EFFICACY OF A DISCHARGE CHECKLIST FOR NEONATES IN REDUCING NEONATALMORBIDITY AND MORTALITY

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DECLARATION

I declare that this dissertation is my original work and has not been submitted for the award of a degree in any other university

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ABSTRACT

Introduction: Of the estimated 5.9 million child deaths in 2015, almost 1 million occurred in the first day of life while about 2 million deaths occurred in the first week. Most of these deaths are readily preventable or treatable with proven, cost-effective interventions. The checklist can act as a tool to reduce neonatal morbidity and mortality.

Objective: The primary objective was to determine the impact of introducing a standardized neonatal discharge checklist on the rate of hospitalization during the neonatal period at the Kenyatta National Hospital. The secondary objective was to determine the acceptability of a structured postnatal discharge checklist among health care workers at Kenyatta National Hospital.

Study design setting and population: a mixed method study that included the Quasi experimental pre- post intervention design and focus group discussion was carried out in the post- natal wards at Kenyatta National Hospital, which is the main referral hospital. Neonates with no complications awaiting discharge were enrolled for the study after consent was obtained.

Methodology: Qualitative and quantitative methods were incorporated in this study. Structured questionnaires were administered to both the mothers in the postnatal ward and the trained nurses on the checklist for the danger signs of newborns, breastfeeding, immunization and the use of chlorhexidine in cleaning the umbilical stump. Qualitative data was obtained using focus group discussions.

Results: Hospitalization rates were 7.4% and 3.2 % in the pre intervention and post intervention periods respectively. There was significant improvement in knowledge on cord cleaning after the intervention ($p =<0.001$) as well as on identifying newborn danger signs ($p=0.005$). There was a trend noted for reduced hospitalization following introduction of the neonatal discharge checklist.

Conclusion: There was a trend for reduced hospitalization following implementation of the neonatal discharge checklist. Acceptability of the discharge checklist was appreciated by health care workers while a call for collaboration with the paediatric department was emphasized.

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ABBREVIATIONS

KNH	Kenyatta National Hospital
KDHS	Kenya Demographic and Health Survey
SDG	Sustainable Development Goals
USAID	United States Agency for International Development
UNICEF	United Nations Children's Fund
WHO	World Health Organization

DEFINITIONS OF TERMS

Neonatal mortality (NN): the statistical rate of infant death during the first 28 days of life after live birth expressed as the number of such deaths per 1000 live births in a specific geographic area or institution in a given time.

Post neonatal mortality (PNN): the number of infant deaths occurring between 28 days and 11 months of life.

Infant mortality: the statistical rate of infant death during the first year after a live birth, expressed as the number of such deaths per 1000 live births in a specific geographic area or institution in a given period

Under 5 mortality: the death of infants and children under the age of five or between the age of one month to four years.

Postpartum: of or occurring in the period shortly after childbirth to 6 weeks**.**

Morbidity: the relative incidence of a particular disease in a specific locality

Mortality: the relative frequency of deaths in a specific population

Hypoxemia: inadequate oxygenation of the blood

Hypoglycemia: abnormally low level of glucose in the blood

CHAPTER ONE
BACKGROUND AND LITERATURE REVIEW

1.1 Background

In 2015 neonatal deaths stood at 2.7 million which showed a decrease from 1990 which was at 5.1 million. The neonatal mortality decline during this period was slower than that of post-neonatal under-five mortality (1-59 months): 47% compared with 58% globally especially in countries of low- and middle- social economic status. According to the statistics in 2015, almost 1 million mortalities occurred on day one of life while about 2 million occurred in the first seven days of life. This could translate to the efforts made in managing infectious diseases that lead to the deaths of children after infancy and the slower decline in reducing neonatal mortality rates than mortality in older ages (47 % vs. 58 %). In sub-Saharan Africa – which still bears the largest burden of under-five mortality –neonatal mortality contributes the greatest portion. Globally, the main causes of neonatal mortality are attributed to preterm birth complications (35%), intrapartum related complications (24%), and sepsis (15%). These child deaths of under fives can be prevented and treated with proven, cost effective interventions.[1]

According to the Kenya Demographic Health Survey (KDHS) 2014, infant mortality rate currently stands at 39 deaths per 1,000 live births while the under-5 mortality rate is at 52 deaths per 1,000 live births.[2] The neonatal mortality rate in the country currently stands at 22 deaths per 1,000 live births, while post neonatal mortality is at 16 deaths per 1,000 live births. These statistics estimated that 56% of infant deaths in Kenya occurred in the first month of life.

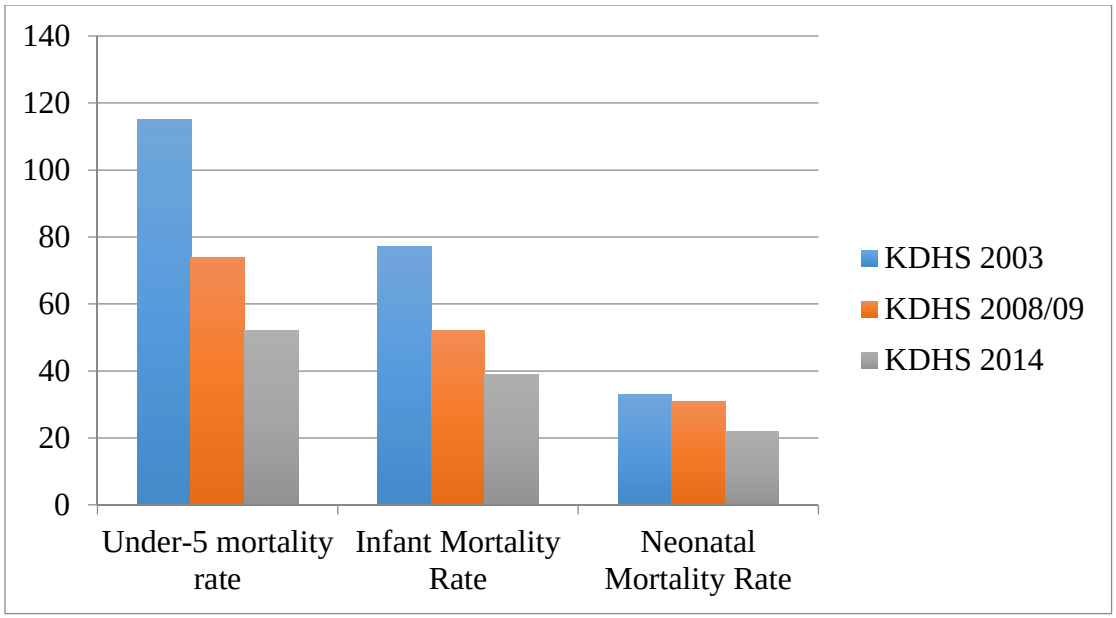

Figure 1.1: KDHS 2003 – 2014

Source: KNBS

Table 1.1: Kenya Demographic and Health Survey 2014-Neonatal, Infant, and Under 5 Mortality Rates

Approximate Calendar years	**Neonatal Mortality Rate**	**Infant Mortality Rate**	**Under 5 Mortality Rate**
2010-2014	22	39	52
2005-2009	24	43	60
2000-2004	26	51	80

The statistics above showed a downward trend in mortality from 1990 and this could be attributed to better health seeking behaviours and outcomes.[(3);(4)]. Since then there has been improved utilization of health care services by pregnant mothers through safe deliveries in a health facilities and provision of postnatal care services to mothers and their neonates a reduction in childhood illnesses has been observed. However, the decline in neonatal mortality rate has not reduced as much as the other indicators. On the contrary, the contribution of neonatal deaths to under-five mortality rate has risen from 32.5% in the 2004 KDHS to 42.3% in the 2014 KDHS

Kenya hopes to achieve the Every Newborn Action Plan's goal of attaining a neonatal mortality rate below 10 deaths per 1,000 live births by 2035 through effective cost friendly interventions as it currently stands at 22 deaths per 1000 live births[5]

If the current statistics are anything to go by, almost of half of the 69 million child mortalities between 2016 and 2030 will be observed in the neonatal period. The share of neonatal deaths is projected to increase to 52% in 2030 globally as compared to 45% seen in 2015. Some countries need to hasten their breakthrough of attaining the Sustainable Development Goal (SDG) of a neonatal mortality rate of 12 deaths per 1000 live births by 2030.For many babies, their first day of life could end up being the day they die. To accelerate this process of achieving this goal, it is critical that pregnant women and neonates have access to good quality care and life-saving effective interventions. It is paramount to sustain the quality these interventions during pre-pregnancy all through to the postnatal period.[1]

An effective and cost friendly intervention to help reduce neonatal morbidity and mortality could be in the form of a discharge checklist. Health care workers to equip the caregivers with the relevant information on newborn care can use this tool.

1.2 The Importance of a Checklist

Prior to birth, a child's survival rate can increase by attending antenatal care consultations, immunizing against tetanus, amongst other interventions. At delivery, newborn survival is increased if it is within a health facility.

After delivery, essential neonatal care should ensure that the initial breaths of the newborn are adequate in order to avoid birth asphyxia, initiation of exclusive breastfeeding within half an hour of delivery, warmth of the baby and appropriate hand washing practices by the mother before handling the child.

Identification and seeking of medical attention for neonatal illnesses is paramount, as the child may succumb quickly if it is not recognized and treated appropriately and on time. Neonates noted to be unwell must be attended to immediately by a clinician. The use of a postnatal discharge checklist has been introduced by World Health Organization(WHO) with the intention to reduce neonatal morbidity and mortality.[6]

For the structured postnatal checklist to be considered important, certain components should be taught to the caregiver upon discharge by the health care worker. These components in the discharge list should comprise of assessment of the baby for any danger signs, confirmation of the newborn immunizations and linkage to the immunization register, assessment of breastfeeding technique like latching, nipple care for the mother and emphasis on the importance of exclusive breastfeeding for 6 months. Other important aspects that can be included are warmth of the neonate, emphasis on hand hygiene and delay of bathing the child for 24 hours which some cultures disapprove of and in such instances it can be delayed for 6 hours.

If these aspects are captured and articulated early upon discharge with the caregivers, a drastic decline in neonatal morbidity and mortality can be realized.

High levels of stress as seen in most fields that are complex and of high intensity can affect level of cognition. These careers, which include aviation and aeronautics amongst other, have come to depend on checklists to aid in decreasing human error. The checklist can act as an important tool by decreasing significantly the risk of costly errors and improving outcomes, which in turn improves delivery of patient care. Despite the benefits of checklists in medicine and critical care, its integration into practice has not been as rapid [7]

Checklists can act as factsheets for reducing medical error and improving outcomes of patient care and wellness, especially in cases when memory, attentiveness and cognitive functions can be altered. The legitimacy of the content seen in the checklist will depend on

the developmental process. This should include a thorough evaluation of the literature review, current practices being undertaken and expert recommendations through technical working groups and validation and acceptance of the tool amongst the target user population before implementation. Input by the health care workers that may interact with the checklist is key in the ongoing process of creating and designing it, giving them a sense of ownership. The content contained in the final tool represents a consensus between all team players and this could improve implementation of it into daily practice. Development of medical-specific checklists has been attributed to lack of literature that outline methodology and special recommendations and this has contributed greatly to its the continued absence in medicine, despite evidence of their fundamental role in human error management. Further areas of research in its utilization may prove that checklists can also curb fatigue in healthcare.[8].

Studies done in Asia have shown that education programs or checklists can be used in the decrease of neonatal morbidity and mortality.

A randomized controlled trial carried out by[9]Shrestha *et al (2015)* study determined the impact of a structured newborn care education program to promote maternal and infant health in Nepal. Participants included 143primiparous mothers (69 in the intervention and 74 in the control group) who had delivered a full term healthy baby. The study noted that a decrease in the number of children who fell ill attending the health center in the intervention group compared to the control group was significant, which revealed that their structured newborn educational and support program promoted infant health. The results further revealed statistically significant differences between the intervention and control groups in their maternal knowledge of newborn care, anxiety, and their confidence during the postpartum period, indicating that the newborn care educational program increased mothers' knowledge and their confidence in newborn care, and decreased maternal anxiety during the postpartum period. The study concluded that the structured educational program for newborn care enhanced the infant's and mother's health, which in turn reduced the neonatal and maternal mortality and morbidity rates in Nepal. This is in relation to Nepal

being a developing country. The use of an intervention would empower both mothers and caregivers with knowledge on newborn care to reduce the number of cases of healthy neonates being admitted to a health facility and neonatal mortality.

In Karnataka, India a pre-post intervention study by [10] Spector *et al (2012)* hypothesized that the implementation of the WHO Safe Childbirth Checklist Program would increase the delivery of essential childbirth practices linked with improved maternal and perinatal health outcomes.. They prospectively observed practices conducted by health workers on 499 women and newborns consecutively enrolled in the birth events(July- September 2010) and compared these with observed practices during 795 consecutively enrolled birth events(September- December 2010) after the introduction of the WHO Childbirth Safe Childbirth Checklist program. Twenty-nine essential practices that target the major causes of childbirth related mortality, such as hand hygiene and uterotonic drug administration were evaluated. The findings established were that delivery of essential childbirth related care practices at each birth event increased from an average of 10 of 29 practices at baseline to an average of 25 of 29 practices afterwards. This showed a significant improvement in the delivery of 28 out of 29 individual practices. This study concluded that the introduction of the WHO Safe Childbirth Checklist program markedly improved the delivery of essential safety practices by health workers. This proves that the use of a checklist can make the quality of service in the medical field efficient.

1.3 The Need for an Intervention in Reducing Neonatal Morbidity and Mortality in Kenya

Local studies done revealed that most neonatal admissions are in the first week of life and could be related to lack of knowledge on ideal neonatal care, identification of danger signs and the need to seek medical attention early.

[11]English *et al* conducted a progressive 18-month observational study in Kilifi District Hospital whose aim was to determine the causes and outcome of young infant admissions. Out of 1080 infants studied within the inpatient set up, 40% were aged 0-7 days old, 24%

were 8-30 days old, 17% were 31-60 days old and 18 % were aged 61-90 days. The overall mortality rate was 18% while that of neonates aged 0-7 days was 34%. Following discharge, 5% of infants aged less than 60 days died within 2 months. The main causes of morbidity and mortality in infants in this region aged less than 2 months included severe infection and prematurity, which collectively accounted for 57% of inpatient deaths.

Jaundice and tetanus resulted in another 27% of the mortality rate. More than 20% of neonates aged 0-7 days had hypoxaemia, hypoglycemia and inability to feed. The study therefore revealed that neonates contribute significantly to the paediatric inpatient morbidity and mortality rate. The checklist can act as an intervention with adequate information to the caregivers on the danger signs to look out for upon discharge from the hospital. If these danger signs are identified early, there could be a reduction in neonatal mortality.

A hospital descriptive cross-sectional hospital based survey was carried out by [(12)]Gathoni *et al (2014)* to determine the knowledge and attitude towards recognition of danger signs of neonatal illness among mothers who deliver at Kenyatta National Hospital. She conducted both questionnaires and focused group discussions on a total of 384 mothers. The study revealed that 97.7% of the mothers knew one danger sign and that there was poor knowledge about convulsions and difficulty in breathing. She concluded that mothers should be educated on the newborn danger signs with emphasis on younger mothers. To ensure that mothers are educated in all aspects, the use of a checklist can teach the essential information required to be covered.

[(13)]Kihara *et al(2014)*conducted a randomized control trial to determine the efficacy of phone based counseling in supporting 180 primi-parous women for exclusive breastfeeding. There were 91 women in the intervention group while the remaining 89 were in the control group. Of relevance was that among the mother baby pairs that were followed up 17% of the babies delivered in hospital had died by 10 weeks of age.

More recently,[14]Obunga *et al (2016)*carried out a study to determine the effect of structured newborn clinical evaluation by paediatric registrars at Kenyatta National Hospital on re-hospitalization rates within the first month of life. She performed a randomized Controlled Study on 600 neonates who were recruited from the Kenyatta National Hospital's maternity unit. The results revealed that out of the neonates who completed the 30-day follow-up period, 19.5% of the control group and 11% of the intervention group were re-hospitalized within the first month of life following birth hospitalization. The majority of these incidences of re-hospitalization occurred by 7 days with 64.6% and 80% of the admissions within the control and intervention groups respectively. This indicated a risk reduction for re-hospitalization of up to 50% within the intervention group. The conclusion arrived at showed that a structured evaluation of neonates following delivery resulted in a reduced re-hospitalization of these neonates.

Most of these morbidities identified in these studies are captured in the checklist, as the mothers will have adequate knowledge and practices on how to handle the neonate with the hope that the implementation of this tool will reduce neonatal mortality.

1.4 Study justification

Globally, 130 million infants are born and out of this, four million of them die in the first 28 days of life. Neonatal deaths account for 40 percent of deaths under age of 5 years worldwide. In Kenya, neonatal deaths account for 60 percent of the overall infant mortality. This is significant and despite this, not much attention has been given to it**.**

The neonatal mortality rate is on a slow decline due to lack of knowledge and appropriate practices. Neonatal mortality contributes significantly to child mortality. The neonatal mortality rate of Kenya fell gradually from 27.6 deaths per 1,000 live births in 1996 to 22.2 deaths per 1,000 live births in 2015. Currently in Kenya, no evidence-based interventions exist at the hospital level to the effect of this. Majority of neonatal hospitalizations with no complications are mainly due to neonatal sepsis or hypernatremia dehydration because of poor breastfeeding techniques. This is attributed to mothers lacking ideal knowledge,

attitude and practices on newborn care upon discharge. This study aims at bridging the gap, by evaluating the efficacy of postnatal checklist.

In Kenya, we have no data on the use of a discharge checklist and this has created a research gap on the effectiveness of using a factsheet hence the need of a scalable intervention. WHO recommends the use of a discharge checklist based on the Demographic Health Survey of 2013-2014 as a way to improve quality health care for both the mother and the newborn.

1.5 Study objective

1.5.1. Primary objective

To determine the efficacy of introducing a standardized neonatal discharge checklist on the rate of hospitalization during the neonatal period at the Kenyatta National Hospital

1.5.2. Secondary objective

i.) To determine the acceptability of a structured postnatal discharge checklist among health care workers at Kenyatta National Hospital.

CHAPTER TWO
METHODOLOGY

2.1 Study Design

This was a mixed method study conducted using the quasi-experimental pre and post intervention design at the postnatal wards in Kenyatta National Hospital between December 2017 and February 2018. There were three focus group discussions conducted on the nurses during the same period to determine the acceptability of the tool amongst health care workers.

2.2 Study Population

The study population had 435 term neonates with no complications after normal vaginal delivery and their mothers recruited in the study upon discharge. Mothers were selected using simple random sampling. There were 216 neonates recruited in the pre intervention phase and 219 in the post intervention phase. A team of 16 nurses was then enrolled to implement the discharge checklist and thereafter engaged in FGDs and surveys. Hospital records and follow up phone calls made determined those among the study population that had been hospitalized.

2.3 Study Location

The study population was recruited from the 3 postnatal wards at the Kenyatta National Hospital. There are 3 postnatal wards at the hospital that each discharge on average 10 mothers with their neonates after an uncomplicated delivery on a daily basis. Each ward has a team of 6 nurses at any given time.

2.4 Study Period

The 216 neonates recruited from the postnatal wards upon discharge were followed up for a period of 4 weeks between December 2017 and January 2018. The nurses were then enrolled and they underwent intense training on how to implement the discharge checklist for three days. Thereafter another 219 neonates were recruited into the study post intervention and each followed up for a period of 4 weeks between January 2018 and

February 2018. Upon completion of recruiting both pre and post intervention, the number of cases of babies hospitalized were recorded.

2.5 Study Outcomes

The intention of the study was to test the following outcomes:

i.) Reduction in hospital admission rates among neonates within the post intervention period of the discharge checklist

ii.) Reduction in mortality rates among neonates during the study period.

iii.) Identification of danger signs by the mother prompting her to seek medical assistance on time.

2.6 Selection of Participants

2.6.1 Inclusion Criteria:

Each of the patients met the following criteria in order to be included in the study:

i.) Term babies born with no complications after a normal spontaneous vertex delivery.

ii.) Informed consent from the mother for participation in the study.

iii.) Mothers with a mobile phone

2.6.2 Exclusion Criteria

Neonates meeting any of the following exclusion criteria were excluded from the study:

i.) Neonates who are sick

ii.) Neonates with low birth weight

iii.) Neonates who are preterm

iv.) Neonates with congenital malformations

v.) Mothers who refused to give consent

vi.) Mothers with no access to a mobile phone

2.7 Sample Size Determination

Using the sampsi command in V12 sample size was able to be determined.

$$n = \frac{\{u\sqrt{[\pi_1(1-\pi_1) + \pi_0(1-\pi_0)]} + v\sqrt{[2\bar{\pi}(1-\bar{\pi})]}\}^2}{(\pi_0 - \pi_1)^2}$$

n = sample size

u = corresponds to the power of the study, at 80%

v = 1.96, standard normal deviate corresponding to 95% confidence interval

π_1= 0.2 = 20%

A study conducted by (15) G.J Escobar et al, in America showed a 4.4% good response rate for the standard treatment group and a reduction in neonatal morbidity and mortality rates by 5 times as compared to Kenya.

π_0= 0.1 = 10%

Aim to reduce by 50 % (that is from 20% to 10%)

N = 219 per group (before and after)

2.8 Study Procedures

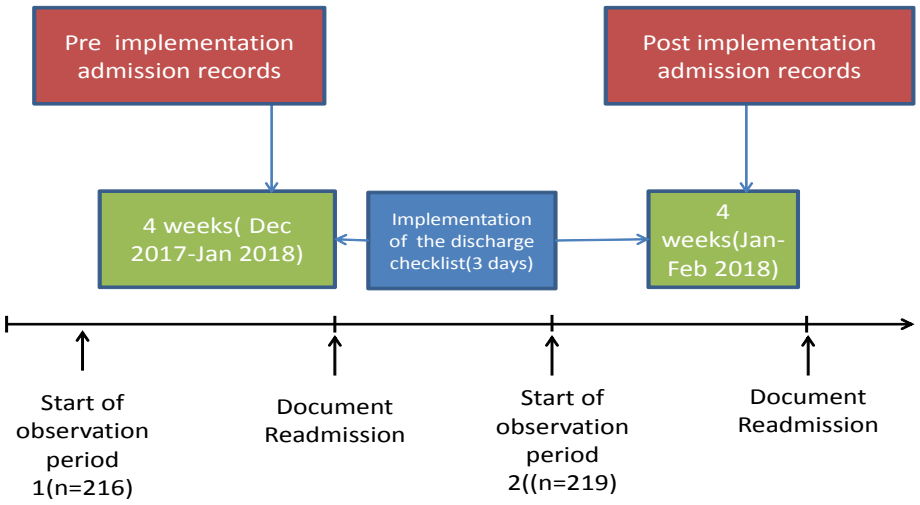

Figure 2.1: Study period

2.8.1 Pre Implementation Period

A preliminary session was held with the ward management team on the purpose and outline of the study. Neonates delivered at the facility and who were in the postnatal ward awaiting discharge were recruited for the study as per the inclusion criteria and informed consent was obtained from their mothers. The mothers were selected using simple random sampling. The 216 neonates were identified and recruited prior to the implementation of the discharge checklist. Every neonate was then followed up for a period of 4 weeks between December 2017 and January 2018 through a phone call on Day 0, 48 hours, 2 weeks and 4 weeks. In addition, a pre survey was conducted by the principal investigator with the help of a trained research assistant on mothers whose neonates had been recruited for the study upon discharge from the hospital. The mothers had the principal investigator's phone number that they could use to contact if the neonates fell ill, got hospitalized or any other queries during this period. Patient's details were protected by assigning a study number and no names were recorded. Data was then collected and analyzed on the number of neonates who were hospitalized or died during this period.

2.8.2 Intervention Period

After the first 216 children had been recruited, 16 nurses who work in the three postnatal wards underwent training for three days on the implementation of the postnatal discharge checklist. The discharge checklist was then administered by the trained nurses between 8 am and 8pm daily and between 8am and 4pm on weekends. On average, each ward has 6 nurses available at any given time. Informed consent was obtained from the nurses who took part in the study

Thereafter a survey was conducted on the nurses on the discharge checklist and focus group discussions in the three postnatal wards using a semi-structured questionnaire were held on the feasibility of the postnatal discharge checklist. The nurses enrolled were assigned an identification number and no names or contacts were revealed.

2.8.3 Post Intervention Period

After the training on the postnatal discharge checklist, another 219 neonates awaiting discharge from the postnatal wards were identified and recruited as per the inclusion criteria between January 2018 and February 2018. The mothers were given informed consent and a study number obtained. Upon discharge, the principal investigator and the research assistants followed up the neonates for a month. Implementation was done for four weeks on the mothers who had delivered during this period and they were followed up via phone call on Day 0, 48 hours, 2 weeks and 4 weeks. The phone call was based on a structured questionnaire on the current health state of the neonate and if the mother or caregiver had any concerns that needed addressed.

At the end of the four weeks of the pre and post implementation of the checklist, there was documentation on the number of hospitalizations to any health facility.
Data was then collected and analyzed.

2.9 Data Collection Management and Analysis

Data collected was entered, coded and cleaned in the excel software, Microsoft office Excel 2010 and then exported into IBM SPSS version 23.0 (SPSS Inc, USA). All statistical analysis was performed using the statistical package for social sciences (SPSS) software. Descriptive statistics was then computed to generate frequencies; means, medians and standard deviations. The cleaned data was managed, stored and analyzed.

Knowledge levels and importance was determined using a series of 10 questions on the postnatal discharge checklist. Perception towards postnatal discharge checklist was assessed using 10- statements on a 4-point Likert scale (Strongly Agree, Agree, Disagree and Strongly Disagree).

The Chi-square test was used to establish comparisons between categorical variables. Pearson's correlation test was used to measure the strength and direction of relationships between the dependent variables (knowledge, perception and practice) and the independent

variables to establish the efficacy of the discharge checklist in reducing neonatal morbidity and mortality. Binary logistic regression tests were used to determine associations between the dependent variables (knowledge, perception and practice) and independent variables (education, years of experience on the use of the postnatal discharge checklist.

All variables significant in the Chi-square with $P<0.05$ was included in the regression models. All tests were two-tailed with a *P*-value of less than 0.05 being considered significant for all statistical analyses. The results of the analyses was presented in frequency tables, figures, contingency tables and graphs with brief write-ups to describe the results and the interpretation derived from the results.

To qualitatively analyze the Focus Group Discussions (FGD) held by the nurses who were trained on the discharge checklist, thematic analysis was performed and common themes and direct quotations were extracted. This coded data was organized and the information presented as narratives. Where necessary, FDG members' information was presented verbatim in the results. This data on the questionnaires was kept under lock and key.

2.10 Data Protection

All identifiable data collection and the phone call follow up was kept confidential and restricted to the principal investigator and the research team involved during the whole study period and only an anonymous study will be published.

2.11 Ethical Considerations

Ethical approval was sought from the Kenyatta National Hospital & University of Nairobi Ethics Research Committee (KNH-UoN ERC) before commencement of study to collect and analyze data collected in the study as part of the thesis dissertation. The purpose of the study was carefully explained to the neonate's mother with a view to obtaining written consent prior to enrolling any child in the study.

On follow up of the neonates, if illness was noted, the mothers were referred to the nearest health facility for further management on their own accord.

Strict confidentiality was observed throughout the entire study period with the study participants given study identification numbers and no personal identification data recorded.

Risks

No experimental investigations or products were employed in this study.

Benefits

The participants in the study received education regarding ideal knowledge, attitude and practices on early identification of danger signs and on newborn care.

Adverse Events

No potential adverse events related to the study were identified or encountered.

Validity of the study

For internal validity, the tool used was standardized both in the pre and post intervention but as a confounder the trained staff may not have been the same in these two periods. There was population bias as mothers with no phones were excluded.

CHAPTER THREE

RESULTS

3.1 Introduction

For the pre intervention phase of the study, 216 women discharged following a normal delivery were surveyed and 219 in the post intervention phase. The 16 nurses working in the postnatal units were recruited for surveys as well as focus group discussions on acceptability of neonatal discharge checklist.

3.2 Caregiver Demographic Characteristics

The majority of caregivers enrolled for the pre intervention phase of the study were young, mean age ± (SD) was 26.3(5.058) and were comparable to those in the post intervention phase whose mean age ± (SD) was 26.09 (4.698).

In both phases of the study, most caregivers who participated were educated beyond primary school with 80.6% in the pre intervention phase and 68.9 % in the post intervention phase respectively.

More than 40% were primiparous in both phases of the study and this corresponds with the young age group described above.

Table 3.1: Pre and Post Intervention Caregiver Characteristics

Characteristics	Pre intervention			Post intervention		
	Frequency (N=216)	Percent (%)	Mean (SD)	Frequency (N=219)	Percent (%)	Mean (SD)
Age (Years)						
≤25	106	49.1	26.34 (±5.058)	105	47.9	26.09 (±4.698)
>25	110	50.9		114	52.1	
Level of education						
Primary	42	19.4		68	31.1	
Post primary	174	80.6		151	68.9	
Parity						
1	96	44.4	1.88 (±0.984)	91	41.6	2.04 (±1.108)
>1	120	55.6		128	58.4	

3.3 Caregiver Knowledge of Newborn Care

Of the 216 women surveyed in the pre intervention period, 207 (95.8%) had knowledge on breastfeeding while of the 219 surveyed in the post intervention period 216 (99.1%) were knowledgeable on breastfeeding.

Knowledge on newborn hygiene on the other hand was relatively low between both groups of caregivers at 41 (19.0%) and 28 (13.0 %) in the pre and post intervention groups respectively.

In the pre intervention phase 128(59.3%) had knowledge on cord care as compared to the 188(85.8%) in the post intervention period.

Table 3.2: Comparison of Characteristics and Knowledge Pre and Post Intervention

Characteristics	Pre intervention Frequency (N=216)	Percent (%)	Post intervention Frequency (N=219)	Percent (%)	P
Demographic Characteristics					
Age (Years)	3.3.1		3.3.2	3.3.3	
≤25	106	49.1	105	47.9	0.85
>25	110	50.9	114	52.1	
Level of education					
Primary	42	19.4	68	31.1	**0.009**
Post primary	174	80.6	151	68.9	
Parity					
1	96	44.4	91	41.6	0.54
>1	120	55.6	128	58.4	
Infant Birth Weight (Kgs)					
≤3.0	106	49.1	105	47.9	0.33
>3.0	110	50.9	114	52.1	
Knowledge					
Danger signs	3.3.4		3.3.5	3.3.6	
Fever	145	67.4	174	79.8	**0.05**
Other symptoms	70	32.6	44	20.2	
Cord cleaning					
Yes	128	59.3	188	85.8	**<0.001**
No	88	40.7	31	14.2	
Breastfeeding					
Yes	207	95.8	216	99.1	0.058
No	9	4.2	2	0.9	
When first Immunization					
Yes	198	91.7	215	98.2	**<0.001**
Don't know	18	8.3	4	1.8	
What to do when you notice danger signs					
Go to hospital	189	91.3	198	93	0.439
Others	18	8.7	31	7	
When to wash the baby					
24 hours or one day after	41	19	28	13	0.106
Others	175	81	187	87	

3.3.1 Pre and Post intervention Comparison of Caregiver Characteristics and Knowledge

In the pre intervention phase of the study, there was a statistically significant association between age and identifying danger signs (fever) with those who were more than 25 years of age more likely to mention fever as one of the danger signs that they would look out for in the newborn. The majority of the caregivers, (91.3%) said that they would go to hospital when they noticed danger signs in the newborn. However, of the minority who said they would take other actions, older age was associated.

There was an association between level of education and knowledge of the danger signs to observe in the newborn. Post primary education was associated with identifying the most common danger sign, fever. (p=0.014).

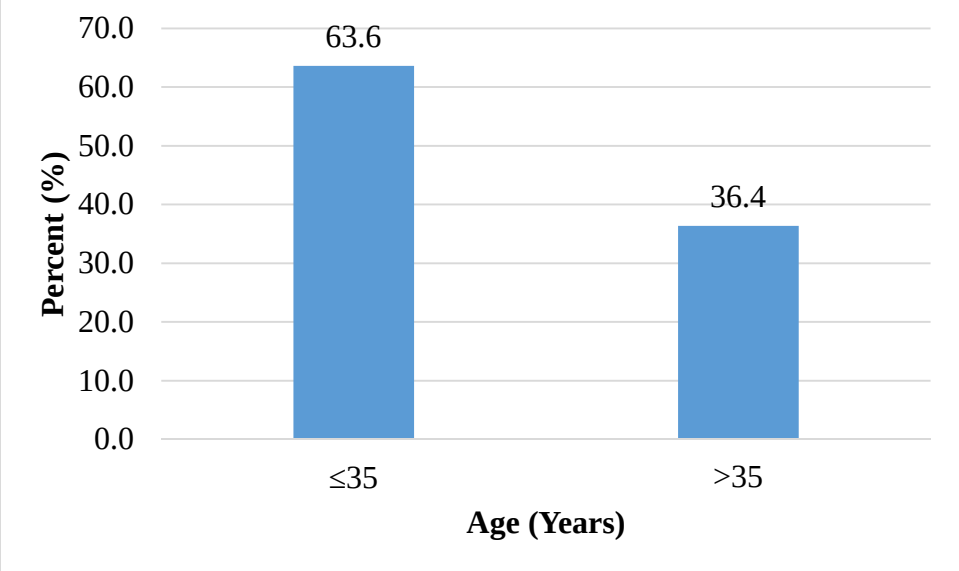

Figure 3.1: Health care worker demographics

3.3.2 Health Care Worker Knowledge and Practices on Newborn Care

All the healthcare workers agreed that: mothers should be taught about newborn care before discharge, should breastfeed within 30 minutes of delivery, should seek medical advice if baby refuses to feed or has not passed urine within 24 hours or has a fever. Of note is that 4 out of 16 health care workers did not agree to cord cleaning with chlorhexidine as compared to the 12 who agreed which is the standard practice.

Table 3.3: Health care worker knowledge and practices on newborn care

HCW newborn care knowledge and practices (N=16)	Strongly agree N(%)	Agree N(%)
Mothers should be taught about newborn care	14(87.5)	2(12.5)
Clean cord with chlorhexidine	8(50.0)	4(25.0)
Breastfeed within 30 minutes of delivery	13(81.3)	3(18.7)
Advise mother to seek medical advice if baby refuses to breastfeed	14(87.5	2(12.5
Advise mother to seek medical advice if baby has not passed urine within 24 hours	13(81.3)	3(18.7)
Advise mother to seek medical advice if newborn has fever	13(81.3)	2(12.5)

The responses were based on the 4 point Likert scale with 4- strongly agree, 3- agree, 2- Don't agree and 1- don't strongly agree.

3.3.3 Caregiver Education on Newborn Care at Discharge

Health care workers mainly talked to caregivers about breastfeeding exclusively for 6 months followed by observing the newborn for danger signs, with 9(60%) and 4(26.7%) respectively giving those as the first response. Other education items for the caregiver at discharge include newborn hygiene, cord care and immunization.

Table 3.4: Caregiver Education on Newborn care at discharge

What to tell mother at discharge	Response			
	1 (N=15)	**2 (N=14)**	**3 (N=14)**	**4 (N=8)**
Breast feed exclusively the first 6 months	9 (60.0)	2 (14.3)	3 (21.4)	6 (75.0)
Cord care	1 (6.7)	2 (14.3)	3 (21.4)	
Newborn Hygiene	1 (6.7)	4 (28.6)	2 (14.3)	
Observe danger signs	4 (26.7)	3 (21.4)	5 (35.7)	1 (12.5)
Immunization		2 (14.3)	1 (7.1)	1 (12.5)

The responses were based on the 4 point Likert scale with 4- strongly agree,3- agree,2- don't agree and 1- don't strongly agree.

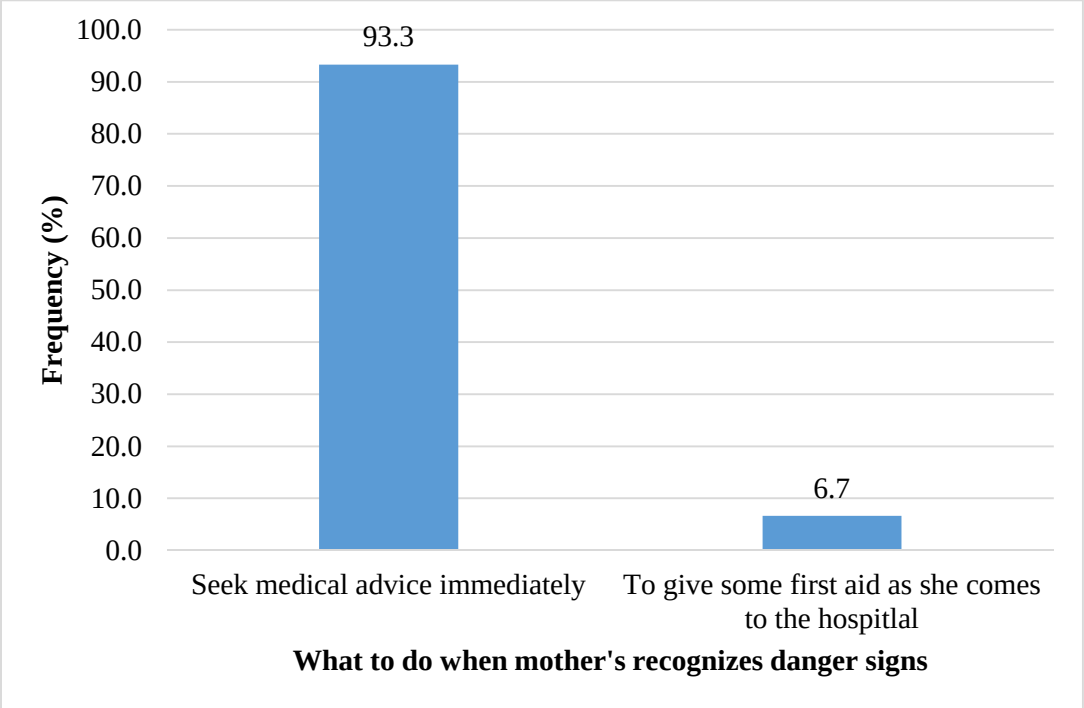

Figure 3.2: Mother education on what to do on observing danger signs

3.4 Qualitative Results: Acceptability of Neonatal Discharge Checklist

Three FGDs were held with nurses working in the postnatal unit at KNH to assess acceptability of the discharge checklist.

Generally, health care workers agreed that the checklist is a great tool that can improve neonatal outcomes. This would be possible with regular training and a close collaboration with the paediatrics department in implementing it.

3.4.1 Checklist Enhances Practice

The health care workers were confident that the checklist would enhance their ability to translate knowledge into practice on aspects of newborn care that may otherwise be forgotten especially considering the heavy workload.

"We explain to the mothers on breastfeeding but not check if they are doing it appropriately because of the numbers." [HCW FGD 1]

"It's time saving, because you don't have to think of what to tell the mother, you just refer to the checklist" [HCW FGD 3]

They also felt that the tool would help them provide knowledge in a clearly guided manner to the caregivers andthis would improve the quality of the services that they offer at discharge of mothers and their newborns.

"The tool is focused, with guided knowledge that the mother needs upon discharge." [HCW FGD 1]

3.4.2 Need for Support to Implement Checklist

Nurses revealed that they need regular training/education to be able to implement the checklist. This would be through continuous medical education sessions and improving the tool to make it user friendly.

"The tool is good, but CMEs are encouraged." [HCW FGD 1]

"It's too crowded; it should be shortened to at least one page and have check boxes to make it user friendly."[HCW FGD 2]

They also felt that they were more equipped to handle the issues relating to the mother but there was need to work closely with the paediatrics unit in order to be able to offer comprehensive discharge services for both the mother and newborn.

"It would be ideal for the pediatrics department to come and examine the neonates upon discharge." [HCW FGD 3]

They also proposed that some of the items/supplies needed to provide the services be availed.

"If the hospital could provide chlorhexidine for the mothers in the wards upon discharge, it would help."[HCW FGD 3]

3.4.3 Checklist has Potential for Improving Neonatal Outcomes

Health care workers acknowledge that the neonatal discharge checklist would ensure they provide standardized care at discharge. Use of the checklist would also ensure the discharge process was comprehensive.

"It would reduce neonatal mortality because we are now able to give more focused information to the mothers, the counseling on hygiene for example would help reduce infections."[HCW FGD 1]

In some cases, the checklist was a source of new knowledge for health care workers that would enhance newborn care.

"I didn't know that the cord needs to be cleaned with chlorhexidine, we normally tell the mothers not to clean and just wait for it to heal."[HCW FGD 3]

"Initially we were told to clean with spirit, then we were told to tell the mothers not clean at all but some clean with water."[HCW FGD 1]

3.5 Hospitalization

Overall, the response rate was 70% in the pre intervention phase and 80% in the post intervention period during the follow up phone calls to determine hospitalization.

Table 3.5: Follow up response rate and Hospitalization rates

Day	Pre Intervention neonatal follow up		Post Intervention neonatal follow up	
	Response rate	**Hospitalization**	**Response rate**	**Hospitalization**
2	166 (76.9)	9 (5.4)	175 (79.9)	5 (2.8)
7	170 (78.7)	3 (1.8)	174 (79.5)	1 (0.6)
14	172 (79.6)	2 (1.2)	179 (81.7)	1 (0.6)
28	150 (69.4)	2 (1.2)	170 (77.6)	0 (0.0)

Hospitalization rates were 7.4% and 3.2 % in the pre intervention and post intervention respectively.

There was significant improvement in knowledge on cord cleaning after the intervention (p =<0.001) as well as on identifying newborn danger signs (p=0.005).
There was a trend for reduced hospitalization following introduction of the neonatal discharge checklist though not significant.

Table 0.6: Assessing the efficacy of a neonatal discharge checklist

Characteristics	**Pre intervention**		**Post intervention**		**P**
	Yes	**No**	**Yes**	**No**	
Hospitalization	16 (7.4)	200 (92.6)	7 (3.2)	212 (96.8)	0.061
Cord cleaning	128 (59.3)	88 (40.7)	188 (85.8)	31 (14.2)	<0.001
Breastfeeding	207 (95.8)	9 (4.2)	216 (99.1)	2 (0.9)	0.058
Characteristics	**Pre intervention**		**Post intervention**		**P**
	Fever	**Other symptoms**	**Fever**	**Other symptoms**	
Danger signs	145 (67.4)	70 (32.6)	174 (79.8)	44 (20.2)	0.005

CHAPTER FOUR

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

4.1 Discussion

With scarcity of data on the efficacy of a neonatal discharge checklist we sought to address this gap through evaluating knowledge that caregivers had before and after the nurses training on it. We also evaluated healthcare workers (nurses) knowledge on newborn care upon discharge as well as held focus group discussions to determine acceptability of the checklist. We assessed the efficacy of the neonatal discharge checklist on neonatal hospitalization rates.

The main areas assessed included knowledge on breastfeeding, cord care, identification of danger signs in the newborn, immunization, and newborn hygiene.

In both phases of the study, we had a relatively young group of mothers who were mostly educated post primary and multiparous with the majority amongst the pre- intervention group at 80.6% compared to the post intervention group at 68.9%, which could be considered a confounder.

Most caregivers had knowledge on breastfeeding compared to other aspects of newborn care being assessed. Various stakeholders including the Ministry of Health and most of the nurses being lactation experts could attribute this to the regular trainings on breastfeeding. In both the pre intervention and post intervention phases, very few mothers (less than 20%) had knowledge on newborn hygiene. Most of the women interviewed said that they would only wash their newborn after the umbilical cord stump had healed while others had no knowledge on when to wash the newborn. This can be compared to the study by Obimbo et al 1999 where mothers had good knowledge on the need for hygiene when cutting the cord, had poor knowledge and practice in other aspects of cord care, and were afraid of handling the cord. In most cases, there may be an assumption that hygiene is a topic that everyone should be acquainted with and health care workers may not see the need to

educate mothers. This clearly reflects the need to have a neonatal discharge checklist at hand to address this knowledge gap.

Fever was the commonly reported danger sign that mothers look out for in addition to the baby not breathing well or refusing to breastfeed. Notably, most of the mothers reported that they would seek medical advice in the event they noticed a danger sign. This can be compared to a study by Gathoni *et al* of 2014 on knowledge of danger signs where the mothers were able to identify one danger sign but not familiar with the other common ones like difficulty in breathing and convulsions.

In both groups, the information on when the child should have the first immunization was adequate at above 90%. This was attributed to the efforts made by the government through the Ministry of Health to ensure regular immunization campaigns are held regularly through which in addition to providing immunization services, information is provided.

On comparing knowledge with demographic characteristics, during the pre-intervention phase, older caregivers were more likely to identify the commonly mentioned danger sign, fever. It was ascribed to the fact that they could have previously taken care of other children. This was consistent with findings in the post intervention phase.

The older caregivers were more likely to take other actions before seeking medical advice in the event they noticed danger signs and these include; tepid sponging and other forms of first aid.

Post primary educated mothers were more likely to identify danger signs as compared to those not educated beyond primary and this would still be considered a confounder, as the mothers in the pre intervention were more educated.

Multiparous women were more likely to have knowledge on breastfeeding, cord care and danger signs to look out for in the pre-intervention phase whereas in the post intervention

phase, only knowledge on danger signs was associated with multiparity. This related to prior experience caring for their other children.

On follow up, the mothers contacted on the phone were to determine if they had observed any danger signs and subsequent hospitalization of the neonates. During the 28-day period, they were contacted at four different time points during which any reported hospitalizations were documented. With fair response rate between 70% and 80%, hospitalization rates reduced in the post intervention period. This coupled with improved knowledge on cord care and identifying danger signs. This can be compared to Kihara et al 2014 that demonstrated increased rates in exclusive breastfeeding in the intervention group due to the phone-based counseling conducted.

Health care workers agreed that mothers need to be educated on newborn care upon discharge on various topics such as breastfeeding, identifying danger signs and newborn hygiene but it was worrying that some of them did not recommend use of chlorhexidine use for cord care. This significant gap in knowledge may have directly influenced the knowledge that they pass to caregivers and in turn improper cord care practices may be a source of neonatal infection. Obimbo et al 1999 demonstrated that the knowledge of a large proportion of HW was incorrect and outdated and recommended that health education on cord care be given at all levels of contact with mothers and that knowledge of all primary HW on cord care be updated. Throughout the years this issue has not been addressed as determined by the results shown in the study.

Shretha's PHD thesis of 2015, which conducted an education program on newborn care, revealed that the mother's knowledge improved which in turn improved infant care.

Breastfeeding exclusively for 6 months and identification of danger signs were among the first responses given to educate mothers. This resonates with the caregiver knowledge levels identified in both phases of the study, showing that mothers were more knowledgeable on breastfeeding and commonly identified fever as a danger sign.

Health care workers strongly felt that the use of a checklist would enhance their provision of neonatal discharge services. However, for the checklist implementation to be a success there is need for training and interdepartmental collaboration to support the process.

They also felt that the neonatal discharge checklist would be a useful tool in ensuring a comprehensive discharge process for both the mother and baby thus highly likely to improve outcomes.

On the hospitalization rates, which a downward trend was demonstrated and this could be attributed to the use of the discharge checklist. Ng'ang'a et al 2013 demonstrated that there was a significant number of well appearing term newborns with sepsis in the post natal wards and as such require routine screening prior to discharge. On day 2 of follow up both in the pre and post intervention phase, hospitalization rates were recorded highest as compared to day 28 where in the post intervention phase where there were none recorded.

4.2 Conclusion

Counseling mothers on the importance of newborn care improves neonatal outcomes. Using a checklist in administering this enhances the experience and guarantees improved outcome.

Mothers interviewed for both the pre-intervention and post intervention phases of the study did not have adequate knowledge on most of the aspects of newborn care. This assessment included newborn hygiene, cord care and danger signs to look out for in the newborn.
Generally, health care workers agreed that essential newborn care counseling was important during post-natal discharge. However, some of them did not have the correct information on cord care and specifically the use of chlorhexidine. Therefore, the checklist would be a great tool that not only saves them time but also enables them provide comprehensive information for the mother upon discharge.

Our study showed a trend in reduced hospitalization following the introduction of neonatal discharge checklist in the post-natal wards at Kenyatta National Hospital and significant improvement in knowledge in the area of cord care and identifying danger signs in the newborn.

4.3 Recommendations

- Adopt the use of neonatal discharge checklists in the post-natal unit at KNH.
- A fact sheet providing all essential information on newborn care be provided to the mothers at discharge.
- Chlorhexidine for cord cleaning to be availed in the obstetrics department.
- Close collaboration between the obstetrics and gynecology and pediatrics will boost implementation of checklist.

4.4 Study Limitations

The study relied on self-reported data with no accompanying measures of data and may have several sources of bias thereby potentially affecting outcomes. There was limited time in conducting the study hence less accurate results. Lack of prior available reliable data on postnatal discharge checklists in Kenya may have been a hindrance. Lack of a mobile phone as an exclusion criterion created a bias. Also noted was that there was limited time for intense training and implementation of the discharge checklist. Level of education for the mothers in the pre intervention phase may be considered a confounder hence more knowledge on newborn care.

4.5 Dissemination of Study Findings

The hospital taking part in the study will receive direct and ongoing feedback in a variety of formats: individualized written reports and feedback visits to the staff. It is with hope the data will have the effect of facilitating improvement on newborn care and reduction in neonatal morbidity and mortality

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APPENDICES

Appendix I: Letter to Ethics and Research Committee

The Chairperson,
Kenyatta National Hospital and University of Nairobi,
Ethics, Research Committee,
P.O. Box 20723,
NAIROBI

Thro'
The Dean,
College of Health Sciences

Thro'
The Chairperson,
Department of Paediatrics and Child Health

Dear Sir/Madam,

RE: SUBMISSION OF MASTERS DEGREE RESEARCH PROPOSAL FOR APPROVAL

I am a second year student pursuing a Masters Degree in Paediatrics and Child Health at the University of Nairobi, College of Health Sciences and would like to submit my research proposal for your approval.

The research proposal is entitled "efficacy of a discharge checklist for neonates in reducing neonatal morbidity and mortality."

Yours Sincerely,

Dr. Daisy Atieno Odundo

Appendix II: Focus Group Discussion Tool for the Trained Nurses

Study Title: STUDY TITLE: EFFICACY OF A DISCHARGE CHECKLIST FOR NEONATES IN REDUCING NEONATAL MORBIDIY AND MORTALITY (P475/08/2017)

Main Objective

To improve the knowledge of health care workers on the care of neonates by using a discharge checklist in reducing neonatal morbidity and mortality. We are here today to discuss about the discharge checklist at the postnatal wards. I would like to know how previous experiences prior to the discharge checklist were and if it is beneficial to you as a health care worker and your mothers. Through this discharge checklist we hope that we will be able to reduce the neonatal morbidity and mortality in the health facility. We encourage each one of you to participate. There is no right or wrong answer. We hope that you can be open and honest to make this activity fruitful and helpful to our children/pupils.

Ground rules:

Everything said here will remain confidential. The report written to summarize the information collected will have no names or identifying information.

Your decision to participate is voluntary.

We would like to hear from everyone present; everyone's opinion is important.

Questions

1) How has the tool helped you impact knowledge on the caregivers upon discharge?
2) Are there any changes you would make on the tool to make it better?
3) How would you determine if the tool would help reduce neonatal morbidity and mortality?

Thank you for your participation in this focused group discussion and after completion of the study we will hold a meeting to give you feedback on the discussion held today. We hope this study will be of benefit to our patients and the country as a whole.

Appendix III: Survey for the Parents

STUDY TITLE: EFFICACY OF A DISCHARGE CHECKLIST FOR NEONATES IN REDUCING NEONATAL MORBIDIY AND MORTALITY (P475/08/2017)

DATE:

This survey is voluntary. Your answers are confidential. Your answers will be used as part of the study being conducted at the health facility on neonatal morbidity and mortality. Please give your finished sheet to the moderator.

Reference ID number

Age:

Level of education:

Parity:

Birth weight of newborn:

Questions:

1) How many children do you have?

---

2)A. How many children have died and at what age?

B. if so, what was the cause of death

……

3) What signs would you notice on your newborn that is falling sick?

……

……

……

……

……

4) If you notice any signs that you have mentioned above, what will you do

5) How do you clean the cord of the child?

---

6) Do you know how to breastfeed a child? How?

---

7) A. When does your baby receive their first vaccination?

B. Where will your child receive the other remaining vaccinations?

……..

8) State some causes that would lead your newborn to be hospitalized after a normal delivery

……

……

9) When will you wash your baby for the first time after delivery? Why?

……

……

Appendix IV: Survey for Trained Nurses

STUDY TITLE: EFFICACY OF A DISCHARGE CHECKLIST FOR NEONATES IN REDUCING NEONATAL MORBIDITY AND MORTALITY (P475/08/2017)

DATE:

This survey is voluntary. Your answers are confidential. Your answers will be used as part of the study being conducted at the health facility on neonatal morbidity and mortality. Please give your finished sheet to the moderator.

BIO-DATA:

REFERENCE NUMBER

Age:

Level of Education:

1. A mother should be taught on newborn care before discharge
   a) Strongly agree ☐
   b) Agree ☐
   c) Disagree ☐
   d) Strongly disagree ☐
2. State what you tell the mother upon discharge

   …….

   ……

   ……

   ……
3. A mother should clean the cord with chlorhexidine 7.1%
   a) Strongly agree ☐
   b) Agree ☐
   c) Disagree ☐
   d) Strongly disagree ☐
4. A mother should breastfeed within 30 minutes of delivering
   a) Strongly agree ☐
   b) Agree ☐

c) Disagree ☐

d) Strongly disagree ☐

5. State the danger signs for neonates that you know

……

……

……

……

……..

6. Do you know how to demonstrate the appropriate technique on breastfeeding?

……

……

…….

7. If the mother recognizes that a newborn is not breastfeeding. She should seek medical attention as soon as possible.

a) Strongly agree ☐

b) Agree ☐

c) Disagree ☐

d) Strongly disagree ☐

8. A mother recognizes that the child has not passed urine in 24 hours. She should seek medical attention.

a) Strongly agree ☐

b) Agree ☐

c) Disagree ☐

d) Strongly disagree ☐

9. If the newborn has a fever the mother should seek medical attention immediately

a) Strongly agree ☐

b) Agree ☐

c) Disagree ☐

d) Strongly disagree ☐

10. If the mother recognizes a danger sign, what advice would you give her?

……

……

11. When should the child start receiving immunizations?

……

……

……

Appendix V: Tool for Phone Call Follow Up Procedures for the Mothers

STUDY TITLE: EFFICACY OF A DISCHARGE CHECKLIST FOR NEONATES IN REDUCING NEONATAL MORBIDITY AND MORTALITY (P475/08/2017)

DATE:

The post discharge phone call will be conducted on the Day 2, 7, 14 and 28 and is to help improve the mother's satisfaction in terms of questions and queries identified and addressed. Through this follow up, we hope to reduce hospitalization rates of the newborn.

Questions:

1. How often does your baby breastfeed both day and night?
2. Is there fast breathing?
3. Is your baby having any hotness of body?
4. Have you noted any abnormal movements the newborn has?
5. How often does the baby pass urine and stool in a day
6. Have you visited any health care facility? If so, why?
7. Has your child received any immunizations?

If any concerns or queries arise, we kindly ask you to visit your nearest health facility to seek further medical attention

Appendix VI: Informed Consent Form for Parents

Informed Consent form for neonates and their mothers, who will be invited to participate in this study from the post-natal wards at Kenyatta National Hospital

[Principle investigator]- Dr. Daisy A Odundo
[Programme]- Post-Graduate Student, University of Nairobi, Paediatrics and Child Health Department

Research Topic: Efficacy of a Discharge Checklist in reducing Neonatal morbidity and mortality

You will be given a copy of the full Informed Consent Form

PART I: Information Sheet

Introduction

My name is Dr. Daisy Odundo, a post-graduate a student at the University of Nairobi. I would like to invite you to participate in the study whose information will be given to you. Before making any decisions or have any questions on the research do not hesitate to contact me.

Purpose of the research

Globally, neonatal mortality has been on a slow downward trend from 1990-2015 with it standing at 22 per 1000 live births in Kenya. Most of these deaths are mainly due to illnesses and prematurity which can be prevented with the mother equipped adequate knowledge on newborn care. The purpose of this study is to have a factsheet or tool with the informed knowledge on newborn care that trained nurses can implement to mothers who have been discharged with the hope that it would eventually reduce neonatal mortality.

Type of Research Intervention

This research will involve examination of your baby and being given information by a

trained nurse on newborn care and thereafter following you and your baby up via mobile phone. The follow-up will be carried out for a month.

Participant selection

I am inviting any mother who has had an uncomplicated delivery and is due for discharge and has a mobile phone to participate in this research

Voluntary Participation

Your participation is entirely voluntary and whether you choose to participate or not, you will still continue to receive treatment at this facility. If you choose to participate you may change your mind later and stop participating.

Procedures and Protocol

For the study to be implemented there will be a comparison of two groups. One group will entail those who will undergo the normal procedure and the second group after the implementation of the discharge checklist.

You will not know which group you have been assigned to so that we can reduce chances of influencing the results of the research. Once we have collected all the information we need, we will compare which of the two procedures has the best results. The standard procedures of management within the post-natal wards will be instituted on the both groups of participants. Upon discharge, we will continue following you up for a month. This will be done to determine whether your baby has experienced any symptoms, whether he/she has been admitted and what the outcomes are. In the event of any illness, you can communicate with us (a number will be provided) in between our follow-up calls.

Risks

Participation in this study will not put you and your baby in danger.

Benefits and Reimbursements

If you participate in this research, there will be a follow up on you and the newborn for the next one month by the doctor and you can have any queries and concerns attended to during this period and be advised accordingly. There will however be no monetary compensation and we will not be responsible for your mobile phone charges.

Confidentiality

The information that we collect from this research will be kept confidential and only the researchers will be able to see the information we collect. The results from the research will be provided to the university and Kenyatta National Hospital while maintaining confidentiality. At the end of the study, we will delete all the participants' mobile phone numbers.

Right to Refuse or Withdraw

You do not have to participate if you do not wish to do so, refusal will not affect you and your baby's treatment at this facility. If you agree to participate, you can stop participating at any time without losing any of your rights as a patient here.

Contact Person

Daisy Odundo- 0722597155

PART II: Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Print Name of Participant: _____

Signature or thumbprint of Participant: _____

Witness: _____

Date: _____

Day/month/year

Statement by person taking consent:

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1.

2.

3.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily. A copy of this ICF has been provided to the participant.

Print name of person taking the consent: _____

Signature of person taking the consent: _____

Date: _____

Dr. Daisy A Odundo

Signature _____

Date _____

Supervisors

Prof. D. Wamalwa

.....

Dr. F. Murila

……

ETHICS AND RESEARCH COMMITTEE.

KNH/UON-ERC

P.O. Box 20723, Nairobi

Appendix VII: Kibali cha Kushiriki katika Utafiti

Fomu ya ruhusa ya kibali kwa ajili ya watoto wa kike na mama zao, ambao wataalikwa kushiriki katika utafiti huu kutoka kwa kata za baada ya kuzaa katika Hospitali ya Taifa ya Kenyatta

[Kanunimpelelezi] - DrDaisyOdundo

[Shule] - Mwanafunzi, Chuo Kikuu cha Nairobi, IdarayaAfyayawatoto

Mada ya Utafiti: Ufanisi wa Orodha ya Kuangamiza kwa Kupunguza maradhi na vifo vya Neonatal

Utapewa nakala ya Fomu ya Ruhusa

SEHEMU YA I: Karatasi ya Taarifa

Utangulizi

Jina langu ni Dk Daisy Odundo, mwanafunzi wa mwisho wa Chuo Kikuu cha Nairobi. Napenda kuwakaribisha kushiriki katika utafiti ambao habari zitapewa kwako. Kabla ya kufanya maamuzi yoyote au kuwa na maswali yoyote juu ya utafiti usisite kuwasiliana na mimi.

Kusudi la utafiti

Ulimwenguni, vifo vya watoto wachanga vimekuwa vimepungua kwa kasi kutoka mwaka wa 1990-2015 na vinavyomilikiwa 22 kwa uzazi wa 1000 walioishi nchini Kenya. Wengi wa vifo hivi ni hasa kutokana na magonjwa na prematurity ambayo inaweza kuzuiwa na mama ameweka ujuzi wa kutosha juu ya huduma ya watoto wachanga. Kusudi la utafiti huu ni kuwa na maelezo au chombo cha ujuzi juu ya utunzaji wa watoto wachanga ambao wauguzi waliofundishwa wanaweza kutekeleza kwa mama ambao wametolewa na matumaini kwamba hatimaye itapunguza vifo vya watoto wachanga.

Aina ya Uingizaji wa Utafiti

Utafiti huu utahusisha uchunguzi wa mtoto wako na kupewa habari na muuguzi aliyefundishwa juu ya huduma ya watoto wachanga na kisha kufuata wewe na mtoto wako kupitia simu ya mkononi. Ufuatiliaji utafanyika kwa mwezi.

Uchaguzi wa washiriki

Ninakaribisha mama yeyote ambaye amekuwa na utoaji usio ngumu na ni kutokana na kutokwa na ana simu ya mkononi kushiriki katika utafiti huu

Kushiriki kwa hiari

Ushiriki wako ni kikamilifu kwa hiari na ikiwa unachagua kushiriki au la, utaendelea kupata matibabu katika kituo hiki. Ikiwa unachagua kushiriki unaweza kubadilisha mawazo yako baadaye na uacha kushiriki.

Taratibu na Itifaki

Kwa ajili ya utafiti kutekelezwa kutakuwa na kulinganisha kwa makundi mawili. Kikundi kimoja kitahusisha wale watakaofuata utaratibu wa kawaida na kundi la pili baada ya utekelezaji wa orodha ya kutokwa.

Huwezi kujua kundi ambalo umetolewa ili tuweze kupunguza nafasi za kushawishi matokeo ya utafiti. Mara tumekusanya maelezo yote tunayohitaji, tutafafanua ni ipi kati ya taratibu hizo mbili zilizo na matokeo bora zaidi. Taratibu za usimamizi wa ndani ya kata za baada ya kuzaa zitaanzishwa kwenye makundi mawili ya washiriki. Baada ya kutokwa, tutaendelea kukufuatia kwa mwezi. Hii itafanyika ili kujua kama mtoto wako amepata dalili yoyote, iwapo amekubaliwa na matokeo yake ni nini. Katika tukio la ugonjwa wowote, unaweza kuwasiliana na sisi (nambari itatolewa) kati ya simu zetu za kufuatilia.

Hatari

Kushiriki katika utafiti huu hakutakuweka wewe na mtoto wako hatari.

Faida na Reimbursements

Ikiwa unashiriki katika utafiti huu, kutakuwa na kufuatilia wewe na mtoto mchanga kwa mwezi mmoja ujao na daktari na unaweza kuwa na maswali na wasiwasi wowote uliohudhuria wakati huu na kushauriwa ipasavyo. Hata hivyo hakutakuwa na fidia ya fedha na hatuwezi kuwajibika kwa mashtaka yako ya simu za mkononi.

Usiri

Taarifa tunayokusanya kutoka kwa utafiti huu itahifadhiwa siri na watafiti tu wataweza kuona habari tunayokusanya. Matokeo kutoka kwa utafiti yatatolewa kwa Chuo Kikuu cha Kuniviti na Chuo Kikuu cha Kenyatta wakati wa kudumisha siri. Mwishoni mwa utafiti, tutafuta namba za simu za washiriki wote.

Haki ya Kuzuia au Kuondoa

Huna haja ya kushiriki ikiwa hutaki kufanya hivyo, kukataa hakutakuathiri wewe na matibabu ya mtoto wako kwenye kituo hiki. Ikiwa unakubali kushiriki, unaweza kuacha kushiriki wakati wowote bila kupoteza haki yoyote kama mgonjwa hapa.

Kuwasiliana na mtu

Daisy Odundo- 0722597155

SEHEMU YA II: Hati ya Ruhusa

Nimesoma taarifa iliyotangulia, au imesomezwa. Nimekuwa na fursa ya kuuliza maswali kuhusu hilo na maswali yoyote niliyoyaomba yamejibiwa kwa kuridhika kwangu. Ninakubali kwa hiari kushiriki kama mshiriki katika utafiti huu.

Jina la Mshiriki: _____

Sahihi au kidole cha Mshiriki: _____

Shahidi: _____

Tarehe: _____

Siku / mwezi / mwaka

Taarifa kwa mtu kuchukua kibali:

Nimesoma kwa usahihi karatasi ya habari kwa mshiriki anayeweza, na kwa uwezo wangu wote kuhakikisha kuwa mshiriki anaelewa kuwa zifuatazo zitafanywa:

1.
2.
3.

Ninathibitisha kwamba mshiriki huyo alitolewa fursa ya kuuliza maswali kuhusu utafiti huo, na maswali yote aliyoulizwa na mshiriki amejibu kwa usahihi na kwa uwezo wangu mkubwa. Ninathibitisha kwamba mtu huyo hakujazimishwa kutoa idhini, na ridhaa imetolewa kwa uhuru na kwa hiari. Nakala ya ICF hii imetolewa kwa mshiriki.

Jina la mtu anayekubali: _____

Saini ya mtu anayechukua kibali: _____

Tarehe: _____

Daisy Odundo

Sahihi _____

Tarehe _____

Wasimamizi

Prof. D. Wamalwa

....

Dk F. Murila

.....

KITITI NA MAFUNZO.

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Appendix VIII: Informed Consent Form for Nurses

Informed Consent form for nurses, who will be invited to participate in this study from the post-natal wards at Kenyatta National Hospital

Principle investigator- Dr. Daisy A Odundo

Programme- Post-Graduate Student, University of Nairobi, Paediatrics and Child Health Department

Research Topic: Efficacy of a Discharge Checklist in reducing Neonatal morbidity and mortality

You will be given a copy of the full Informed Consent Form

PART I: Information Sheet

Introduction

My name is Dr. Daisy Odundo, a post-graduate a student at the University of Nairobi. I would like to invite you to participate in the study whose information will be given to you. Before making any decisions or have any questions on the research do not hesitate to contact me.

Purpose of the research

Globally, neonatal mortality has been on a slow downward trend from 1990-2015 with it standing at 22 per 1000 live births in Kenya. Most of these deaths are mainly due to illnesses and prematurity which can be prevented with the mother equipped adequate knowledge on newborn care. The purpose of this study is to have a factsheet or tool with the informed knowledge on newborn care that trained nurses can implement to mothers who have been discharged with the hope that it would eventually reduce neonatal mortality.

Type of Research Intervention

This research will involve examination of newborns and giving the mother relevant information of newborn care by a trained nurse upon discharge. The newborns will then be followed up by phone call by the principal investigator for a month.

Participant selection

I am inviting any trained nurse who works at the postnatal wards and is in contact with mothers upon discharge to participate in the study.

Voluntary Participation

Your participation is entirely voluntary and whether you choose to participate or not, you will still receive information that will be relevant for the mothers upon discharge. If you choose to participate you may change your mind later and stop participating.

Procedures and Protocol

For the study to be implemented there will be a comparison of two groups. One group will entail those who will undergo the normal procedure and the second group after the implementation of the discharge checklist.

Once we have collected all the information we need, we will compare which of the two procedures has the best results. The standard procedures of management within the post-natal wards will be instituted on the both groups of participants. Upon discharge, the mother and the newborn will be followed up for a month. This will be done to determine whether the baby has experienced any symptoms, whether he/she has been admitted and what the outcomes are.

Risks

Participation in this study will not put you the trained nurse in any danger.

Benefits and Reimbursements

If you participate in this research, there will be attainment of knowledge on newborn care. There will however be no monetary compensation.

Confidentiality

The information that we collect from this research will be kept confidential and only the researchers will be able to see the information we collect. The results from the research will be provided to the university and Kenyatta National Hospital while maintaining confidentiality. At the end of the study, we will delete all the participants' details.

Right to Refuse or Withdraw

You do not have to participate if you do not wish to do so, refusal will not interfere with your normal duties at the hospital. If you agree to participate, you can stop participating at any time without losing any of your rights.

Contact Person

Daisy Odundo- 0722597155

PART II: Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Print Name of Participant: _____

Signature of Participant: _____

Date: _____

Day/month/year

Statement by person taking consent:

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1.

2.

3.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily. A copy of this ICF has been provided to the participant.

Print name of person taking the consent: _____

Signature of person taking the consent:_____

Date: _____

Dr. Daisy A Odundo

Signature _____

Date _____

Supervisors

Prof. D. Wamalwa

Dr. F. Murila

ETHICS AND RESEARCH COMMITTEE.

KNH/UON-ERC

P.O. Box 20723, Nairobi

Appendix IX: Time Frame

The following is a proposed time-frame of the study process:

Number	Activity	Estimated Time
1	Proposal Development and Presentation	One month
2	Submission of proposal for ethical approval	Two months
3	Pretesting and seeking permission	One month
4	Data Collection	3 months
5	Data Analysis	One month
6	Thesis writing	Two months
7	Thesis submission	One month

Appendix X: Study Budget

Category	Remarks	Units	Unit Cost (KShs)	Total (KShs)
Proposal Development	Printing drafts	1000 pages	5	5,000
	Proposal Copies	8 copies	500	4,000
Data Collection	Stationery Packs (Pens, Paper and Study Definitions)	10	100	1000
	Training research assistants	5 days	1000	5, 000
	Research assistants (2)	9 weeks	1000 X 2	18, 000
Data Analysis	Statistician	1		25,000
Thesis Write Up	Computer Services			5,000
	Printing drafts	1000 pages	5	5,000
	Printing Thesis	10 copies	500	5,000
Contingency funds				20,000
Total				**73,000**

Appendix XI: 0.11 CHECKLIST (Adopted from USAID)

USAID FROM THE AMERICAN PEOPLE | MCHIP Maternal and Child Health Integrated Program | Maternal and Child Survival Program

POSTNATAL CARE

PRE-DISCHARGE CHECKLIST

Do not discharge until at least 24 hours after a normal vaginal birth.

The mother has a danger sign: • Heavy bleeding • Severe abdominal pain • Unexplained pain in chest or legs • Visual disturbance or severe headache • Breathing difficulty • Fever, chills • Vomiting		➔	Assess the cause(s) and initiate care or refer. Delay discharge until all danger signs have been resolved for at least 24 hours and there is a follow-up plan in place.
The mother's bleeding is heavy or has increased since birth (e.g., bleeding soaks a pad in less than 5 minutes).		➔	Delay discharge. Evaluate and treat possible causes of bleeding (e.g., uterine atony [not contracted], retained placenta, or vaginal/cervical tear).
The mother has an abnormal vital sign: • High blood pressure (SBP > 140 mmHg or DBP >		➔	Evaluate the cause of abnormal vital sign(s) and treat or refer.

90 mmHg) • Temperature > 38.0°C • Heart rate > 100 beats per minute			Defer discharge until vital signs have been normal for at least 24 hours and no danger signs remain.
The mother is not able to urinate easily or is leaking urine.		➔	Defer discharge; continue to monitor and evaluate the cause; treat or refer as needed.
The mother is being treated for a complication, and her condition has not stabilized (e.g., vital signs are not normal or she has a danger sign).		➔	Delay discharge until the mother's condition has been stable for at least 24 hours, with normal vital signs and no danger signs remain. Refer if necessary.
The baby has any of these danger signs: • Fast breathing (> 60 breaths/minute) • Severe chest in-drawing • Fever (temperature ≥ 37.5°C axillary) • Hypothermia (temperature < 35.5°C) • Yellow palms (hands) or soles (feet) • Convulsions • No movement or movement only on stimulation • Feeding poorly or not feeding at all		➔	Assess cause of danger signs and initiate care or refer. Delay discharge until all danger signs have been resolved for at least 24 hours and there is a follow-up plan in place.
The baby is not breastfeeding at least every 2–3 hours (day and night).		➔	Delay discharge and evaluate the causes. Treat or refer. Delay discharge until the baby has been breastfeeding well for at least 24 hours.

Assess Mother for Problems	No	Yes	Recommended Actions
The baby weighs < 2,500 g.		➔	Delay discharge. Initiate appropriate care for small babies or refer for advanced care.
The baby has not passed urine and/or stool.		➔	Delay discharge and monitor; refer as needed.
The baby's umbilical stump is bleeding or has discharge, a foul odor, or redness around it.		➔	Delay discharge. Ensure that appropriate care is started.

ESSENTIAL ACTIONS FOR EVERY MOTHER AND BABY BEFORE DISCHARGE

Action	Initial
Examine mother and baby Verify normal vital signs Mother: • Temperature < 38.0°C • SBP < 140 mmHg; DBP < 90 mmHg • Heart rate < 100 beats per minute Newborn: • Respiration < 60 beats per minute • Temperature 36.5–37.5°C axillary	
Confirm newborn immunizations have been given and linked to immunization register.	
Assess breastfeeding and provide support if needed (e.g., positioning of baby, nipple care).	
Confirm that mother has been counseled on postpartum family planning, including the benefits of spacing births at least 2 years apart. Confirm that the woman's contraceptive method of choice has been started (as available) and refer her for family planning follow-up. *Note: Pre-discharge postpartum contraceptive options include the lactational amenorrhea method, intrauterine device, progesterone only pills, implants, condoms, and permanent methods. In breastfeeding women, progestogen only injectables may be started at 6 weeks postpartum and combined oral contraceptive pills (COPs) may be started at 6 months postpartum. In non-breastfeeding women, COPs may be started at 6 weeks postpartum.*	
Counsel the mother and family on: • Hand washing, general hygiene, and cord care • Keeping the baby warm • Danger signs for baby and mother (see above); where to go if any danger signs occur • Exclusive breastfeeding for first 6 months; avoid prelacteal feeds • Healthy eating for the mother and iron supplementation through 3 months • Signs of postpartum depression and how to get help • Sleeping under a long-lasting insecticide-treated net • Follow-up care for the mother for any medical conditions (e.g., high blood pressure) • Resuming sexual relations and ensuring safe sex	
Confirm syphilis and HIV testing.	
If the mother is living with HIV, verify that the mother and newborn have received antiretrovirals per protocol and that a follow-up plan is clearly communicated.	
Review the follow-up plan for routine care and review the complication readiness plan in case any danger signs occur (mother or baby). Link to community postnatal services, if possible. Remind about: • 3 postnatal care visits in the first 6 weeks: at 3 days, 7–14 days, and 6 weeks • Baby's immunizations • Follow-up family planning	

If there are no problems and all of the essential actions have been completed, the mother and baby may be discharged. Thank the woman and her family for coming to give birth at the facility. Encourage her to give feedback on her birth experience.

Be sure to document all care in the mother's and newborn's records.

Signature: Date:

This job aid is made possible by USAID, the Maternal and Child Survival Program, and the Maternal and Child Health