

**KNOWLEDGE AND ATTITUDE OF POSTNATAL
MOTHERS ON ESSENTIAL NEWBORN CARE
PRACTICES AT KENYATTA NATIONAL HOSPITAL**

A dissertation submitted in partial fulfilment for the degree of Masters in Medicine
(Paediatrics and Child Health), University of Nairobi

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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.

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ABSTRACT

INTRODUCTION: Of the 130 million babies born yearly, nearly 4 million die in neonatal period¹. Almost all deaths occur in low and middle income countries with the highest rates in sub-Saharan Africa². Kenya Demographic Health Survey (KDHS) 2008/9 places neonatal mortality rate at 31 deaths per 1,000 live births with only a marginal decline from 2003 rate of 33 deaths per 1,000 live births. Essential Newborn Care practices, developed by WHO, are simple measures that can improve neonatal outcomes. The aim of the study was to assess maternal knowledge and attitude towards selected aspects of essential newborn care practices.

METHODOLOGY: A hospital based cross-sectional study was conducted in Kenyatta National Hospital. A total of 380 postnatal mothers were interviewed using structured pretested questionnaires. Knowledge was assessed using closed and open ended questions. A score of one was allocated for correct knowledge and zero for incorrect. Attitude was assessed using a five point Likert scale. Data was analysed using SPSS version 18.

RESULTS: More than 90% of mothers knew of breastfeeding on demand, exclusive breastfeeding and colostrum use. Only 17.8 % of mothers identified BCG and OPV as birth vaccines while 7 % of mothers believed vaccines were harmful. Modes of thermoregulation identified included kangaroo care (7%), warm room (4%) and warm clothing (93%). Only 4 mothers knew the cord should be left clean and dry without applying any substances. At least 6 of 13 newborn danger signs were identified by more than 90% of mothers. Positive attitude was noted most consistently on breastfeeding and cord care. Multivariate analysis showed poor maternal knowledge was associated with lack of antenatal education on newborn care (OR 3.3, p 0.003, CI 1.5-7.4), no ANC visits (OR 5.1, p 0.018, CI 1.3-19.3) or incomplete ANC visits (OR 2.5, p 0.001, CI 1.5-4.2).

CONCLUSION: Knowledge gaps exist in cord care, eye care, and immunisation. Postnatal mothers have a positive attitude towards cord care and breastfeeding but negative attitude towards other components of newborn care. Lack of antenatal education on newborn care and those who fail to attend all the recommended four antenatal clinic are likely to have poor knowledge and should be targeted for newborn education.

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LIST OF ABBREVIATIONS

AAP-American Academy of Paediatrics

ANC – Antenatal Care

BCG - Bacille Calmette Guerin

DPT- Diphtheria Pertussis Tetanus

EPI -Expanded Programme on Immunisation

KDHS - Kenya Demographic and Health Survey

KNH - Kenyatta National Hospital

MDG - Millennium Development Goals

OPV- Oral Polio Vaccine

OR – Odds Ratio

SD- Standard Deviation

WHO - World Health Organisation

DEFINITIONS

Essential Newborn Care: A set of recommendations by the World Health Organisation on newborn care practices that include thermoregulation, clean delivery and cord care, breastfeeding, initiation of breathing and resuscitation, eye care, immunization and care of preterm/ low birth weight.

Neonate: Any infant from birth to the 28th day of life.

Knowledge: Refers to expertise or skills acquired by a person through experience or education

Attitude: Refers to a person's overall evaluation of a particular behavior. It is assumed to have two components which work together: beliefs about consequences of the behavior and the corresponding positive or negative judgement about the behavior.

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

BACKGROUND

1.1 INTRODUCTION

Neonatal mortality remains high despite a declining proportion of deaths among children less than five years of age¹. Every year, nearly 40% of all deaths in children under-five are among newborn infants¹. Three quarters of these newborn deaths occur in the first week of life¹. Of the 130 million babies born every year, about 4 million die in the first 4 weeks of life². Almost all (99%) of these neonatal deaths occurred in low income and middle income countries with the highest rates occurring in sub-Saharan Africa (35 deaths per 1000 live births in 2010)².

Causes of neonatal deaths vary; 35 % result from preterm birth complications and 23% are due to complications occurring during birth¹ (Figure 1). Sepsis, congenital anomalies and pneumonia are among other causes of neonatal deaths¹. Most of these newborns die at home, without skilled care that could greatly increase their chances for survival².

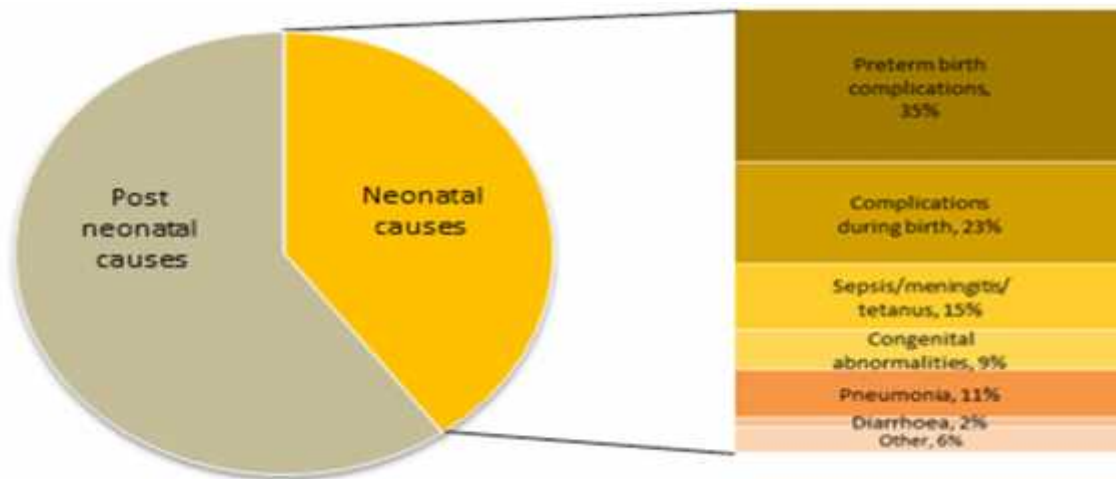


Figure 1: Global distribution of deaths among neonates, by cause.

Neonatal health remains a challenge in Kenya. The Kenya Demographic and Health Survey (KDHS) 2008 places neonatal mortality rate at 31 deaths per 1,000 live births³. Comparison of the infant mortality rate between KDHS 2003 and 2008 shows a steep decline from 77 to 52 deaths per 1000 live births in sharp contrast to neonatal mortality rate which showed only a marginal decline from 35 to 31 deaths per 1000 live births³.

The fourth Millennium Development Goal (MDG-4) aims to reduce infant and child mortality by two thirds between 1990 and 2015. With only one year to go, achieving the targets in under-five mortality (33 deaths per 1000 live births) and infant mortality (26 deaths per 1000 live births) by 2015 will be impossible unless neonatal care receives more attention. Sub-Saharan Africa, where child mortalities remain high, needs to put in more effort to meet this target² (figure 2).

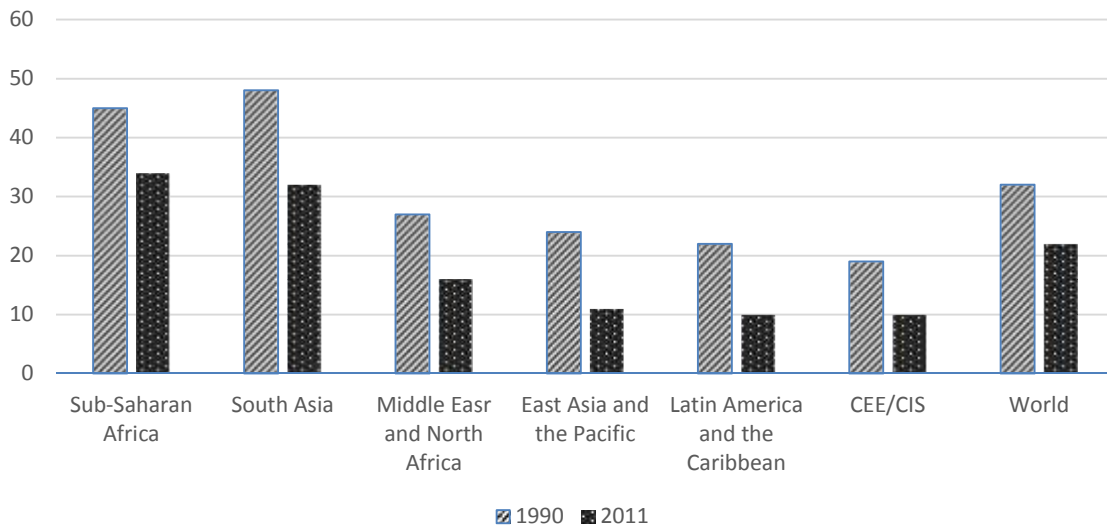


Figure 2: Proportion of under five deaths that occur in neonatal period (percentage), by UNICEF region, 1990 and 2011.

The World Health Organization has come up with a set of guidelines, Essential Newborn Care practices, which are evidence based cost effective measures to improve neonatal outcomes.

These guidelines are to be used by all those who interact with the neonate including the health care provider and mother and encompass breastfeeding, cord care, eye care, thermoregulation, immunization and care of the low birth weight infant. Majority of neonatal deaths occur at home where neonates lack appropriate newborn care. Lack of knowledge, coupled with strong cultural beliefs, influence neonatal survival once a neonate is at home with the primary caregiver^{4, 5, 7}. In a study done in Kenyatta National Hospital paediatric wards, Simiyu showed that 41% of neonatal deaths occurred in the first 24 hours of admission with majority of these deaths occurring in the first week (83.5%) of admission⁵. It was noted that parents delayed in bringing their infants for medical attention and only came when infants were in terminal stages⁵. Waiswa et al in Uganda also noted delay in primary caregivers bringing newborns to hospital contributed significantly to mortality⁷. Newborn care practices by the primary caregiver immediately after birth are important in determining neonatal mortality and morbidity rates.

1.2 LITERATURE REVIEW

The World Health Organisation has come up with a set of simple, cost effective measures that can be used by both the healthcare worker and the primary caregiver to ensure improved neonatal outcome. Components of the WHO essential newborn care practices include cord care, breastfeeding, thermoregulation, eye care, immunisation, management of birth asphyxia and recognition of danger signs with special emphasis on the care of low birth weight infants.

1.2.1 Cleanliness and Umbilical cord care

The umbilical cord connects the fetus and the placenta in utero. After birth the umbilical cord is cut and clamped. The cord stump dries, shrivels, and falls off five to fifteen days after birth⁹. The

umbilical stump can be a source of infection if not properly cared for^{6,9}. The umbilical stump must, therefore, be kept clean.

While it is generally agreed that cutting the cord using a sterile cutting instrument is the best practice, opinions vary on the best method of care for the cord stump⁶. Health workers have advocated varying practices regarding cord care including the use of a wide range of antiseptic products (alcohol, silver sulphadiazine, iodine, chlorhexidine) to clean the umbilical stump⁸⁻¹⁰. Recent research has advocated for use of soap and water or natural healing and abandonment of application of antiseptic substances to the cord⁶. Dore et al recommend the practice of doing nothing except keep the cord clean and dry without applying anything¹⁰. Evidence-based acceptable practices include effective hand hygiene and keeping the cord dry and exposed to air or loosely covered with clean clothes, with the diaper folded below the umbilicus⁶. If the umbilical cord stump becomes soiled with urine or feces, then cleaning the area with water is adequate⁶.

Once the umbilical cord separates, minimal discharge is expected. Until the cord falls off, the area should be kept dry as much as is possible to promote separation and healing^{6,10}. The mother should be aware of danger signs of umbilical cord infection including pus discharge, reddening around umbilical stump and/or the surrounding skin and other signs of infection including fever, lethargy and difficulty in breathing⁶.

In a study conducted on 307 mothers in an urban slum in Kenya, Obimbo et al found that while most mothers (91%) knew the need for hygiene during cord cutting, only 28% knew about hygiene while tying the cord. As many as 79% of mothers were afraid of handling the unhealed cord and less than half of them had good knowledge on postnatal cord care¹².

Tetanus toxoid during pregnancy is also important in preventing neonatal tetanus that may be introduced through unsterile cord care practices during delivery^{6, 11}. Neonates born to mothers who received tetanus toxoid are protected from tetanus. Maternal Immunoglobulin-G antibodies are transported across the placenta into the fetal circulation¹¹. Two doses of tetanus toxoid are required to ensure protection in a previously unimmunized pregnant woman and her neonate from tetanus¹¹.

1.2.2 Thermoregulation

The newborn is much less efficient in thermoregulation than adults¹³. Immediately after birth, the newborn begins to lose heat, a process which puts them at risk of hypothermia. Heat loss occurs through conduction, convection, radiation and evaporation¹³. Low birth weight and premature infants are at an even greater risk and lose heat easily^{13, 15}. Hypothermia is defined by the World Health Organization as an axillary temperature below 36.5°C¹³. Several hospital based studies in Africa have shown a high incidence of hypothermia in the neonatal period¹⁴⁻¹⁶.

Recommendations have been made by WHO to ensure the newborn is not at risk of hypothermia. These are described in 10 steps referred to as “warm chain”¹³. They include warm delivery room, immediate drying, skin to skin contact, breastfeeding, bathing and weighing postponed, appropriate clothing/bedding, rooming in, warm transportation and resuscitation, training and awareness raising.

The mother must maintain the warm chain when she is at home, whether the delivery took place at home or in hospital. After delivery, practices to prevent hypothermia include rooming in, breastfeeding on demand and dressing the infant appropriately. Early bathing exposes the

newborn to hypothermia^{6, 13}. WHO recommends bathing after six hours of life and preferably on the second or third day of life¹³. For the low birth weight and premature infants who are at higher risk of hypothermia, extra measures need to be taken to ensure these babies remain warm includes use of radiant heaters and incubator care¹³.

Neonatal hypothermia has been shown to increase neonatal mortality and morbidity^{17, 18}. A study done in Nigeria showed a high prevalence of hypothermia (67.6%) among neonates admitted within 72 hours of delivery¹⁵. Prevalence was high among babies aged 6 hours or less, preterms, low birth weight infants, asphyxiated babies, babies who had not been breastfed and those without recent oiling of the skin¹⁵.

Hyperthermia is also a sign of infection and is one of the danger signs that the mother must be aware of and act on. It occurs when the neonate's axillary temperature goes above 37.5°C¹³. Temperature can be assessed by using a thermometer or feeling the infant's skin and observing for other signs. Cold skin could indicate hypothermia and if the neonate skin is red and hot with a flushed face, hyperthermia may be present¹³.

1.2.3 Immunization

Immunisation is one of the most effective preventive health measures in reducing child mortality and morbidity. WHO launched the Expanded Programme on Immunization (EPI) in 1974 following the campaign to eradicate polio. It aims to prevent deaths from vaccine preventable diseases such as tuberculosis, diphtheria, tetanus, pertussis, pneumococcal, polio, and measles. Immunisation contributes significantly to the attainment of Millennium Development Goal 4 by reducing vaccine preventable diseases.

The Kenyan Ministry of Health, Division of Vaccines and Immunization offers routine immunization to infants which includes vaccination against tuberculosis at birth or within the first two weeks of life; polio at birth, 6 weeks, 10 weeks and 14 weeks, three doses each of the DPT-Hepatitis B-Haemophilus influenza type b (also called Pentavalent) together with pneumococcal at 6 weeks, 10 weeks and 14 weeks, and measles vaccine at 9 months. Correct maternal knowledge and positive attitude on immunization contributes to achievement of high immunization rates ¹⁹⁻²⁰. A study done in Nigeria by Babalola et al found a positive correlation between mothers' education and the fully immunized child ¹⁹. In the same study, incorrect knowledge as to the preventive role of routine immunization was widespread with diarrhoea, fever, convulsion, teething problems, vomiting and malaria believed to be vaccine-preventable diseases ¹⁹.

Over the past three years, Kenya has experienced recurrent outbreaks of vaccine preventable diseases mainly measles and one reported case of polio. Uptake of vaccination services is dependent on several factors including knowledge and attitude of mothers. A study done in Mathare in 2001 showed advanced maternal age and lack of knowledge on immunization contributed to low immunization rates ²⁰.

1.2.4 Breastfeeding

Breast milk is the best milk for the newborn. While the proportion of breastfed babies is high worldwide, there are wide variations in the duration of breast feeding with sub-optimal breast feeding practice still the norm in most countries ⁶. Lack of exclusive breast-feeding substantially increases the risk of poor newborn and childhood outcome. Globally, less than 40% of infants under six months of age are exclusively breastfed ²¹. According to KDHS 2008, only 32% of

infants less than 6 months are exclusively breastfed while 42% of Kenyan newborns are given prelacteal feeds which inversely correlate with maternal education²².

During the 1990's, several worldwide efforts were initiated to promote breastfeeding. Some of these include the Innocenti Declaration on Breastfeeding (1990), the World Summit for Children (1990), The Earth Summit (1992) and the International Conference on Nutrition (1992). The Baby Friendly Hospital Initiative was launched in 1991 by WHO and UNICEF. It aims to support, protect and promote breastfeeding. In Kenya, only 5.7% of hospitals and maternity facilities have been designated "Baby Friendly" based on the global or national criteria²³. More recent global efforts to promote breastfeeding include the World Breastfeeding Trend Initiative launched in 2008 which Kenya is a signatory of. Efforts are currently being undertaken by the Kenyan Government to promote breastfeeding such as the recent passing of the Breast milk Substitutes (Regulation and Control) Bill 2012 which aims to monitor entry of breastmilk substitutes into the Kenyan Market.

Early and exclusive breastfeeding is important in the newborn. In Kenya, only 58.1% of neonates are initiated on breastmilk within one hour²². Colostrum which is the first breastmilk is highly nutritious and protective to the newborn. A study done in India showed that in some communities, colostrum was regarded as dirty milk and was discarded. Initiation of breastfeeding was delayed for two to three days to allow for the onset of "clean" milk²⁴.

Kimani-Murage et al did a study in two urban slums in Kenya and found that while there was universal breastfeeding with almost all children (99%), more than a third (37%) were not breastfed in the first hour following delivery, and 40% were given something to drink other than

the mothers' breast milk within 3 days after delivery. Exclusive breastfeeding for the first six months was rare as only 2% of infants benefited from this ²⁵.

1.2.5 Recognition of danger signs

There has been an increasing trend towards early hospital discharge of the mother baby pair following delivery ²⁶. Early discharge is defined by the American Academy of Pediatrics (AAP) as a postpartum hospital stay of 48 hours following vaginal delivery and 96 hours following Caesarean section. Concerns highlighted in recent publications suggest that there has been an increase in neonatal hospital readmission rates associated with shortened length of post birth stay ²⁶⁻²⁷. Mwaniki et al conducted a 19 year study and noted an increase in the burden of neonatal admissions in a rural hospital in Kenya with close to 60% of all inpatient deaths in under-fives being neonates ²⁸.

Shortened hospital stay for the mother baby pair following childbirth implies limited time for adequate infant assessment and maternal education, including assessment of feeding and detailed instructions for parents concerning breastfeeding or the detection of illnesses²⁹. Mothers must take on the responsibility of recognizing signs and symptoms of illness.

Whether delivery takes place at home or in a healthcare facility, once at home, neonatal outcome relies heavily on the mother's ability to recognize illnesses and act promptly and appropriately.

The infant's caregiver must recognize and act on danger signs. Some of these include hypothermia, fever, jaundice, poor feeding and convulsions. Jaundice on day one and convulsions are always indicative of serious illness ⁶. A study done in India showed that

knowledge was low with only 7% of mothers able to recognize convulsions as a danger sign while only 2% recognized and acted on hypothermia³⁰.

In a study done in Kenyatta National Hospital paediatric wards, Simiyu showed that 41% of neonatal deaths occurred in the first 24 hours of admission with majority of these deaths occurring in the first week (83.5%) of admission⁵. It was noted that parents delayed in bringing their infants for medical attention and only came when infants were in terminal stages⁵. Waiswa et al in Uganda also noted delay in primary caregivers bringing newborns to hospital contributed significantly to mortality³.

1.2.6 Eye care

Ophthalmia neonatorum refers to conjunctivitis occurring during the first month of life³¹. It typically appears 2-5 days after birth and presents with eye discharge, swelling and/ or reddening of the eye⁶. *Neisseria gonorrhoea* and *Chlamydia trachomatis* are the two main causes of ophthalmia neonatorum^{6, 31-34}. A study done by Laga et al in a hospital in Nairobi showed a 7% prevalence of gonococcal eye infection and 29% for Chlamydia³². Infections are usually passed on from the mother's genital tract to the neonate during delivery³³. In ideal set ups, screening of pregnant women for sexually transmitted illnesses should be done but this may not be possible in developing countries hence the need for eye prophylaxis against ophthalmia neonatorum³³.

Crede recognized the benefits of prophylactic eye treatment as early as 1881³³. He noted that 2% silver nitrate reduced the incidence of ophthalmia neonatorum from *Neisseria gonorrhoea*³³.

This method of eye prophylaxis has now been widely adopted with the use of other agents

including tetracycline eye ointment⁶. Without treatment, ophthalmia neonatorum may lead to serious complications including blindness due to corneal ulceration^{6, 31}.

Traditional practices by the primary caregiver such as the application of breastmilk to treat eye infections are still ongoing³⁵. These have been shown to be ineffective in treating neonatal conjunctivitis and should not be used^{6, 35}. WHO advocated for the use of silver nitrate or tetracycline eye ointment⁶. The primary caregiver must recognise and act on signs of eye infection in order to avoid serious complications such as blindness due to corneal ulceration and scarification. Mothers should, therefore, be advised to bring their babies to hospital if they notice any eye discharge, swelling or reddening and avoid applying traditional substances that may worsen the condition⁶.

2. STUDY JUSTIFICATION AND UTILITY

This study aimed to identify if postnatal mothers were equipped with correct knowledge and attitude on essential newborn care practices at the point of hospital discharge.

Data on maternal knowledge and attitude towards newborn care at the point of hospital discharge is lacking in our setting. The ability to identify knowledge gaps early in the neonatal period will help health care workers identify and implement timely and appropriate interventions that will lead to better neonatal outcomes.

WHO essential newborn care guidelines are simple measures that can be used by primary caregivers in resource limited settings to ensure good neonatal outcomes.

3. RESEARCH QUESTION

What is the level of knowledge and attitude towards essential newborn care practices among discharged postnatal mothers in Kenyatta National Hospital?

4. OBJECTIVES

4.1 Broad Objective

To assess postnatal mothers' knowledge and attitude towards essential newborn care practices at Kenyatta National Hospital.

4.2 Specific Objectives

- 4.2.1** To determine maternal knowledge and attitude towards cord care, immunization, eye care, newborn danger signs, thermoregulation and breastfeeding.
- 4.2.2** To determine sociodemographic factors associated with poor maternal knowledge on newborn care.

5. METHODOLOGY

5.1 Study design

A hospital-based descriptive cross sectional study was carried out.

5.2 Study site

The study was carried out in the Kenyatta National Hospital post natal wards. KNH is a national referral hospital serving patients from the entire country. There are three postnatal wards where the mother and her neonate(s) stay together until they are discharged. The hospital encourages mothers who wish to deliver in the facility to attend antenatal clinic within KNH but also receives mothers who fail to do so or are referred from other facilities. Based on the KNH medical records for the year 2011, the total number of deliveries for the year was 11,328 with an average of 944 per month.

The bed capacity of each postnatal ward is approximately 50 but postnatal mothers often exceed this capacity resulting in sharing of beds among dyads. Healthcare workers in postnatal wards include nurses, Obstetric resident doctors and Consultant Obstetricians. An average of two to four nurses work in each shift which range from 6 to 15 hours. The Obstetric residents average 2 to 4 and conduct daily ward rounds on the mothers while the consultants conduct weekly ward rounds.

The general condition of the neonate is examined by nurses on arrival to the postnatal wards. Thereafter hospital staff rely on mothers to raise any concerns they may have on their neonates. Scheduled health talks are rarely offered. Kenyatta National Hospital is a “Baby Friendly” certified hospital with an explicit policy on breastfeeding which is displayed on posters in the

postnatal wards. Trained nurses offer birth vaccinations to neonates in postnatal wards on weekdays. No hospital policies exist on any other aspect of newborn care.

Though there is no explicit policy for the length of postnatal hospital stay, it is the norm that for spontaneous vertex deliveries, the mother and her neonate(s) are discharged within 24 hours if no complications arise and within 72 hours for caesarean section deliveries. Mothers are usually discharged following review by Obstetric trainee doctors or Consultant Obstetricians. No paediatric reviews are done on neonates prior to discharge from the postnatal wards.

5.3 Study population

The study population consisted of post natal mothers admitted in Kenyatta National Hospital wards from July 2013 to September 2013.

5.4 Inclusion criteria

- Post natal mothers of neonates born in Kenyatta National Hospital.
- Post natal mothers who gave informed consent.

5.5 Exclusion criteria

- Post natal mothers whose neonates died or were admitted to KNH New Born Unit immediately after birth.
- Postnatal mothers of babies with significant congenital anomalies that are likely to interfere with delivery of the essential newborn care practices such as cleft lip palate.

5.6 Sample size determination

Sample size was determined by Fisher's formula for sampling proportions for a finite population.

$$n = \frac{Z^2 N p (1 - p)}{D^2 (N - 1) + Z^2 p (1 - p)} = \frac{1.96^2 \times 11328 \times 0.5(1 - 0.5)}{0.05^2(11328 - 1) + 1.96^2 \times 0.5(1 - 0.5)} = 371$$

n = required sample size

N = population size (Based on the KNH medical records for the year 2011, the population size was 11,328)

Z = normal standard deviation with a 95% confidence interval in this case 1.96

P = population proportion (in the absence of previous studies in similar settings, an assumption was made of 50% prevalence.)

D = standard error in this case 0.05

Therefore the minimum sample size was 371.

5.7 Sampling method

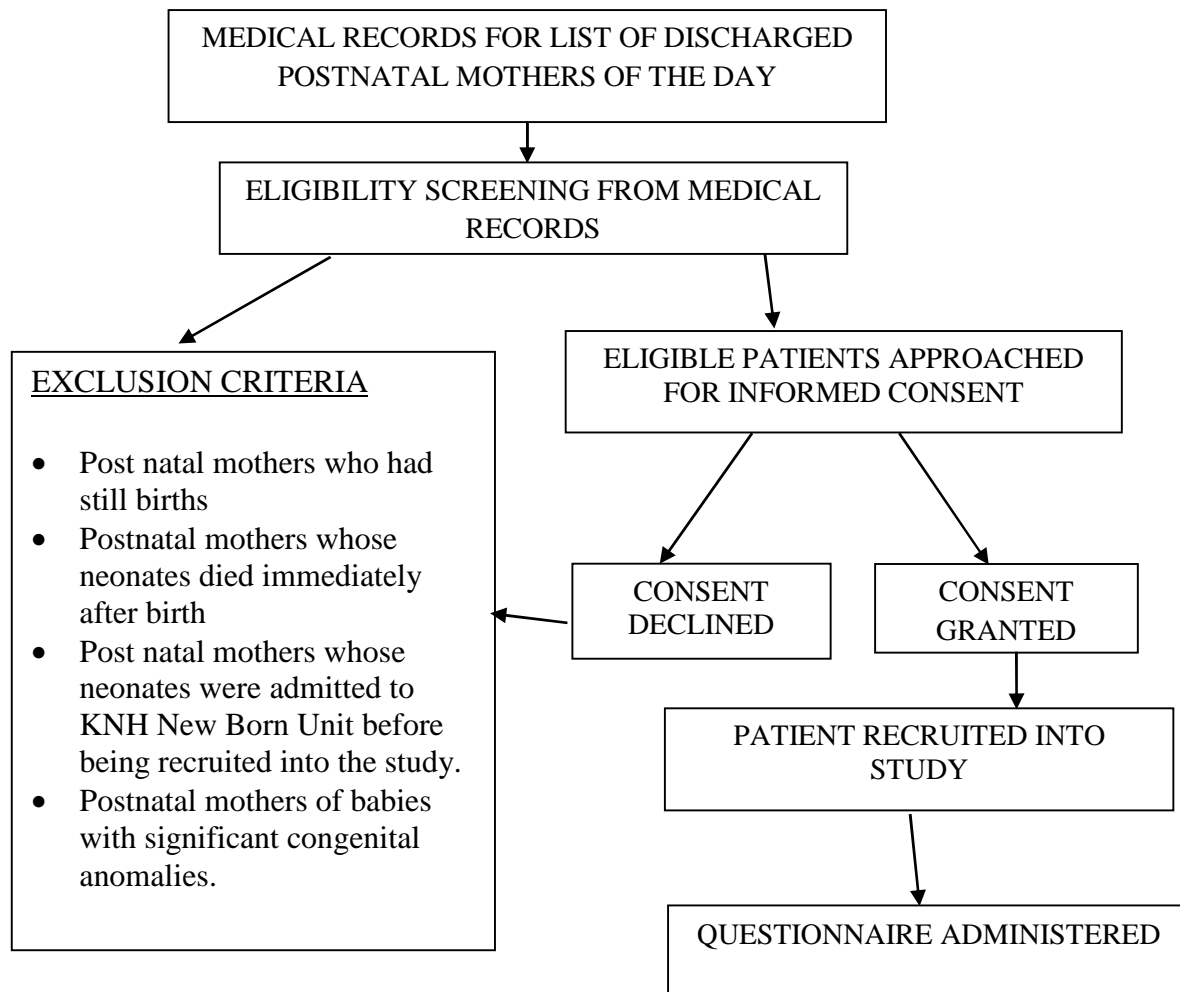
Postnatal mothers were selected via consecutive sampling. Medical records were used to determine the list of patients discharged on the particular day from all three postnatal wards. The investigator then identified those mothers who met the eligibility criteria from the medical records and informed consent was obtained. This process of sampling was repeated until the minimum sample size was obtained.

5.8 Recruitment and process of obtaining consent

Once postnatal mothers were determined to be eligible to participate in the study, they were approached by the principal investigator or research assistant.

The interviewer explained to the potential study participant the purpose and methods of the study. Informed verbal and written consent using a predesigned consent form was obtained from the mother (Appendix II).

5.8.1 Flow chart of recruitment procedure



The consent form explained the purpose of the study as well as potential benefits and risks of participating in the study. Any questions pertaining to the study were addressed after which the postnatal mothers voluntarily signed the consent form if they agree to participate in the study.

5.9 Data collection

The data collection was carried out by the principal investigator or the research assistant who was trained by the principal investigator. After recruiting the study subjects, a structured pre-tested questionnaire was used to collect data. The questionnaire was administered to the mother by the principal investigator or the research assistants who read out the questions and filled in the mother's responses. The questionnaire consisted of both close and open ended questions addressing the following:

- i. Neonate's and parents socio-demographic data.
- ii. Antenatal and birth history of the neonate.
- iii. Mother's knowledge on the WHO essential newborn care practices. Knowledge was assessed by closed ended and open ended questions.
- iv. A five point Likert scale was used to assess maternal attitude on various aspects of essential newborn care practices. The ratings included: Strongly agree, Agree, Neutral, Disagree and Strongly disagree.

5.10 Data management

Data were collected and stored in the Microsoft access database. The collected data were then coded, verified and analyzed using the Statistical Package for Social Sciences computer version 18.0 software.

A scoring system was used to analyse responses to closed ended questions on knowledge:

1=Correct response (consistent with WHO essential newborn care guidelines)

0= Incorrect response (inconsistent with WHO essential newborn care guidelines). Any mother who did not know the answer was considered to have an incorrect response.

The responses for the open ended questions were summarized and descriptive statistics carried out.

During analysis for factors associated with poor maternal knowledge on newborn care, the median score was used as a cut off to distinguish between poor knowledge and satisfactory knowledge. A total of 16 questions were asked to assess knowledge on various aspects of newborn care (appendix 1). Those scoring below the median were considered to have poor knowledge and above or equal to the median considered satisfactory knowledge. Similar studies have been done where the median score was used as a cut of level to distinguish between poor knowledge and satisfactory knowledge ⁴⁵.

The level of knowledge was then cross tabulated against the variables of interest. The variables which were significantly associated with poor knowledge at bivariate analysis were further analysed using multivariate analysis test (multiple logistic regression) to determine factors independently associated with poor knowledge. Associations between poor knowledge and each independent variable were examined by odds ratios (OR) and 95% Confidence Interval.

Responses for attitude were based on a 5 point Likert scale. These responses were later collapsed into 3 cells representing agreement, neutral or disagreement for ease of interpretation.

Statistical testing was done using Chi square tests for categorical data and Student's t tests for comparison of means during analysis of factors associated with poor knowledge. Data was then presented using pie charts, histograms and tables.

6. 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.

7. ETHICAL CONSIDERATIONS

The study was conducted after approval by the Kenyatta National Hospital Ethics and Research Committee. The researcher explained the purpose of the study to the mother before recruitment and informed consent was obtained. Any information pertinent to care of neonate was immediately communicated to the primary doctor. No invasive procedures were done as part of the study. No tissue specimen were collected as part of the study.

Participation in this study was purely voluntary and there was no monetary gain. The postnatal mothers were free to withdraw from the study without any penalty. No compensation was offered for participation in the study. An exit interview was carried out once the primary caregiver discharged the mother and her neonate(s). No follow up interviews were required.

8. CONTROL OF ERRORS AND BIASES

- i. The questionnaire was pretested on a sample population to ensure validity of the questionnaire before commencement of the study. Study tools were revised accordingly
- ii. A research assistant was trained by the principal investigator and provided with standard operating manual to guide in filling the questionnaire which ensured uniformity.
- iii. 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.

9. STUDY ASSUMPTIONS

- i. The parent answered truthfully to the questions asked during the interview.
- ii. Misinterpretation of questions was minimal.
- iii. Errors during analysis and presentation of the results was minimal.

RESULTS

A total of 380 postnatal mothers were interviewed. This chapter present results of sociodemographic characteristics of participants as well as knowledge and attitude towards essential newborn care practices of participants. It also describes the factors that were associated with poor knowledge among postnatal mothers.

1. Socio-demographic characteristics

The socio-demographic characteristics of the respondents are as shown in Table 1.

Table 1: Sociodemographic characteristics of participants

| Variable | Number | Percentage or SD |
|---|-----------------|-------------------------|
| Mean age of the mother(SD) (Min-Max) | 27.8 16-42 | 6.4 |
| Mean age of the father(SD) Min-Max | 33.3 17 - 55 | 7.5 |
| Marital status | | |
| Unmarried | 92 | 24.2 |
| Married | 288 | 75.8 |
| Employment status | | |
| Employed | 243 | 63.9 |
| Unemployed | 137 | 36.1 |
| Education level | | |
| No education | 9 | 2.4 |
| Primary and below | 15 | 3.9 |
| Secondary | 183 | 48.2 |
| Tertiary | 173 | 45.5 |
| Religion | | |
| Christian | 356 | 93.7 |
| Islam | 24 | 6.3 |

The mean age of the mothers was 27.8(\pm 6.4) years while that of the fathers was 33.3(\pm 7.5) years. Of the 380 mothers interviewed, 24.2 % were married. Employed women accounted for 63.4 % of those interviewed while unemployed were 36.1 % as shown in Table 1. Professional careers accounted for 63.4% of those employed while 16.9 % were in small scale business. Skilled manual accounted for 10.3%, unskilled manual 5.8%, domestic services 2.9% and agriculture accounted for 0.4%.

The proportion of women who had received some basic level of education was relatively high with, 45.5% having received tertiary education, 48.2% secondary education and 3.9% primary education and only 2.4% with no education as shown in Table 1. Christianity accounted for 93.7% of the respondents' faith with the remaining 6.3% being of Islam faith.

2. Antenatal, perinatal and postnatal history

Of the 380 mothers interviewed, 88.2% had attended antenatal clinic. The mean gestation at first visit was 5 months (\pm 1.6) with an average of 3.6 visits (\pm 1.1). Majority of the mothers were multiparous (61.1%) while primiparous accounted for 38.9% of those interviewed. Vaginal deliveries accounted for 67.1% while Caesarean section accounted for 32.9 %.

The proportion of male to female deliveries was almost equal with male neonates accounting for 48.2 % and females 50.8% giving a male to female ratio of 1:1. The median length of postnatal hospital stay was 48 hours (24 – 96 hours).

The majority of newborn care education was given in the antenatal period (80.8%) compared to the postnatal period (27.1%). Table 2 shows nurses and midwives provided most of newborn care education to mothers in both periods. As regards breastfeeding, 75.2% of mothers received education during the antenatal period with only 10.0% postnatally. In addition, 68.2% of the

mothers obtained information on immunization antenatally while only 6.6% postnatally as shown in Table 2.

Table 2: Education on essential newborn care

| Variable | Frequency (%) | |
|--|------------------|----------------|
| | During pregnancy | After delivery |
| Mother educated on newborn care | | |
| Yes | 307 (80.8) | 103(27.1) |
| No | 73 (19.2) | 277 (72.9) |
| Provider of the information* | | |
| Doctors | 157 (51.1) | 5 (4.8) |
| Nurses /midwives | 205 (66.8) | 84 (81.6) |
| Peers/friends | 1 (0.3) | 255 (67.1) |
| Family | 0 (0.0) | 125 (32.9) |
| Type of information received | | |
| Breastfeeding | 289 (75.2) | 259 (68.2) |
| Cord care | 64 (16.8) | 15 (3.9) |
| Eye care | 6 (1.6) | 0 (0) |
| Thermoregulation | 100 (26.3) | 2 (0.5) |
| Danger signs in newborn | 33 (8.7) | 6 (1.6) |
| Care of low birth weight | 1 (0.3) | 0 |
| Immunization | 38 (10) | 25 (6.6) |
| * Mothers could give more than one response | | |

Provision of education on eye care was low both antenatally and postnatally at 1.6 % and 0% respectively. Maternal education on danger signs in the newborn during both the antenatal and postnatal periods was also low at 8.7% and 1.6 % respectively as shown in table 2. Only 26.3 % of the mothers received education on thermoregulation antenatally and a smaller percentage of 0.5% postnatally. None of the mothers were educated on care of the low birth weight postnatally.

Only one mother reported having being informed about this during her antenatal visit. Education on cord care was also relatively low with only 16.8% of mothers antenatally and 3.9 % postnatally.

3. Knowledge on essential newborn care

Table 3 shows that more than 90% of mothers knew about breastfeeding on demand, exclusive breastfeeding for 6 months and that colostrum should be given to their newborns. The mean duration between delivery and initiation of breastfeeding reported by mothers was 15 minutes (± 5). While majority of the mothers knew that prelacteal feeds should not be given to neonates, 15.8% believed in giving their neonates prelacteal feeds as shown in Figure 3.

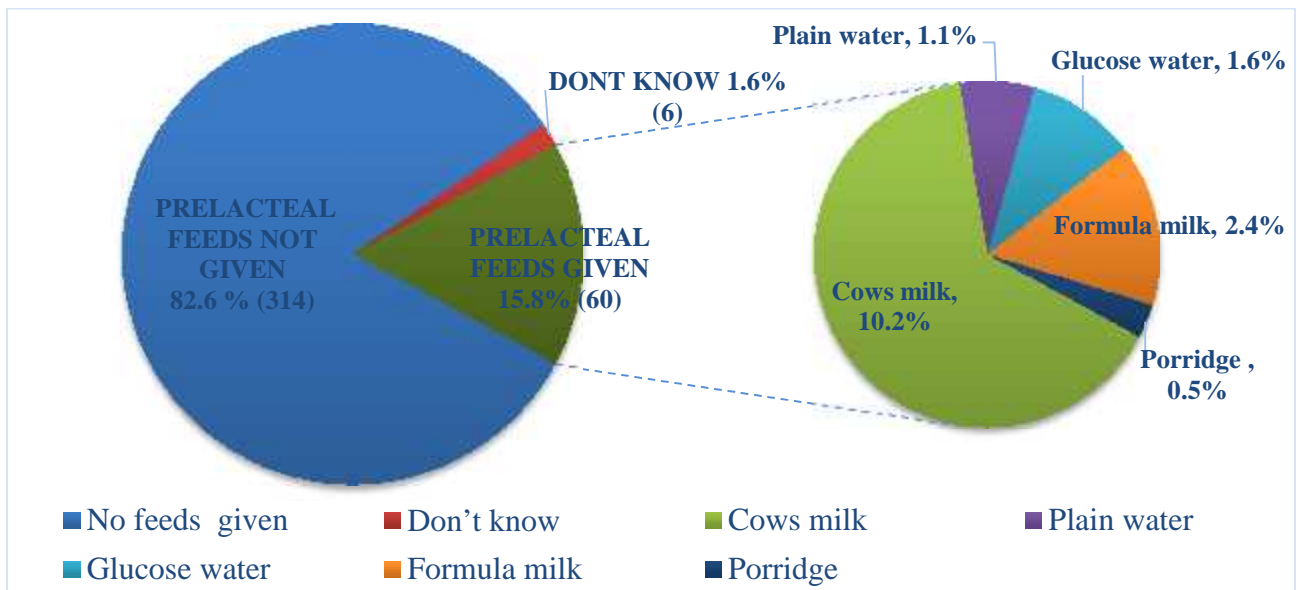


Figure 3: Knowledge on prelacteal feeds given to neonates

Almost all mothers (99.7 %) were aware of the need to vaccinate their newborns at birth while 98.7% knew that vaccines were given to prevent diseases. Modes of keeping the baby warm identified by mothers are shown in Table 3.

Table 3: Knowledge on selected aspects of newborn care

| Variable | Factor level | Frequency n (%) |
|---|---------------------|------------------------|
| Breastfeeding | | |
| Prelacteal feeds should be given to baby | Yes | 60 (17.4) |
| | No | 314 (82.6) |
| | Don't know | 6 (1.6) |
| Duration of exclusive breastfeeding | <6 months | 7 (1.8) |
| | 6 months | 356 (93.7) |
| | >6 months | 17 (4.5) |
| Babies should be breastfed on demand | Yes | 377 (99.2) |
| | No | 3 (0.8) |
| Colostrum should be given to baby | Yes | 375 (98.6) |
| | No | 5 (1.4) |
| Immunisation | | |
| Vaccines prevent diseases in your baby | Yes | 375 (98.7) |
| | No | 5 (1.3) |
| Disease prevented by vaccine given on left forearm at birth (BCG) | Known | 127 (33.4) |
| | Not known | 253 (66.6) |
| Disease prevented by vaccine given orally at birth (OPV) | Known | 216 (56.8) |
| | Not known | 164 (43.2) |
| Cord care | | |
| Umbilical stump should be left uncovered | Yes | 144 (37.9) |
| | No | 236 (62.1) |
| A soiled umbilical stump should be cleaned with water | Yes | 99 (26.1) |
| | No | 281 (73.9) |
| The cord should be left clean and dry without applying substances | Yes | 4 (1) |
| | No | 376 (99) |
| Thermoregulation | | |
| Baby should be nursed in the same room as mother | Yes | 359 (94.5) |
| | No | 21 (5.5) |
| Skin to skin contact prevents heat loss in your baby | Yes | 26(6.8) |
| | No | 354 (93.2) |
| Warm clothing prevents heat loss in your baby | Yes | 353(92.9) |
| | No | 27 (7.1) |
| Warm room prevents heat loss in your baby | Yes | 16 (4.2) |
| | No | 364 (95.8) |
| Signs of eye infection | | |
| Eye discharge | Known | 310 (81.6) |
| | Not known | 70 (18.4) |
| Reddening of eyes | Known | 185 (48.7) |
| | Not known | 195 (51.3) |
| Swollen eye | Known | 127 (33.4) |
| | Not known | 253(66.6) |

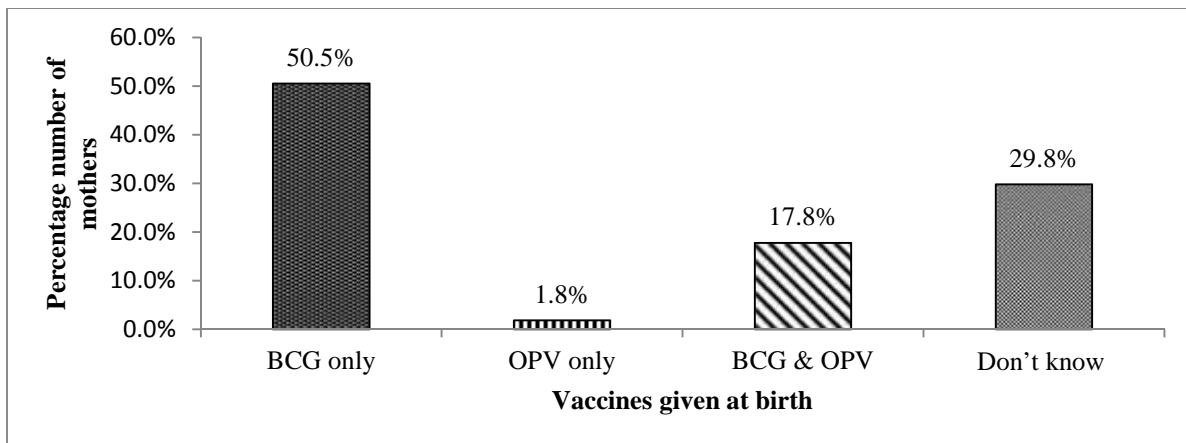


Figure 4: Proportion of mothers with knowledge on vaccines given at birth

Figure 4 shows only 17.8% of mothers were aware of both BCG and OPV vaccines were given at birth. Slightly more than half of the mothers (50.5%) reported that BCG was the only vaccine given at birth as shown in figure 4. However, only 33.4% knew that the vaccine was for prevention of tuberculosis. A total of 7 mothers (1.8%) reported that OPV was the only vaccine given at birth although a larger percentage of 56.8% knew OPV protected the child from polio.

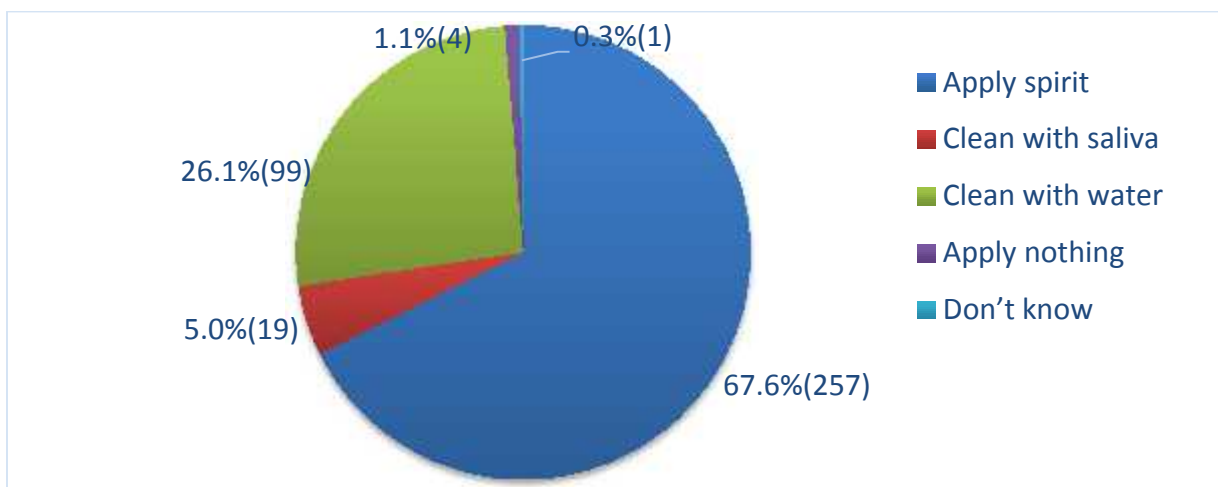


Figure 5: Knowledge on substances used to clean the soiled umbilical stump.

Among the mothers interviewed, 37.9 % correctly stated that the stump should be uncovered.

Figure 5 shows items mothers identified for use in cleaning a soiled umbilical cord stump.

Out of those interviewed, 67.6% of mothers believed that surgical spirit should be used to clean the soiled umbilical stump while 26.1% believed plain water should be used. Five percent of mothers believed that saliva should be applied to the stump while one mother did not know.

Signs of eye infection identified by mothers is shown in Table 3.

4. Attitude towards essential newborn care

| | Breastfeeding | | |
|---|----------------------|----------------|-----------------|
| | N (%) | | |
| | Agree | Neutral | Disagree |
| Breastfeeding should be done at both day and night | 378(99.5 %) | 0 | 2 (0.5 %) |
| Mixed feeding should not be practiced | 312 (82.1%) | 13 (3.4 %) | 55 (14.5 %) |
| Thermoregulation | | | |
| Babies with low birth weight lose heat faster than normal weight babies | 252(66.3%) | 122 (32.1%) | 6 (1.6%) |
| Babies shouldn't be bathed in cold water | 371(97.6%) | 3 (0.8%) | 6(1.6%) |
| Cleanliness and cord care | | | |
| A dirty umbilical cord can cause infection in your baby | 375 (98.7%) | 5 (1.3%) | 0 |
| A previously used razor blade should not be used to cut the cord | 374 (98.4%) | 4 (1.1 %) | 2 (0.5%) |
| Immunisation | | | |
| Vaccines are harmful to your baby | 27 (7.1%) | 206 (54.2%) | 147 (38.7%) |
| Eye care | | | |
| Substances(aside from those prescribed)can be applied to infected eye | 25(6.6%) | 9 (2.4%) | 346 (91%) |

Table 4 shows attitude towards various aspects of newborn care. Mothers had positive attitude towards cord care with slightly more than 98% agreeing that a dirty cord could cause infection and that a previously used razor blade should not be used to cut the cord.

Substances believed to treat eye infections

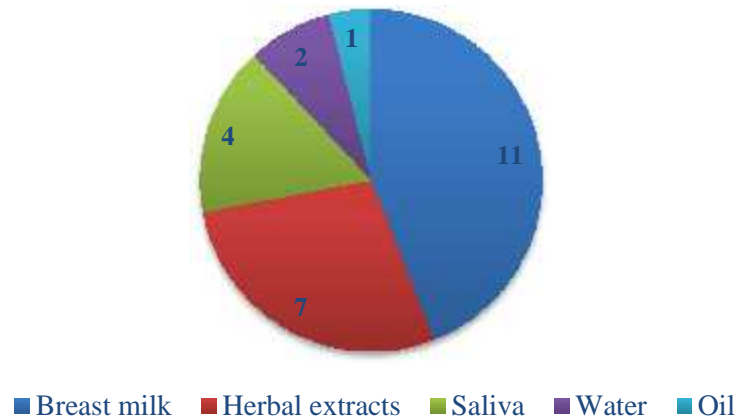


Figure 6: Substances identified by mothers for treating eye infections

Regarding safety of vaccines, 7.1% believed vaccines would harm their children while 54.2% were unsure.

Most mothers (97.6%) felt that a baby should be bathed in cold water while only 66.3% agreed that low birth weight babies lost more heat than normal weight babies. A small proportion of mothers (6.6 %) believed that substances aside from those prescribed by medical personnel can be applied to an infected eye. Figure 6 shows the substances mothers believed could be used to treat the infections in their neonates.

5. Danger signs in the neonate

Table 5 depicts that more than 90% of mothers were able to recognise 6 out of 13 signs of serious illness in the newborn which included jaundice, fever, difficulty in breathing, excessive crying, vomiting and diarrhoea as signs of serious illness. Although 96.6% of mothers recognised fever as a danger sign, only 48.9% recognised hypothermia.

While excessive crying and irritability was recognised by 94.2% of mothers as a danger sign, only 62.9% identified decreased activity as a sign of serious illness. Signs of ophthalmia neonatorum were identified by 85.2% of mothers and only 78.2% believed that convulsions required urgent medical attention. A small proportion of mothers (7.9%) were unsure whether a baby stopping to breastfeed was a danger sign although the majority (87.6) agreed.

Table 5: Danger signs in the newborn

| Variable | Agree (%) | Not sure (%) | Disagree (%) |
|---|------------------|---------------------|---------------------|
| Yellowish discoloration of eyes, palms, soles | 373 (98.2) | 7 (1.8) | 0 (0) |
| Umbilicus red, discharging pus, skin red | 315 (82.9) | 52 (13.7) | 13 (3.4) |
| Eyes swollen, sticky, red or draining pus | 323 (85.0) | 39 (10.3) | 18 (4.7) |
| Baby unable to breastfeed | 333 (87.6) | 30 (7.9) | 17 (4.5) |
| Convulsions | 297 (78.2) | 66 (17.3) | 17 (4.5) |
| Difficulty in breathing | 365 (96.0) | 4 (1.1) | 11 (2.9) |
| Baby hot to touch/Fever | 367 (96.6) | 1 (0.2) | 12 (3.2) |
| Baby cold to touch/hypothermia | 186 (48.9) | 76 (20.0) | 118(31.1) |
| Baby previously active becomes lethargic | 239(62.9) | 77 (20.3) | 64 (16.8) |
| Abdominal distension | 261 (68.7) | 55 (14.5) | 64(16.8) |
| Diarrhea | 368(96.8) | 7 (1.9) | 5 (1.3) |
| Vomiting | 372 (97.9) | 3 (0.8) | 5 (1.3) |
| Cries excessively/irritable | 358(94.2) | 12 (3.2) | 10 (2.6) |

6. Factors associated with poor maternal knowledge on newborn care

Bivariate analysis of the predictors of poor knowledge showed that younger mothers had significant poorer knowledge than older mothers ($p < 0.001$) as were unmarried mothers, OR 2.7 (95% 1.7-4.4), $p < 0.001$ (Table 6).

Table 6: Factors associated with poor maternal knowledge on newborn care

| Variable | Poor knowledge (< Median) | Satisfactory knowledge (>= Median) | OR (95% CI) | P value |
|---|-------------------------------------|--|--------------------|----------------|
| Mean age of the mother (SD) | 24.5 (6.2) | 29.6 (5.7) | - | <0.001 |
| Marital status | | | | |
| Not married | 50 (54.3%) | 42 (45.7%) | 2.7 (1.7-4.4) | <0.001 |
| Married | 88 (30.6%) | 200 (69.4%) | Reference | |
| Parity | | | | |
| Primiparas | 85 (57.4%) | 63 (42.6%) | 4.6(2.9-7.1) | <0.001 |
| Multiparas | 53 (22.8%) | 179 (77.2%) | Reference | |
| Education level | | | | |
| Primary level and below | 15 (62.5%) | 9 (37.5%) | 6.1 (2.5-15.1) | <0.001 |
| Secondary level | 86 (47.0%) | 97 (53.0%) | 3.3 (2.0-5.2) | <0.001 |
| Tertiary level | 37 (21.4%) | 136 (78.6%) | Reference | |
| Employment status | | | | |
| Employed | 60 (24.7%) | 183 (75.3%) | Reference | |
| Unemployed | 78 (56.9%) | 59 (43.1%) | 4.0 (2.6-6.3) | <0.001 |
| Attended antenatal clinic | | | | |
| Having attended | 37 (82.2%) | 8 (17.8%) | 10.7 (4.8-23.8) | <0.001 |
| Having not attended | 101 (30.1%) | 234 (69.9%) | Reference | |
| Mean ANC visits (SD) | 3.2 (1.2) | 3.8 (1.1) | - | <0.001 |
| Categories | | | | |
| None | 32 (86.5%) | 5 (13.5%) | 25.8 (9.4-70.6) | <0.001 |
| 1-3 | 68 (44.7%) | 84 (55.3%) | 3.4 (2.0-5.3) | <0.001 |
| 4 or more | 38 (19.9%) | 153 (80.1%) | Reference | |
| Mean gestation at first visit (SD) | 5.2 (1.6) | 5.0 (1.6) | - | 0.246 |
| Education on newborn care received | | | | |
| During pregnancy | | | | |
| Yes | 80 (26.1%) | 227 (73.9%) | Reference | |
| No | 58 (79.5%) | 15 (20.5%) | 11.0 (5.9-20.4) | <0.001 |
| After delivery | | | | |
| Yes | 16 (15.9%) | 57 (78.1%) | Reference | |
| No | 122 (39.7%) | 185 (60.3%) | 2.4 (1.2-4.3) | 0.004 |
| Mean duration of hospital stay in hours(SD) | 65.4 (35.9) | 63.7 (34.9) | - | 0.654 |

Poor knowledge was also associated with primigravidae, OR 4.6 (95% CI 2.9-7.1), $p < 0.001$ and those who had lower than tertiary level of education; OR 6.1 (95% CI 2.5-15.1) for primary and

OR 3.3 (95% CI 2.0-5.2) for secondary level. Non-attendance of ANC, lack of education on essential newborn practices during and after delivery were all associated with increased chance of mothers having poor knowledge (Table 6).

In multivariate analysis to control for confounding effect, not completing the recommended four ANC visits and lack of education on newborn care practices during pregnancy were independently associated with increased chance of poor knowledge among mothers (Table 7). It did not reveal any association between maternal age, parity, level of education or marital status.

Table 7: Factors independently associated with poor knowledge (logistic regression)

| Variable | OR (95% CI) | P-value |
|---|--------------------|----------------|
| Number of ANC visits | | |
| None | 5.1 (1.3-19.3) | 0.018 |
| 1-3 | 2.5 (1.5-4.2) | 0.001 |
| 4 or more | Reference | |
| Education on newborn care practices during pregnancy | | |
| Yes | Reference | |
| No | 3.3 (1.5-7.4) | 0.003 |

DISCUSSION

Combating neonatal morbidity and mortality requires equipping mothers with correct knowledge on newborn care to ensure appropriate practices. A main finding in our study was that majority of the education on newborn care practices was provided to mothers during the antenatal period. The importance of this was shown by Weiner et al in Laos, who demonstrated that antenatal education among expectant mothers resulted in sustained improvement in knowledge of newborn care in the postnatal period ⁴⁷. In our study, we noted a significant drop in dissemination of information on all components of essential newborn care in the postnatal period compared to antenatal period. This could possibly be because the study was conducted in a busy referral hospital with a large number of patients compared to hospital staff who often have a large workload.

The main source of information on newborn care in our study was from medical personnel. Similarly, the KDHS 2008/9 figures which showed that 92 percent of women in Kenya receive antenatal care from a medical professional, either from nurses, midwives or doctors. This implies that mothers in our setting rely principally on health care providers rather than family and peers for information on newborn care.

The components of essential newborn care that were investigated included cord care, eye care, breastfeeding, thermoregulation, immunization and danger signs in the newborn. Majority of the newborn care education received among the study participants was related to breastfeeding. In our study, breastfeeding knowledge among mothers was encouraging with most mothers aware of exclusive breastfeeding and breastfeeding on demand. These findings were similar to those reported by Senarath et al who also found that majority of Sri Lankan postnatal mothers were aware of on demand feeding as well as early and exclusive breastfeeding ⁴⁵. A Ghanaian study

suggested all-cause neonatal mortality could be reduced by sixteen percent if all infants initiated breastfeeding on day 1 of life and by twenty two percent if initiation took place within the first hour of life ⁴⁸.

Colostrum, the first breast milk is highly nutritious and protective to the newborn. Almost all mothers in our setting knew that colostrum should be given to their babies. These findings are more encouraging than an Indian setting where strong cultural beliefs hampered the use of colostrum³⁸. Attitude towards breastfeeding was also positive with most mothers agreeing with WHO recommended breastfeeding practices. Kloebler-Tarver showed a direct correlation between maternal attitude and optimal breastfeeding practices ⁴⁹. KNH is a Baby Friendly certified hospital that promotes breastfeeding which could explain the good knowledge levels and positive attitudes towards breastfeeding among postnatal mothers in our study.

Consensus is still ongoing on the best cord care practices. WHO advocates for hygienic practices while handling the cord which is a potential source of infection. In our study, attitude was assessed by determining mothers' beliefs on handling the cord. Most mothers were of the opinion that surgical spirit should be used to clean a soiled cord. Only four mothers agreed with the recommendation of using the cord clean and dry without applying any substances. This variation in opinions among postnatal mothers in our setting is likely due to a lack of consensus among healthcare providers on the best practice for cord care. A Cochrane meta-analysis showed that there was no significant advantage of use of antibiotics and antiseptics over keeping the cord clean and dry ⁹.

In the present study, almost all mothers were aware of the need to vaccinate their neonates. An interesting finding was that none of the mothers knew of Hepatitis B vaccine. In Kenyatta National Hospital, nurses trained in immunisation visit the postnatal wards daily and offer both

OPV and BCG to all newborns. Hepatitis B vaccine is not routinely given in the hospital which could explain the lack of knowledge on this vaccine among the mothers. Mothers in our study scored poorly when asked to match vaccine given with the disease it prevented. Findings suggest poor dissemination of immunisation information to mothers by healthcare providers.

Our study found that information on danger signs in the neonate was not adequately disseminated to mothers both antenatally and postnatally. Senarath et al also found that only eleven percent of antenatal Sri Lankan mothers were educated on danger signs⁴⁵. Lack of adequate dissemination postnatally could be due to the increasing trend towards a short postnatal hospital stay implying limited time to educate mothers on newborn care after delivery²⁹. In our study, the median duration of postnatal hospital stay was 48 hours.

Recognition of danger signs in the newborn by mothers has been shown to be a cause of concern in several studies conducted in developing countries^{12, 16, 30, 36}. In our study, the danger signs that were identified by most mothers included fever, jaundice, difficulty in breathing, excessive crying, diarrhea and vomiting. Few mothers identified signs of ophthalmia neonatorum, similar to a Bangladesh study where only five percent of mothers recognized conjunctivitis as a sign of illness³⁶. This worrying figures could easily translate to the increased cases of ophthalmia neonatorum especially in our set up where eye prophylaxis such as tetracycline eye ointment is often neglected.

While almost all mothers recognised hyperthermia as a danger sign, less than fifty percent recognised hypothermia. Senarath et al also found that hypothermia was less recognised as a danger sign compared to fever⁴⁵. This disparity in knowledge on danger signs in our setting

could translate to significant neonatal morbidities and mortalities if not addressed as shown by Waiswa et al^{5,30}.

Failure to attend at least four antenatal clinic visits and lack of antenatal education on newborn care were found to be an independent predictor of poor knowledge among postnatal mothers. In sharp contrast to our findings, a Sri Lanka study which showed no association between antenatal visits and maternal knowledge⁴⁵. However, in agreement with our findings were Weiner et al who showed that antenatal education increases mothers' understanding of basic newborn care⁴⁷. The main conclusion from this is that antenatal clinics provide an opportunity to educate mothers on newborn care which results in sustained knowledge in the postnatal period.

STRENGTHS OF STUDY

The findings of this study provide valuable information for improving the quality of programs to educate mothers on essential newborn care practices. This is possible by enabling the identification knowledge gaps and negative attitude towards newborn care.

This study, being cross sectional, provided a relative quick way to obtain information on newborn care as there was no need for follow up.

STUDY LIMITATIONS

The study was based on reported rather than observed knowledge and attitude towards newborn care practices. There was therefore a risk that mothers may report what was expected of them but their actual practices may be different.

Lack of a universal census on definition of good or poor knowledge and attitude posed a challenge in the study. Similar studies done have used the median as cut off level to distinguish between poor knowledge and satisfactory knowledge which was applied in this study.

As the study was carried out among postnatal mothers in Kenyatta National Hospital, findings may not be generalised to the whole country.

CONCLUSIONS

1. Most maternal education on essential newborn care was received in the antenatal period.
2. Provision of information on essential newborn care to postnatal mothers was unsatisfactory in our set up with regards to eye care, care of the low birth weight, thermoregulation, immunisation and danger signs in the neonate.
3. The component of essential newborn care that mothers were most knowledgeable on was breastfeeding. Knowledge gaps existed among postnatal mothers with regards to eye care, cord care and immunisation.
4. Postnatal mothers had a positive attitude towards cord care and breastfeeding while they had negative attitude towards other components of newborn care.
5. Postnatal mothers most likely to have poor knowledge on essential newborn care practices included those who failed to fully attend antenatal clinic visits and those who did not receive any source of newborn education during pregnancy.

RECOMMENDATIONS

1. Special emphasis needs to be placed when educating vulnerable groups including those who failed to fully attend antenatal clinic visits.
2. In our setting, certain components of the essential newborn care package need more emphasis during education programmes including eye care, immunisation and cord care.

CONFLICT OF INTEREST

There were no conflicts of interest in this study.

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APPENDIX 1: QUESTIONNAIRE

Study identification number.....

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

| | | | | |
|-----------|-------|---------|----------------|--|
| Christian | Islam | 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 (<i>skip to Q 8</i>) |

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(<i>go to Q4</i>) |

2. What information were you provided on?

| | |
|--|------------------|
| | Breastfeeding |
| | Cord care |
| | Eye care |
| | Thermoregulation |

| | |
|--|------------------------------|
| | Immunisation |
| | 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 (<i>go to Q 5</i>) |
| | No(<i>proceed to next section</i>) |

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 |
| | Immunisation |
| | 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 birth after delivery?

| Minutes | Hours | Days | Don't know |
|---------|-------|------|------------|
| -- | -- | -- | |

3. Your baby should 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 |
|----------------|-------|----------------------------|----------|-------------------|
| | | | | |

5. Mother-baby skin to skin contact prevents the baby from getting cold.

| 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 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 |
| | 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 |

| | |
|--|-----------------|
| | Other (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?

| | |
|--|---|
| | i. Fed the baby(<i>go to question 7</i>) |
| | ii. Threw it away (<i>go to question 6</i>) |
| | iii. Other (specify)- (<i>go to question 6</i>) |

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. Vaccines are 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 | | | | | |
| Diarrhoea | | | | | |
| Vomiting | | | | | |
| Cries excessively/irritable | | | | | |

Thank you for your participation!

APPENDIX 2: CONSENT FORM FOR THE STUDY

Study identification number: _____ Date: _____

STUDY TITLE

Knowledge and attitude of postnatal mothers on essential newborn care practices at Kenyatta National Hospital.

PRINCIPAL INVESTIGATOR

Dr Lucia Amolo

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

SUPERVISORS

1. Professor Aggrey Wasunna

Senior Lecturer, Department of Paediatrics and Child Health, University of Nairobi.

2. Dr. Grace Irimu

Senior Lecturer, Department of Paediatrics and Child Health, University of Nairobi.

3. Dr. Daniel Njai

Senior Lecturer, 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. Please 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 study aims to assess knowledge and attitude of postnatal mothers on essential newborn care practices in Kenyatta National Hospital. Essential newborn care practices encompass cord care practices, immunization, thermoregulation, initiation of breathing, eye care, breastfeeding, management of birth asphyxia and recognition of danger signs. These practices are important in the care of your baby and help to prevent newborn illness.

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. Amolo Lucia, 0722638919.

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 extension 44355.

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

Interviewer's signature..... Date

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 I can withdraw from the study at any time without any penalty.

Interviewee's signature..... Date

APPENDIX 3: 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 prevent 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.

