taja)

5. Chanjo la OPV inalinda mtoto wako kutoka maradhi gani?

Polio	Sijui	Nyingine (taja)

MTAZAMO

6. Je! Faida ya chanjo ni nini?.....

.....

7. Chanjo inaweza kuwa na madhara kwa mtoto wako?

Kubali sana	Kubali	Wala hawakubaliani wala hawakubaliani	Kutokubali	Sikubaliani kabisa

7. Ikiwa unakubali, wanamuumiza vipi mtoto wako? .....

H. MAARIFA KUHUSU UTUNZAJI WA MACHO

1. Je! Unajua dalili zozote ambazo zitakufanya ujue mtoto wako ana maambukizi ya jicho?

Jicho kutoa uchafu	jicho kuwa nyekundu	Uvimbe kwa jicho	Nyingine (taja)

MTAZAMO

2. Vifungu (kando na vilivyoamriwa na daktari) vinaweza kutumika kwa jicho la mtoto wako ikiwa unaona kutokwa, kuwa nyekundu au uvimbe.

Kubali sana	Kubali	Wala hawakubaliani wala hawakubaliani	Kutokubali	Sikubaliani kabisa

3. Ikiwa unakubali, utatumia nini kwa jicho la mtoto wako?

Maziwa ya matiti	kinyesi cha ng'ombe	Mate	Nyingine (taja)

I. ISHARA HATARI KWA MTOTO MCHANGA

1. Je! Unajua dalili zozote ambazo zitakuambia mtoto wako ana ugonjwa mbaya?

…….....**...**

2. Ni ipi kati ya ishara zifuatazo ambazo zinaweza kuzingatia kuashiria ugonjwa mbaya katika mtoto mchanga?

Katika kiwango cha 5 kwa utaratibu wa mama kujua

	Muhimu sana	Muhimu kwa kiwango fulani	Sio hakika	Sio kweli muhimu	Sio muhimu kabisa
Mchanganyiko wa rangi ya manjano, mitende, nyayo					
Nyekundu, ikitoa usaha, ngozi yanayozunguka nyekundu					
Macho kuvimba, nata, nyekundu au kutoa usaha					
Mtoto huacha kunyonya					
Harakati isiyo ya kawaida ya kuteleza ya miguu na macho					
Ugumu wa kupumua					
Homa					
Baridi mtoto kuguzwa					
Mtoto hapo awali anakuwa kikamilifu na hatua ya kutisha					
Usumbufu wa tumbo					
Kuhara					
kutapika					
Analia sana/Akikasirika					

Asante kwa ushiriki wako!

APPENDIX 3: CONSENT FORM FOR THE STUDY

(English version)

Study identification number:_____ Date:_____

STUDY TITLE

Knowledge and attitude of postnatal mothers on essential newborn care practices at Marsabit County Refferal Hospital

PRINCIPAL INVESTIGATOR

Dr Guyatu Dida

Registrar, Department of Paediatrics and Child Health, University of Nairobi.

SUPERVISORS

1. Professor Dalton Wamalwa,

Department of Paediatrics and Child Health, University of Nairobi.

2. Dr. Lucy Mungai

Department of Paediatrics and Child Health, University of Nairobi.

i. INTRODUCTION

I am currently a postgraduate student at the University of Nairobi, Department of Paediatrics. I would like to request you and your baby to participate in my research study. The purpose of this consent form is to give you information you will need to help you decide whether to participate in the study. Kindly read this form carefully. You are free to ask any questions about the study. The investigator will be available to answer any questions that arise during the study and afterwards.

ii. OBJECTIVE OF THE STUDY

This aim of this study is to assess knowledge and attitude of postnatal mothers on essential newborn care practices in Marsabit County Referral Hospital. Essential newborn care practices encompass cord care practices, immunization, and thermoregulation, initiation of breathing, eye care, breastfeeding and recognition of danger signs. These practices are important in the care of your baby and help to prevent newborn illness and early recognition of danger signs.

iii. CONFIDENTIALITY

Any information that you provide will be held in strict confidentiality and will only be used only for the purpose of this study.

iv. BENEFITS

Any mother who is found to be lacking in knowledge on essential newborn care practices will be promptly educated.

Any information that is pertinent to the care of your baby will be promptly passed on to your primary physician.

v. RISKS

No invasive procedures or tissue samples will be obtained from you or your baby as part of the study.

vi. VOLUNTARISM

Participation in this study is purely voluntary and there is no monetary gain. You are free to withdraw from the study if you so wish without any penalty.

vii. COMPENSATION

No compensation will be offered for participation in the study.

viii. EXPECTED TIME IN THE STUDY

An exit interview will be carried before you leave the hospital once your primary caregiver discharges you and your baby. No follow up interviews or visits related to the study will be required.

ix. CONTACT INFORMATION

If you have any questions about the study or your participation in the study you can contact the principal investigator, Dr. Guyatu Dida, 0716296495.

If you have any questions on your rights as a research participant you can contact the Kenyatta National Hospital Ethics and Research Committee (KNH/UON/ERC) by calling 2726300 extensions 44355.

I confirm that I have explained to the parent all relevant information about the study as indicated above.

Consent to take part in research

a. I voluntarily agree to participate in this research study
b. I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
c. I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.
d. I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.
e. I understand what participation in the study involves.
f. I understand that I will not benefit directly from participating in this research.
g. I understand that all information I provide for this study will be treated confidentially.
h. I understand that in any report on the results of this research my identity will remain anonymous.
i. I understand that if I inform the researcher that myself or someone else is at risk of harm they may have to report this to the relevant authorities - they will discuss this with me first but may be required to report with or without my permission.
j. I understand that signed consent forms will be retained until the results of the dissertation are confirmed by the examination council.
k. I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

I confirm that the above study has been explained to me. I agree to participate in the study with my baby. I have had a chance to ask questions about the research, to which satisfactory answers have been given. I understand l can withdraw from the study at any time without any penalty.

Interviewee's signature……... Date……..

APPENDIX 4: FOMU YA IDHINI YA UTAFITI

(Kiswahili)

Maelezo ya Washiriki na Fomu ya Kujiandikisha katika Utafiti

Nambari ya Utafiti..... Tarehe .....

Kichwa cha Utafiti:

Kujua maarifa na mtazamo ya akina mama baada ya kuzaa kuhusu mazoea muhimu ya utunzaji wa watoto wachanga katika hospital ya rufaa ya kaunti ya Marsabit.

Mtafiti Mkuu:

Dr Guyatu Dida
Mwanafunzi, Idara ya Maabara ya Pediatrics na Afya ya Watoto, Chuo Kikuu cha Nairobi.

Wasimamizi:

1. Professor Dalton Wamalwa
Idara ya Maabara ya Pediatrics na Afya ya Watoto, Chuo Kikuu cha Nairobi

2. Dr. Lucy Mungai
Idara ya Maabara ya Pediatrics na Afya ya Watoto, Chuo Kikuu cha Nairobi

i. Utangulizi:

Mimi ni mwanafunzi wa shahada ya pili katika Chuo Kikuu cha Nairobi. Napenda kukujulisha kuhusu utafiti ninaofanya na kuomba wewe na mtoto wako kushiriki katika utafiti. Lengo la fomu hii ya idhini ni kukupa taarifa unayohitaji ili kukusaidia kuamua kuwa mshiriki katika utafiti. Tafadhali soma fomu hii kwa makini. Jisikie huru kuuliza maswali yoyote kuhusu

utafiti. Mtafiti atakuwa anapatikana kujibu maswali yoyote ambayo yanaweza kutokea wakati wa utafiti na baadaye.

ii. Malengo ya Utafiti:

Kusudi la utafiti huu ni kutathmini maarifa na mtazamo wa akina mama baada ya kuzaa juu ya mazoea muhimu ya utunzaji wa watoto wachanga katika hospitali ya rufaa ya kaunti ya Marsabit. Mazoea muhimu ya utunzaji wa kamba, chanjo, matibabu ya mwili, utunzaji wa macho, kunyonyesha na utambulizi wa ishara hatari. Tabia hizi ni muhimu katika utunzaji wa mtoto wako na husaidia kuzuia ugonjwa mpya na utambulizi wa mapema wa ishara hatari.

iii. Siri:

Habari yoyote ambayo unatoa itafanywa kwa usiri mkali na itatumika tu kwa sababu ya utafiti huu.

iv. Faida:

Mama yoyote ambaye hupatikana kukosa ujuzi juu ya mazoea muhimu ya utunzaji wa watoto wachanga ataelemishwa haraka.
Habari yoyote ambayo ni muhimu kwa utunzaji wa mtoto wako itapitishwa kwa daktari wako wa msingi.

v. Athari

Hakuna taratibu za uvamizi au sampuli za tishu zitachukuliwa kutoka kwako ama kwa mtoto wako kama sehemu ya utafiti.

vi. Kujitolea

Kushiriki katika utafiti huu ni kwa hiaritu na hakuna faida ya kifedha. Uko huru kujiondoa kwenye utafiti ikiwa unataka hivyo wakati wowote bila adhabu yoyote**.**

vii. Fidia

Hakutakuwa na fidia ya fedha kwa ushiriki katika utafiti huu.

viii. Muda ya utafiti

Mahojiano ya kutoka nje yatafanywa kabla ya kutoka hospitalini mara tiu mlezi wako wa kwanza atakapokuondoa wewe na mtoto wako. Hakuna mahojiano yafuatayo au ziara zinazohusiana na utafiti zitahutajika.

ix. Maelezo ya uwasiliano

Ikiwa una maswali yoyote kuhusu utafiti au ushiriki wako katika utafiti unaweza kuwasiliana na mtafiti mkuu, Dr Guyatu Dida, 0716296495. Ikiwa una maswali yoyote juu ya haki zako kama mshiriki wa utafiti unaweza kuwasiliana na Kenyatta National Hospital-Chuo Kikuu cha Nairobi Kamati ya Maadili na Utafiti (KNH / UON / ERC) kwa kupiga simu namba 2726300 Ugani 44102. Barua pepe: uonknh_erc@uonbi.ac.ke

Kukubali kushiriki katika utafiti

a. Nakubali kwa hiari kushiriki katika utafiti huu.
b. Ninaelewa kuwa hata nikikubali kushiriki sasa, naweza kujiondoa wakati wowote au kukataa kujibu swali lolote bila matokeo ya aina yoyote.
c. Ninaelewa kuwa naweza kuondoa ruhusa ya kutumia data kutoka kwa mahojiano yangu ndani ya wiki mbili baada ya mahojiano, kwa hali ambayo nyenzo zitafutwa.
d. Nimekuwa na madhumuni na maumbile ya utafiti ulinielezea kwa maandishi na nimepata nafasi ya kuuliza maswali juu ya utafiti.
e. Ninaelewa ni ushiriki gani katika utafiti unajumuisha
f. Ninaelewa kuwa sitafaidika moja kwa moja kutokana na kushiriki katika utafiti huu.
g. Ninaelewa kuwa habari zote ambazo ninatoa kwa utafiti huu zitatibiwa kisiri.
h. Ninaelewa kuwa katika ripoti yoyote juu ya matokeo ya utafiti huu kitambulisho changu kitabaki bila majina.
i. Ninaelewa kuwa ikiwa nitafahamisha mtafiti kwamba mimi au mtu mwingine yuko hatarini kuumiza anaweza kulazimika kuripoti hii kwa maafisa husika - watajadili haya kwanza lakini wanaweza kuhitajika kuripoti na au bila ruhusa yangu.

j. Ninaelewa kuwa fomu za idhini iliyosainiwa itahifadhiwa hadi matokeo ya utafiti yatakapothibitishwa na baraza la mitihani.
k. Ninaelewa kuwa niko huru kuwasiliana na yeyote wa watu waliohusika katika utafiti ili kutafuta ufafanuzi zaidi na habari.

Ninathibitisha kwamba utafiti hapo juu umeelezea kwangu. Ninakubali kushiriki katika utafiti na mtoto wangu. Nimepata nafasi ya kuuliza maswali kuhusu utafiti, ambayo majibu ya kuridhisha yamepewa. Ninaelewa naweza kujiondoa kutoka kwa utafiti wakati wowote bila adhabu yoyote.

Sahihi ……. Tarehe……..

APPENDIX 5: WORK PLAN

	TIME PERIOD											
ACTIVITY	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**July**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Literature review and Concept development	*											
Written Research Protocol and 1st submission to KNH-REC						*						
2nd submission and corrections									*			
Final submission and expected approval									*			
Data collection										*		
Data analysis												*
Report writing												*
Submission of draft report												*

APPENDIX 6: RESEARCH BUDGET PROPOSAL

S/N	PARTICULAR	DESCRIPTION	UNIT/S	UNIT COST IN KSHS	TOTAL COST IN KSHS
1.	Computer	Lap top	1	50,000	50,000
2.	Printer	Desk jet	1	15,000	15,000
3.	Proposal development	Printing, photocopying and binding several proposal drafts	10	500	5,000
4.	Data analysis	Statistician Services	1	30,000	30,000
5.	Typing, binding and photocopy of the final draft		1	20,000	20,000
6.	Poster presentation		1	15,000	15,000
7.	Publication		1	50,000	50,000
8.	Transportation	Return bus fare to Marsabit	1	5000	5000
9.	Contingency 15%		1		28500
	Total				**218,500**

APPENDIX 7: COMPONENTS OF THE ESSENTIAL NEWBORN CARE

1. Early and exclusive breastfeeding

Breastfeeding should be started within an hour of delivery. Feeding should be as frequent as the baby demands without prelacteal feeds or other fluids and food. Knowledge on the importance of breastfeeding should be disseminated among families and communities as well as health workers and managers.

2. Cleanliness and cord care

Clean delivery and clean cord care can be ensured everywhere in health facilities by policies and practices for prevention, detection and control of nosocomial infections and at home by strengthening standards of cleanliness. A complementary strategy to reduce neonatal tetanus is immunising pregnant women with tetanus toxoid.

3. Thermoregulation

Simple measures such as warm delivery room, immediate drying of the baby and skin to skin contact with the mother prevents loss of body warmth. Birth attendants and families need to be instructed on how to rewarm babies that become hypothermic.

4. Initiation of breathing, resuscitation

Birth asphyxia should be promptly recognised and management should follow the basic principles of resuscitation, aspiration of mouth and nostrils, end ventilation with positive pressure.

5. Eye care: prevention and management of ophthalmia neonatorum

Eye prophylaxis involves cleaning the eye immediately after birth and applying either silver nitrate drops or tetracycline eye ointment within the first hour of birth. There must be early diagnosis and management of ophthalmia.

6. Care of the low birth weight and/or preterm

Additional warmth, cleanliness and nutrition, early recognition and management of diseases in preterms and/ or low birth weight.

7. Immunisation

At birth BCG, OPV and Hepatitis B vaccines are recommended by WHO.

8. Management of newborn illnesses

Major newborn illnesses should be recognised early both at home and at the health facility so that the baby can be managed appropriately.

APPENDIX 8: ETHICAL APPROVAL

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

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

Ref: KNH-ERC/A/376

11th October, 2019

KENYATTA NATIONAL HOSPITAL APPROVED 11 OCT 2019 KNH/UoN-ERC P. O. BOX 20723 - 00202 NAIROBI

Dr.Guyatu Dida Wario
Reg. No.H58/6668/ 2017
Dept.of Paediatrics and Child Health
School of Medicine
College of Health Sciences
University of Nairobi

Dear Dr. Guyatu

RESEARCH PROPOSAL: KNOWLEDGE AND ATTITUDE OF POSTNATAL MOTHERS ON ESSENTIAL NEWBORN CARE PRACTICES AT MARSABIT COUNTY REFERRAL HOSPITAL (P497/06//2019)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 11th October 2019 – 11th October 2020.

This approval is subject to compliance with the following requirements:

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