

**HIGH-IMPACT LOW-COST INTERVENTIONS IMPLEMENTED TO ENHANCE THE
QUALITY OF CARE GIVEN TO PRETERM BABIES IN KILIFI COUNTY, KENYA**

by

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DECLARATION

I declare that **HIGH-IMPACT LOW-COST INTERVENTIONS TO ENHANCE THE QUALITY OF CARE GIVEN TO PRETERM BABIES IN KILIFI COUNTY, KENYA** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the dissertation to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other education institution.



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HIGH-IMPACT LOW-COST INTERVENTIONS TO ENHANCE THE QUALITY OF CARE GIVEN TO PRETERM BABIES IN KILIFI COUNTY, KENYA

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ABSTRACT

The main objective of this study was to explore and describe the implementation of national policies/guidelines regarding low-cost high-impact interventions to enhance health outcomes for preterm babies among health professionals in Kilifi County.

A mixed method approach, with a convergent parallel design was used. Seventeen public health facilities were chosen purposively for the study. Census sampling for the nurses and midwives was utilized with a sampling frame of 146 nurses and midwives. Data was collected using semi structured questionnaires to the nurses and midwives (n=102); A health facility assessment tool with facility leaders (n=16); focus group discussions were held among with nurses and midwives (n=7); in-depth interviews with key informants n=seven and unstructured observation.

Analysis of quantitative data was done using the Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics (i.e. mean and standard deviation for continuous variables, frequencies and percentages for discrete variables) and inferential statistics were used to answer the research questions. Qualitative data was coded and analysed thematically.

The results provided rich information from several data sources highlighting a need to improve the implementation of four evidence-based practices that would enhance health outcomes for preterm babies. Guidelines/policies, important equipment and medications were not always available, which caused frustration among healthcare workers in their efforts to provide care for preterm babies. Despite common recognition of their key function, guidelines are not always adhered to, as shown in this study. Inadequate use of guidelines reflects the omission of beneficial treatments, possible avoidable harms, and

suboptimal patient care. This study also established that there were associations between participants' gender and percentage scores for knowledge and practice and implementation. The study also highlights barriers and enablers to implementation of clinical guidelines and possible strategies to effective implementation.

Key concepts

Enhance; health interventions; high impact; low cost; preterm baby.

Muhtasari

Lengo la utafiti huu lilikuwa ni kuchunguza na kuelezea utekelezaji wa sera za taifa/miongozo kuhusu gharama nafuu hatua juu ya athari ya kuimarisha matokeo ya afya, kwa ajili ya watoto njiti kati ya wataalamu wa afya katika kata la Kilifi. Mchanganyiko njia mbinu, na muunganiko sambamba kubuni ilitumika. Vituo vya afya vya umma Kumi na saba vilichaguliwa makusudi kwa ajili ya utafiti. Sensa sampuli kwa wauguzi na wakunga ulitumiwa kwa sampuli hii ya wauguzi na wakunga mia moja arobaini na sita. Takwimu zilikusanywa kwa kutumia nusu ya muundo dodoso za wauguzi na wakunga (nambari= mia moja na mbili); vituo vya afya tathmini chombo na viongozi kituo (Nambari= kumi na sita), majadiliano ya vikundi kati ya wauguzi na wakunga (nambari=saba); mahojiano ya kina na watoa habari wakuu (nambari=saba) na uchunguzi haujatengenezwa. Data ya ubora ilikuwa kuchambuliwa kwa kutumia SPSS toleo la ishirini na tatu. Takwimu maelezo (yaani maana na kiwango kupotoka kwa vigezo endelevu, masafa na asilimia kwa vigezo vya kipekee) na takwimu sisizo na mapendeleo zilitumika kujibu maswali ya utafiti. Data ya ubora ilikuwa kutolewa na kuchambuliwa kwa makusudi. Matokeo kutoa habari tajiri na vyanzo kadhaa data kuonyesha haja ya kuboresha utekelezaji wa shughuli nne ushahidi wa msingi ambayo kuongeza matokeo ya afya kwa ajili ya watoto njiti. Miongozo / sera, vifaa muhimu na dawa zilikuwa hazipatikani kila wakati, ambazo zilisababisha kuchanganyikiwa miongoni mwa wafanyakazi wa afya katika juhudi zao za kutoa huduma kwa ajili ya watoto njiti. Pamoja na kutambua kawaida ya kazi yao muhimu, miongozo si daima kuzingatiwa na, kama inavyoonekana katika utafiti huu. Matumizi duni ya miongozo huonyesha upungufu wa matibabu ya manufaa, madhara yanayoweza kuepukwa, na huduma ya afya ya watoto njiti ya chini. Utafiti huu pia ulibaini kwamba kulikuwa na uhusiano kati ya jinsia ya washiriki na asilimia alama kwa maarifa na mazoezi na utekelezaji. Utafiti huo pia unaonyesha vikwazo na wawezeshaji na utekelezaji wa miongozo ya kliniki na mikakati inawezekana utekelezaji.

Dhana muhimu:

Kuongeza; mtoto njiti; gharama nafuu; athari ya juu; kuongeza; hatua za afya.

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Dedication

To the Almighty God :

Thank you for strength and provision along the arduous road of my studies.

Thank you for offering me this great achievement

I give all the glory to you!

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LIST OF ABBREVIATIONS

AKU:	Aga khan University
CME:	Continous Medical Education
EmONC:	Emergency Obstetric and Newborn Care
FGD:	Focus Group Discussion
HC:	Health Centre
IDI:	In-depth Interviews
KDHS:	Kenya Demographic and Health Survey
KMC:	Kangaroo Mother Care
MOH:	Ministry of Health
NBU:	Newborn Unit
SCH:	Sub county Hospital
SPSS:	Statistical Package for Social Sciences
UNISA:	University of South Africa
VLBW:	Very Low Birth Weight
WHO:	The World Health Organization

CHAPTER 1

ORIENTATION OF THE STUDY

1.1 INTRODUCTION

This thesis is a product of research that sought to analyse the availability of and fidelity in implementing national guidelines for the care of preterm babies in Kilifi County, Kenya. The study aimed to add to the existing body of knowledge that identifies barriers to proper implementation of guidelines, with the intention to use the findings to inform the design of high-impact low-cost interventions for the care of preterm babies. Such clinical interventions could have a remarkable impact in reducing the mortality, morbidity, and disability associated with poor care practices for preterm babies.

This chapter shapes the general background and conceptual foundations of this study. It provides background information and sets out the problem statement, research purpose, objectives, research questions, study significance, foundations of the study, key concepts research methodology and relevant ethical considerations.

1.2 BACKGROUND INFORMATION ABOUT THE RESEARCH PROBLEM

1.2.1 Source of the research problem

Preterm birth is the birth of a baby before completion of 37 weeks of gestation. Each year, about 15 million infants are born preterm worldwide, translating to about one in 10 of all infants born (Lassi, Middleton, Crowther & Bhutta 2015:985). Complications associated with preterm are births the major direct cause of new-born deaths globally, and prematurity comes second from pneumonia as a leading cause of all child deaths (Lawn, Kinney, Belizan, Mason, McDougall, Larson, Lackritz, and Friberg & Howson 2013:s6)

Although preterm births represent significant financial, organizational, clinical and personal burdens to women, their families and wider society, strategies implemented to decrease the rate of preterm births have had minimal success Friberg, Kinney, Lawn, Kerber Odubanjo, Bergh, Walker, Weissman, Chopra and Black (2010:e1000295).

Moreover, among preterm infants who are likely to survive, the extra burden of disability related to being born preterm may have serious socioeconomic effects for families and the wider health system (Howson, Kinney, McDougall & Lawn 2013:s1).

In low-income countries, only 10% of infants born before the 28th gestational week survive compared with 90% in high-income countries (Dickson, Simen-Kapeu, Kinney Huicho, Vesel, Lackritz, De Graft Johnson, Von Xylander, Rafique, Sylla & Mwansambo 2014:438-454). According to Lawn et al (2014:185-209), 60% of all preterm births occur in sub-Saharan Africa and South Asia, although sub-Saharan Africa bears the highest proportion of negative outcomes. Those authors noted that the end result of improved care for preterm babies would be immediate and have considerable benefits. Additionally, more than 75% of the 1.1 million preterm babies who die each year could be saved, even without employing complex technological care.

1.2.2 Background to the research problem

About 10% of preterm babies are born between 28 and 32 gestational weeks. In low-resource countries, more than half of these preterm babies may die, but most of these deaths could be prevented with feasible, low-cost care (WHO 2015). The World Health Organization (WHO) (2015) reported that most preterm infants (>80%) are born at 32-37 gestational weeks (moderate to late preterm), and are susceptible to preventable deaths because of lack of modest (but essential) interventions; e.g., provision of warmth, and support for breathing and feeding. Alleman (2014:201) found that the risk for neonatal death due to preterm birth complications was about 12 times higher for a preterm baby born in Africa compared with a baby born in Europe. However, three-quarters or more of these preterm babies could be saved with viable, cost-effective interventions (Howson et al 2013:S1). Bhutta, Das, Bahl, Lawn, Salam, Paul, Sankar, Blencowe, Rizvi, Chou and Walker (2014:347-370) stated that essential newborn care remains suboptimal, even for preterm infants born in a health facility. The studies discussed above show that although preterm babies have a higher risk for complications and even death, interventions to enhance their survival have not been optimised, particularly in low- and middle-income countries.

Extra support for improved care of preterm neonates significantly boosts their survival. Lawn et al (2014:189-205) reported that extra support for early and exclusive

breastfeeding, extra warmth support, hand washing, application of chlorhexidine for cord care and skin-to-skin care improved outcomes for preterm babies. Currently, the selection of intervention and degree of implementation depends on available resources, policies in individual countries, geographical settings and institutional and individual factors (WHO 2015). Therefore, it is necessary to consider different determinants when evaluating the implementation of interventions for preterm care.

Kangaroo mother care (KMC; thermal protection by uninterrupted skin-to-skin contact), support for early initiation and exclusive breastfeeding or any other appropriate feeding plus timely recognition of/response to illness are interventions for which there is evidence of a high impact on preterm babies' survival (Lawn, Davidge, Paul, Xylander, De Graft Johnson, Costello, Kinney, Segre & Molyneux 2013b:S5). Use of low-cost interventions such as KMC has been reported to yield a 51% reduction in mortality for newborns weighing less than 2,000 g (Howson et al 2013:s1). Similarly, Gravett and Rubens (2012:368-373) showed that KMC, early feeding support, extra warmth support and hygienic cord care enhanced preterm babies' health outcomes. Those authors also reported that the success of such interventional care depends on nurses and other caregivers who have appropriate skills in caring for preterm babies. These results were reinforced by Lawn et al (2014:189-205), who cautioned that immediate deployment of intensive care for preterm babies may not succeed if simple hygiene, attention to immediate preterm feeding, warmth provision and other basic interventions are not in place.

Myths and misconceptions around preterm birth, which are more prevalent in low- and middle-income countries, have slowed action on prevention and the care of preterm babies. Implementation of interventions to improve outcomes for preterm babies requires more research, and more informed policy attention and programmatic investment (Lawn et al 2014:189-205; Howson et al 2013:S1). Gravett and Rubens (2012:368-373) noted that evidence-based interventions and strategies are needed to improve the survival of preterm babies; however, these interventions and strategies are often not accessible to those who need them most. Surprisingly, many interventions could be provided through existing service delivery packages. However nearly all available interventions currently have low coverage, with less than one-third of preterm babies receiving such packages of care. The packages of care for small and ill new-borns that offer the greatest results

tend to have low and unequal coverage, and as such, are the most sensitive pointers of health system functionality (Dickson et al 2014:438-454).

Blencowe, Cousens, Oestergaard, Chou, Moller, Narwal, Adler, Garcia, Rohde, Say and Lawn (2012:2162-2172) recommended that basic interventions to improve the survival of preterm babies need to be scaled up. Improvement of the survival of preterm babies depends on realising high coverage of evidence-based interventions for improving outcomes for these babies (Lawn, Blencowe, Waiswa, Amouzou, Mathers, Hogan, Flenady, Frøen, Qureshi, Calderwood & Shiekh 2016:587-603). In a countdown to the Millennium Development Goals 2015 report, Victora, Requejo, Barros, Berman, Bhutta, Boerma, Chopra, De Francisco, Daelmans, Hazel and Lawn (2016:2049-2059) reported that in low- and middle-income countries, achievement of high, equitable and sustained coverage of interventions that are life-saving for new-borns is not sufficient. They further reported that in addition to coverage gaps, there were massive inequalities in intervention coverage, although progress had occurred in some countries. Appropriate evidence-based strategies are needed to address these gaps and improve the survival of preterm babies.

While acknowledging the milestones achieved regarding reduction of newborn deaths over the last decade, Friberg et al (2010:e1000295) concluded that like other low- and middle-income countries, there is an urgent need to accelerate interventions for the care of preterm babies in Kenya, as the global community embarks on the journey towards achieving Sustainable Development Goals.

Studies conducted in Asia and sub-Saharan Africa revealed gaps in the availability of policies, equipment and medicine that are dedicated to support implementation of evidence-based interventions aimed at improving care for preterm infants (Gondwe, Munthali, Ashorn & Ashorn 2016:1441-1447; Levison, Nanthuru, Chiudzu, Kazembe, Phiri, Ramin & Aagaard 2014:123; McClure, Saleem, Goudar, Dhaded, Guruprasad, Kumar, Tikmani, Kadir, Raza, Yasmin, Moore, Kim, Bann, Parlberg, Aceituno, Carlo, Silver, Lamberti, Patterson & Goldenberg 2018:89). Gondwe et al (2016) also found that although some policies and guidelines covering such care exist, nurses and midwives generally lacked knowledge and understanding of these guidelines. Collectively, findings from previous studies revealed serious gaps in the availability of commodities to support

preterm babies' care, as well as inadequate knowledge in current nursing practice to improve the care for and survival of preterm babies.

The Kenyan Ministry of Health (MOH) reported that of the 1.5 million live births in Kenya annually, 193,000 (12.8%) babies are born prematurely (before 37 weeks of gestation). Preterm birth complications are reported to be the leading cause of death among children under 5 years of age (Kenya Demographic Health Survey 2014). According to Mramba, Nassir, Ondieki and Kimanga (2010:152), coverage of interventions to improve outcomes for preterm babies has been challenging, especially in remote counties in Kenya. Integrating and scaling up available interventions in counties that have a high number of neonatal deaths has potential to save these lives (Aluvaala, Nyamai, Were, Wasunna, Kosgei, Karumbi, Gathara & English 2015:42-47).

1.3 RESEARCH PROBLEM

In Kenya, the rate of preterm births remains high, yet there is a paucity of research on this subject. Kenya National Bureau of statistics, Ministry of Health/Kenya, National AIDS Control Council/Kenya, Kenya Medical Research Institute & National Council for Population Development/Kenya (2015); Kenyan Demographic Health Survey (2014) indicated that one in eight babies is born preterm. This, translates to 22 babies every hour, giving Kenya an estimated preterm birth rate of 12%. A recent study conducted in one of Kenya's biggest public health referral facilities reported a preterm birth prevalence of 18.3% (Wagura, Wasunna, Laving & Wamalwa 2018:107).

Kilifi County (the site for this study) is a remote area in Kenya where access to neonatal, child and maternal health services is severely restricted, with resultant high rates of preterm deaths. With 87 deaths per 1,000 live births, Kilifi County has one of the highest under-5 mortality rates across Kenya. Newborn mortality in Kilifi County accounts for almost 66% of child mortality, and is almost twice the national average. The Kilifi County Demographic Health System reported that preterm birth is a leading cause of neonatal mortality in the county, with an estimated 17 neonatal deaths per 1,000 live births; a figure that is way above the national average (County DHS 2015).

Data on national coverage for several evidence-based interventions for preterm infants are scarce in Kenya (Aluvaala et al 2015:42). There is an urgent need for systematic

studies and proper documentation regarding how interventions targeted at improving the care and protection of preterm babies have been implemented (Murphy, Gathara, Mwachiro, Abuya, Aluvaala & English 2018:72). Moreover, there is a scarcity of recent documented research that has explored the knowledge and understanding of current guidelines for improving preterm outcomes, as well as the determinants of guideline implementation. It is therefore an enlightening endeavour to investigate the extent to which four known evidence-based interventions (resuscitation, warmth provision, early feeding and use of chlorhexidine for cord care) have been implemented in public health facilities in Kilifi County, with the aim of improving preterm babies' health outcomes. This empirical challenge for the Kenyan health system motivated the present study.

1.4 AIM AND PURPOSE OF THE STUDY

This study aimed to explore and describe the implementation of national policies/guidelines regarding low-cost high-impact interventions to enhance health outcomes for preterm babies. Findings from this study may be used to inform the design of instructional strategies to enhance implementation of Kenyan national policies and guidelines in Kilifi County, Kenya.

1.4.1 Research objectives

- To determine the extent to which current policies and guidelines regarding interventions to enhance health outcomes for preterm babies are being implemented in public health facilities in Kilifi County.
- To describe the knowledge, understanding and use of policies and guidelines for improving health outcomes for preterm babies among nurses and midwives in Kilifi County health facilities.
- To identify factors associated with implementation of relevant policies and guidelines in the management of preterm babies in health facilities in Kilifi County.
- To explore barriers and enablers for healthcare workers in implementing these policies and guidelines in the participating facilities.
- To propose instructional strategies to enhance compliance with national guidelines and policies to improve health outcomes for preterm babies.

1.4.2 Research questions

This study seeks to answer five key questions:

- What is the extent to which current national policies and guidelines regarding interventions to improve health outcomes for preterm babies are being implemented in health facilities in Kilifi County?
- What is the knowledge and understanding of nurses and midwives in health facilities in Kilifi County regarding national policies and guidelines for improving health outcomes for preterm babies?
- What factors are associated with implementation of national policies and guidelines by nurses and midwives in health facilities in Kilifi County?
- What are the current enablers and barriers for midwives and nurses in implementing these policies and guidelines in health facilities in Kilifi County?
- What strategies can be developed to enhance implementation of national policies and guidelines by nurses and midwives to improve health outcomes for preterm babies?

1.5 SIGNIFICANCE OF THE STUDY

The current study will provide valuable evidence regarding implementation of national policies and guidelines in Kenya to improve the quality of care and health outcomes for preterm babies. This study identifies gaps that could serve as a guide for designing instructional strategies to support better implementation of guidelines and improve health outcomes for preterm babies in Kilifi County, Kenya. It is anticipated that such strategies will eventually lead to a reduction in the mortality, morbidity and disability associated with inadequate implementation of these guidelines. Fixing this problem in clinical practice will also contribute to decreasing the economic and social costs resulting from poor care practices.

1.6 DEFINITION OF TERMS

1.6.1 Enhance

Enhance implies improving the quality, amount or strength of something (Oxford 2009). In the context of this study, enhance means to improve the quality of care for preterm babies or raise it to a higher level.

1.6.2 High-impact

This term means having great effect (Oxford 2009). In this study's context, high-impact means being able to positively affect or influence preterm care, and having a major positive effect on the health of preterm babies.

1.6.3 Health intervention

A health intervention is referred to as a blend of programme strategies or elements that are intended to produce changes in behaviour or improve the health status of individuals or a whole population. Health interventions may include educational programmes, policies that are new or stronger, improvements on the environmental improvements or health promotion campaigns (WHO 2006). A health intervention can also be defined as an act executed for, with or on behalf of a population or persons, with the aim of evaluating, maintaining, improving, modifying or promoting health conditions or health functioning (WHO 2015). Interventions are classified into three major types, depending on the guidance level and supporting evidence.

Category 1: These are interventions with guidelines recently approved by the WHO Guidelines Review Committee. They include guidelines that are supported by recommendations or other procedures of guidance agreed or endorsed by the World Health Assembly.

Category 2: These are interventions for which systematic review(s) have been conducted, but current guidelines approved by the WHO Guidelines Review Committee are not yet available.

Category 3: These are interventions for which systematic reviews have not yet been conducted and there is limited evidence available regarding the interventions.

Both Categories 1 and 2 interventions are included in the WHO recommendations. In the context of this study, health interventions mean acts of resuscitation, provision of warmth, immediate feeding and infection prevention that are performed for preterm babies to improve their health outcomes.

1.6.4 Low-cost

This term means not requiring a lot of financial investment (Oxford 2009). In this study's context, low-cost means not requiring a lot of investment in terms of money, technology or human resources.

1.6.5 Preterm baby

According to the WHO (2012), preterm birth refers to birth before completion of 37 weeks of gestation, or birth before 259 days from the first day of the woman's last normal menstrual period. In the context of this study, a preterm baby refers to an infant or baby born before 37 weeks of gestation, irrespective of the method of measurement of gestational age.

1.6.6 Quality of care

This refers to excellence levels that characterise the health service or healthcare provided, founded on accepted principles of quality (WHO 2006). In the context of this study, quality of care means the degree to which health services for preterm babies increase the likelihood of desired health outcomes that are consistent with up-to-date professional knowledge.

1.7 THEORETICAL FOUNDATIONS OF THE STUDY

1.7.1 Research paradigm

This study is founded on pragmatism as a philosophical tradition. Pragmatism involves the application of combined quantitative and qualitative assumptions to collect and analyse data in a single study in a way that maximises the strengths while minimising the weaknesses of each approach (Fetters, Curry & Creswell 2013:2134-2156). This study

used pragmatism in determining the meaning of concepts, words, ideas and beliefs, and to clarify the consequences of the actions taken. This philosophical approach guided the operationalisation of the key concepts (e.g. high-impact and low-cost interventions), and further enabled these concepts to be unpacked and assessed in relation to the guidelines of interest. This facilitated the success of this study through optimal and interactive application of both quantitative and qualitative data.

1.7.2 Theoretical framework

This study used contextual interaction theory as the theoretical framework. This theory was advanced by a policy researcher, Hans Bressers, in the 1990s (Bressers 2007:323). The theoretical framework was chosen because the present study involves research that investigates the implementation of guidelines. Contextual interaction theory centres on implementation of policy, and considers policy processes as an interface between actors (people, groups or organisations). It postulates that implementation of policy is a process of social interaction and involves three important components (Figure 1.1). The first component is 'inputs', which includes the relevant activities and required resources for policy implementation. 'Process' is the second component, which entails a process of conversion that is created by the various actors' interactions and policy implementation process activities. The final component is 'outputs' component is the last, which is the outcomes of the process in the form of changes, either behavioural or physical. A policy output depends on the assessment of its contribution to the policy goals. These interactions are invariably performed in a setting (arena) where rules and principles of actions, issues and performers are precisely specified or well-defined to enable the implementation of policy. Figure 1.1 presents this scenario as it applies in the contextual interaction framework.

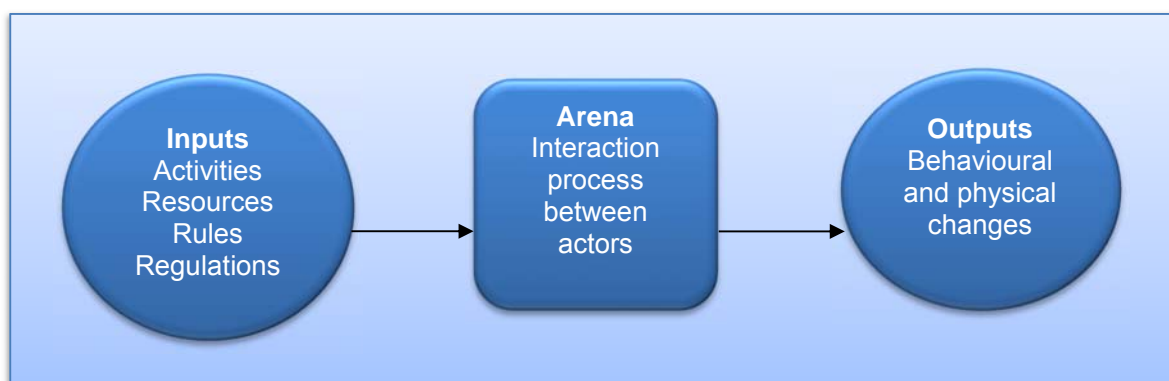


Figure 1.1 Theoretical framework

(Bressers 2007:323)

1.7.3 Conceptual framework

This study's conceptual framework was adapted from contextual interaction theory (Bressers 2007:323) and contextualised to this study (Figure 1.2).

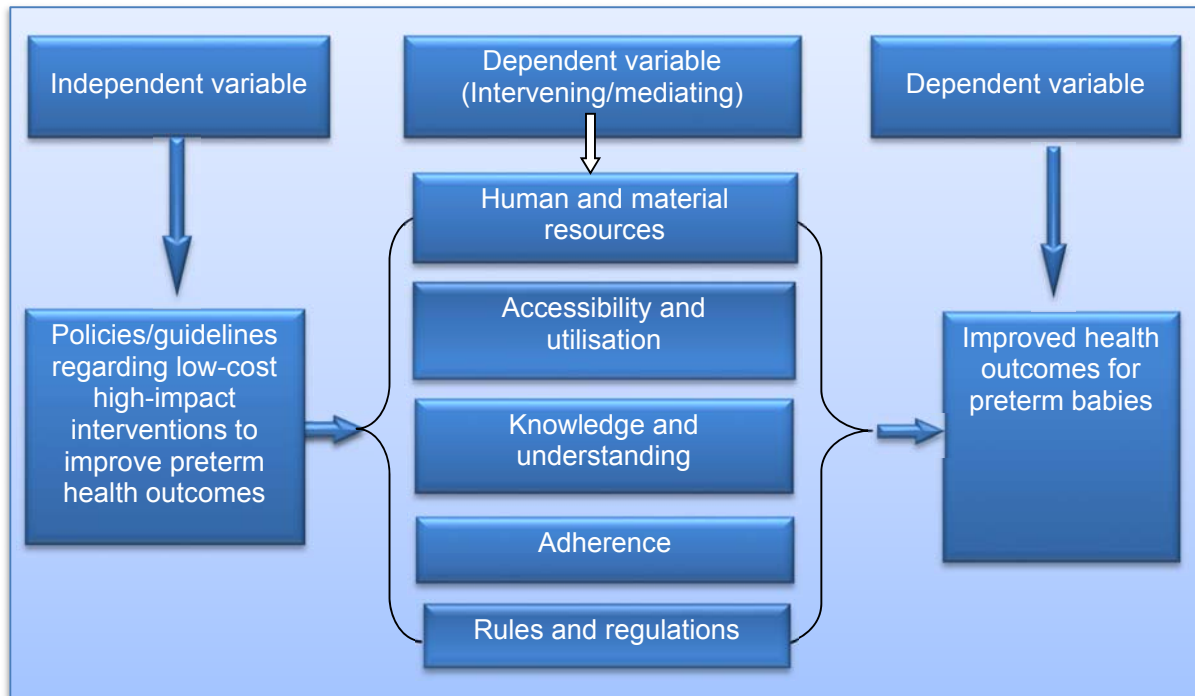


Figure 1.2 Conceptual framework
(Adapted from Bressers 2007:323)

1.8 RESEARCH DESIGN AND METHOD

1.8.1 Research approach

A mixed methods approach was selected for this study. Mixed methods research involves the use of combined quantitative and qualitative approaches in a single study. This allows data to be collected and analysed using both approaches to maximise the strengths and minimise the weaknesses of each approach. This approach was best suited to addressing the complexity of implementation of guidelines and policies related to care for preterm babies in the study area. It harnesses rich and in-depth data to allow an insightful analysis of both the qualitative and quantitative dimensions of the study (Creswell 2013:24).

This study used a convergent parallel design. This involved collecting both qualitative and quantitative data contemporaneously, analysing the data for the two arms separately and then integrating and interpreting the results to answer the research questions (Romm & Ngulube 2015:223; Creswell 2013:24). The rationale for this approach was that quantitative data would provide a summative perspective of the research problem, whereas qualitative data would support a more cogent and in-depth explanation of the statistical results by exploring the experiences and perceptions of nurses and midwives who work in the participating health facilities (Romm & Ngulube 2015:223-224; Creswell 2013:24; Creswell & Plano Clark 2011:53-106).

1.8.2 Research Context

1.8.2.1 Study area

The current study was carried out in 17 health facilities in Kilifi County, which is situated in the coastal region of Kenya. All participating health facilities were public, and were categorised as level three (health centres) and level four (sub-county), as per the classification used by the Kenyan MOH (2015).

1.8.2.2 Study population

The study population comprised of public health facilities in Kilifi County, Kenya. The study also involved nurses and midwives who worked in the participating health facilities at the time of data collection.

1.8.2.3 Sample size and sampling methods

This study used a multistage sampling technique, which is a preferred approach when sampling units are complex and multi-layered. At the first level, simple random sampling was used to identify 17 health facilities. This was followed (second level) by convenience sampling that involved the inclusion of all nurses and midwives working in the sampled facilities who were present at the time of data collection. A census method was used to collect data from nurses and midwives who worked in the participating health facilities (i.e. all nurses and midwives who were available during the study period were recruited for the study). The decision to use convenience sampling was based on the small number

of nurses and midwives in each health facility (between seven and nine nurses and midwives in total in each facility). Nurses and midwives were subsequently involved in focus group discussions. In total, there were seven focus groups, each including 5–8 nurses and midwives.

1.8.3 Data collection methods and procedures

This study utilised both quantitative and qualitative methods of data collection. The Health Assessment Checklist, adapted from the Service Availability Readiness and Availability (SARA) tool was customised to assess the implementation and coverage of relevant policies and guidelines used to improve outcomes for preterm babies in participating health facilities. The checklist was administered to each facility leader with the objective of assessing the extent of guideline implementation.

A semi-structured questionnaire with vignettes was used for data collection regarding knowledge, understanding and use of policies/guidelines among nurses and midwives. The tool was pre-tested among 10 nurses and midwives who worked at a public hospital that was not one of the participating health facilities. An interview guide for the focus group discussions was developed based on relevant literature and quantitative data, and used to collect qualitative data regarding barriers and enablers to implementing policies and guidelines. Seven focus group discussions were conducted based on the focus group guide, each comprising 5–8 nurses and midwives. Seven in-depth interviews were also conducted among key informants.

1.8.4 Data quality control

Research assistants were selected, trained and used in pre-testing the data collection tools. All data collectors were oriented on the data to be collected as part of data quality assurance. A questionnaire was handed to each participant, and the researcher and a research assistant were present to assist those who needed clarification or explanations. Each completed questionnaire was checked for missing data. All questionnaires and interview recordings were checked each day at the end of data collection to ensure clarity and completeness. The voice recorders that were used for the key informant interviews and focus group discussions were well maintained and safeguarded from interference to ensure good data quality.

1.8.5 Ethical considerations

Ethical clearance to carry out this study was sought from the research ethics committees of the University of South Africa (UNISA) and the Aga Khan University (AKU). Approval was also obtained from the County Research Ethics Committee of the County Government of Kilifi, where the data were collected. Participation in this study was voluntary, and written informed consent was obtained from all participants. The researcher identified and sampled participants and explained the purpose, benefits and possible risks of the study. Confidentiality and anonymity were maintained throughout the study by ensuring that no names or numbers could be traced to individuals or facilities. The data were secured in lockable cabinets during the study period, and were only accessible to the researcher. After data analysis and report writing, questionnaires and audio recordings were kept securely, to be destroyed 2-3 years following completion of the study.

1.9 SCOPE AND LIMITATIONS OF THE STUDY

The scope of this study was 17 public health facilities in Kilifi County and the nurses and midwives who worked in these health facilities. Limitations of this study include:

- Health facility assessments were largely conducted with the maternity unit in charge or highest-level nurse/midwife present at that time. This could be interpreted as reflecting the highest knowledge on the availability of equipment, medications and guidelines, especially those that were kept locked.
- The vignettes used were deliberately simplified assessments of essential, basic care for preterm babies in the initial days of life, which aimed to highlight the most obvious gaps. Best practice was tested by asking about expected care. This may differ somewhat from actual care; therefore, the practical use of guidelines could be overestimated.
- This study was limited in terms of available funding, and therefore could not cover a wider scope.

1.10 STRUCTURE OF THE THESIS

This thesis is structured in seven chapters, according to the UNISA guidelines for writing PhD theses. Detail of the content of each chapter is provided as follows.

Chapter 1: Introduction

This chapter presents background information about the research problem, describes the research problem, outlines the research objectives and questions, highlights the significance of the study, describes the theoretical foundations of the study, and describes the research design, method and scope of the study.

Chapter 2: Literature review

This chapter presents a review of the background literature relating to preterm births. The literature review also considers several high-impact low-cost interventions that improve outcomes for preterm babies, the knowledge and understanding of healthcare providers regarding these interventions, and possible barriers and facilitators to implementing relevant policies and guidelines.

Chapter 3: Research methodology

This chapter discusses the perspectives that directed this study, methodological approaches used to conduct the research, study design, area under study, sampling technique, data-collection instruments and the techniques used for data analysis. The chapter also discusses validity, reliability and ethical considerations related to the study.

Chapter 4: Presentation and discussion of quantitative data

This chapter reports the findings of the quantitative data analysis. It discusses the data sources and analysis, response rate, participants' demographic characteristics, availability of guidelines, availability of equipment/essential drugs and knowledge and practice among nurses and midwives regarding key interventions. The chapter also presents factors associated with implementation of interventions by nurses and midwives, challenges in implementation and suggested ways to improve implementation.

Chapter 5: Presentation and discussion of qualitative data

This chapter presents a description and analysis of the qualitative data. An outline of the data collection and analysis is followed by the findings from the focus group discussions with nurses and midwives at participating health centres and sub-county hospitals, in-depth interviews with key informants and unstructured observations. The chapter also presents conclusions based on consideration of these findings

Chapter 6: Discussion of findings

This chapter presents a synthesis of the quantitative and qualitative data, with the aim of triangulating the data obtained from both methods to enable a comprehensive and integrated understanding of the results. Data triangulation and integration also allows detailed insights based on the present findings

Chapter 7: Summary, conclusions and recommendations

This chapter presents the study's conclusions, recommendations and limitations, grounded on the interpretation of findings discussed in Chapters 4, 5 and 6. Answers to the research questions are provided in this chapter and further, discussions of the theoretical and policy implications of the research findings are provided.

1.11 CONCLUSION

This chapter described the orientation of the study. It discussed the background information, and outlined the research problem, research purpose and aims, significance of the study, definition of terms, theoretical foundations, scope of the study, research design and method, , study areas and participant' background. The chapter that follows presents a detailed review of the literature and description of the theoretical perspective.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents a review of the background literature relating to preterm births. The review also considers several high-impact low-cost interventions that improve outcomes for preterm babies, the knowledge and understanding of healthcare providers regarding these interventions and possible barriers and facilitators to implementing relevant policies and guidelines.

The literature review accomplishes several purposes. First, it shares with readers the findings of other published studies that are closely linked to the present study. It also relates this research to wider current discussions, filling gaps and extending the findings of prior studies. Second, it provides a framework for establishing the importance of the present research, and offers a basis for comparing the results with other studies. With regard to the quantitative phase of this study, the researcher discusses relevant literature that helps to establish a rationale for the research questions. However, there will be less consideration of the literature relating to the qualitative phase, as the researcher will incorporate existing knowledge into later chapters.

The first part of this chapter covers the broader issue, followed by sections that focus on the research problem more specifically. This will lead into the methodology chapter. Section 2.2 discusses general information regarding preterm births and preterm babies to provide context for this study.

2.2 GENERAL INFORMATION ABOUT PRETERM BABIES

2.2.1 Characteristics of preterm babies

The most extensively used and accepted definition of preterm birth is that used by the WHO (2015), which defines a preterm birth as any birth before 37 completed weeks of gestation, or before 259 days from the first day of the woman's last menstrual period

(Alleman 2014:201-220). Preterm birth can be further subdivided based on gestational age:

- Extremely preterm (<28 weeks of gestation)
- Very preterm (28-32 weeks of gestation)
- Moderate or late preterm (32-37 weeks of gestation)

Alleman (2014:201-220) categorised preterm births as:

- Late preterm (34-36 weeks of gestation)
- Moderately preterm (32-33 weeks of gestation)
- Very preterm (28-31 weeks of gestation)
- Extremely preterm (<28 weeks of gestation)

Alleman (2014:201-220) further explained that 'the terms are not always mutually exclusive, e.g., very preterm can refer to all infants born at <32 weeks without subdividing into extremely preterm'. Although there are several ways to estimate the gestational age of a preterm baby, the most common methods used are: Early ultrasound estimation; last normal menstrual period; measurement of fundal height; and assessment of the new born after birth (Howson et al 2013:s1; Liu & Black 2015:2234-2235). The most accurate method for determining gestational age in non-in vitro fertilisation pregnancies is by first trimester ultrasound (transvaginal or trans-abdominal). Pregnancies dated using this method are reported to have a lower incidence of being induced for post-term labour (gestational age ≥ 42 weeks) (Alleman 2014:201-220). Newborns delivered before 37 weeks of gestation are at risk for serious morbidity and mortality, which will be discussed in detail in the next section.

2.2.2 Morbidity and mortality related to preterm birth

About 15 million babies are born before term every year, translating to about one in 10 of all babies born worldwide (Lassi et al 2015:985). However, many countries lack statistics on the number of preterm births, or available statistics may be inaccurate, especially in low- and middle-income countries. In a review focused on accelerating prevention and care for preterm babies, Lawn et al (2013b:s5) reported that complications from preterm

births are the main direct cause of newborn mortality globally, and the second leading cause of all deaths in childhood (following pneumonia). Similarly, a recent systematic analysis (Liu & Black 2015: 2234-2235) revealed that preterm birth and intrapartum-related problems accounted for 59% of total newborn deaths. In addition, preterm birth is currently the leading direct cause of all deaths in children under 5 years (Black, Levin, Walker, Chou, Liu, Temmerman & Group 2016:2811-2824; Lawn et al 2014:189-205; Liu & Black 2015:2234-2235). These studies clearly show that the burden of morbidity and mortality associated with preterm birth is a worldwide problem.

During the neonatal period, preterm babies are predisposed to serious illness or death (Kinney, Lawn, Howson & Belizan 2012:1); without proper treatment, preterm babies who live on have a higher risk for disabilities and their quality of life may be poor. Previous studies highlighted that complications of preterm births are the largest cause of newborn mortality and the second leading cause of deaths among children under 5 years (Bergh, De Graft-Johnson, Khadka, Om'Iniabohs, Udani, Pratomo & De Leon-Mendoza 2016:1; Kinney et al 2012:1).

According to Vogel, Lee and Souza (2014:56), most preterm babies (over 80%) are born late preterm (between 32 and 37 weeks) of gestation; however, all preterm babies are at more risk than full-term newborns, and many need special care just to stay alive. Newborn survival, principally that of preterm babies is now on global and national agendas (Liu, Oza, Hogan, Perin, Rudan, Lawn, Cousens, Mathers & Black 2015:430-440). Another important factor is that many preterm infants who survive face lifetime disability. The extra burden of prematurity-related morbidity for preterm babies who survive affects families and health systems (Howson et al 2013:S1).

2.2.3 Global perspectives on preterm births

Research conducted in European countries (Zeitlin, Manktelow, Piedvache, Cuttini, Boyle, Van Heijst, Gadzinowski, Van Reempts, Huusom, Weber, Schmidt, Barros, Dillalo, Toome, Norman, Blondel, Bonet, Draper & Maier 2016:i2976) concluded that guaranteeing outcomes that are best for preterm babies is crucial for their future overall health and growth, and also for decreasing the burden related to these babies on healthcare systems, communities and families. That study also indicated that the presence of wide inequalities in the risk-adjusted morbidity and mortality of the very

preterm babies through nations and newborn units is likely to suggest that considerable gains are possible by use up-to-date clinical knowledge and practice. Additional research comparing the care of very preterm babies across countries and units supports this assertion (Alleman, Bell, Li, Dagle, Smith, Ambalavanan, Laughon, Stoll, Goldberg, Carlo & Murray 2013:e175-e184). Clinical practices sometimes are not consistent with the up-to-date scientific evidence, to include failure to use treatments proven to be safe and effective , and the use of others whose evidence is limited or where there are concerns of safety (Alleman et al 2013:e175-e184).

Although preterm births represent substantial organisational, clinical, personal, and financial burdens for preterm babies, their families, communities and countries, approaches to reduce preterm birth rates have not been successful (Blencowe et al 2012:2162-2172). Until lately, lack of country-level data on preterm birth made preterm birth nearly invisible, and hindered specific actions in response in many low- and middle-income nations. In a report published in the Lancet, Blencowe et al (2012:2162-2172) estimated that reliable time trend data for preterm birth rates were becoming available in many countries. Everybody has a part to play in reaching the goal of reducing these rates, including government leaders, professionals, healthcare providers and families. Families are the most affected, and their voices remain crucial for change in many countries that have demonstrated the greatest progress (Howson et al 2013:S1).

Kinney et al (2012:1) noted that although all nations share the burden of preterm birth, 60% of these births occur in sub-Saharan Africa and South Asia (sub-Saharan Africa has the highest proportion). In low-income countries, only 10% of children born before the 28th gestational week survive compared with 90% in high-income countries (Bergh et al 2016:1). This means that the burden of preterm births disproportionately affects low- and middle-income countries. (Lassi et al 2015:985-1000). Importantly, more than 75% of the 1.1 million preterm babies who die each year could be saved without needing complex technology.

The following section describes interventions that have been implemented to improve outcomes for preterm babies in general, and then focuses specifically on the four interventions that will be addressed in this study.

2.2.4 Literature on proven interventions to improve health outcomes for preterm babies

In low-income countries, more than half of the babies born at or before 32 gestational weeks die needlessly because the lack of viable, cost-effective care (e.g., warmth, early breastfeeding support, breathing support and basic care for infections) compared with high-income countries, where nearly all of these babies survive (Liu, Oza, Hogan, Chu, Perin, Zhu, Lawn, Cousens, Mathers & Black 2016:3027-3035). As noted in previous studies (Howson et al 2013:S1, Iams, Romero, Culhane & Goldenberg 2008:164-175; Lassi et al 2015:985-1000), several interventions are available which improve the preterm newborns' survival. These include use of prophylactic steroids for preterm labour, supplementation with vitamin K immediately after delivery, management of pneumonia and neonatal sepsis cases, delaying clamping of the umbilical cord, resuscitation by use of room air (vs. 100% oxygen), hospital-based KMC, thermal care, early initiation of breastfeeding, use of surfactant and use of Continuous positive airway pressure to the lungs for infants who suffer respiratory distress syndrome.

A chain of bundles of care building upon the essential newborn care comprising support for immediate initiation and exclusive breastfeeding hygienic cord care and thermal care have been highlighted (Lawn et al 2013:S5). That study further indicated that these interventions use few resources and can be delivered to improve outcomes for preterm babies. In addition, extra care for small babies (including KMC and feeding support) may reduce deaths among preterm babies weighing <2,000 grams by half (Lawn et al 2013:S5).

Morbidity and mortality following birth of preterm infant has potential to be reduced by use of interventions targeted to the preterm baby after birth (Black et al 2016:2811-2824; WHO 2010). Kinney et al (2012:1) indicated that the most useful combination of interventions comprised those that might increase survival chances and health outcomes of babies born preterm when this was unavoidable. Essential and additional care for preterm newborns for prevention or treatment of possible complications is also crucial for their survival devoid of disability (Bergh et al 2016:1; Kinney et al 2012:1). Interventions that are low-cost, including neonatal resuscitation training and other essentials of basic newborn care, can reduce deaths due to the main diseases that cause neonatal mortality. Although guidelines for necessary newborn care focusing on basic interventions (e.g.,

neonatal resuscitation, maintenance of normal body temperature, early and exclusive breastfeeding, proper hygiene and infection prevention) are available, they are not optimally implemented in some settings (WHO 2012).

Overview of a systematic reviews focused on interventions to improve neonatal health and survival conducted by Lassi et al (2015:985-1000) highlighted that countries with increased burdens of newborn and infants deaths ought to discover ways to successfully implement interventions to improve preterm babies' survival. This suggests that the use of more widely accessible clinical practices which are comprehensive and evidence-based might yield considerable gains in preterm survival without severe disability (Black et al 2016:2811-2824; Lassi et al 2015:985-1000). It is essential to identify research gaps in the content of core packages of interventions to ensure that priority lifesaving interventions are delivered. Consequently, effective interventions and evidence-based approaches need to be broadly deployed, provided across the continuum of neonatal, child, maternal and reproductive healthcare (Lassi et al 2015:985-1000).

The term '*coverage gap*' is used to describe the difference among current coverage of essential care and full or universal coverage reaching the families. Country and health facility variations in preterm outcomes are enormous, and may indicate sub-optimal use of clinical evidence related to care of preterm (Zeitlin et al 2016:i2976). Although the study by Zeitlin et al (2016) was undertaken in European countries, the authors suggested that more complete utilisation of evidence-based practices might yield considerable gains across all settings. They noted that their findings supported the increasing focus on combining effective interventions to improve practices of care and attain the best possible outcomes for preterm infants.

Lassi et al (2015:985-1000) reported that the selection of interventions and the extent of implementation at present depends on availability of policies and resources, in different countries and geographical locations. Their results further showed that although evidence for the effectiveness of numerous vital interventions is unavailable, such interventions save the lives of thousands of preterm babies each day. Low-cost interventions, if provided in the correct period of time and by use of appropriate procedures may save several more lives. However, the practice of these approaches remains variable or unavailable in low- and middle-income countries. This means that implementing

interventions and providing training for midwives and nurses to realise optimal implementation is necessary (Gülmezoglu et al 2016:115; WHO 2014).

The systematic review by Lassi et al (2015:985-1000) showed that interventions to strengthen prevention of preterm births and improve outcomes for preterm babies are both affordable and achievable in resource-constrained environments. Such interventions decrease the proportion of preterm births and the associated morbidity and mortality. In the Lancet series on preterm birth, Iams et al (2008:164-175) emphasised that tertiary interventions are those intended to improve outcomes for preterm babies. They further indicated that because preterm babies are susceptible users of healthcare facilities, such outcomes are a subtle indicator of healthcare system functionality, since these infants may die in minutes if the right care is not provided.

Additional support for enhanced care for preterm babies has been shown to have a major effect. Further support for early initiation and exclusive feeding with breast milk, extra support for warmth (e.g. KMC), hand washing, chlorhexidine for cord care and skin-to-skin care have proven improvement in the outcomes for preterm babies. However, the selection of these interventions and degree of implementation varies with available resources in different countries and settings (Howson et al 2013:S1).

Provision of KMC, early feeding support, extra warmth support and hygienic cord care depend on nurses and other health professionals with skills in caring for preterm babies (Gravett & Rubens 2012:368-373). Focusing on intensive care strategies will fail if basic hygiene and careful attention to feeding plus other simple building blocks have not been put in place (Howson et al 2013:S1).

A meta-analysis by Lasswell, Barfield, Rochat and Blackmon (2010:992-1000) that focused on guidelines for perinatal regionalisation suggested that very low birth weight (VLBW) babies should be born at highly specialised hospitals (commonly titled as level III hospitals). In spite of these recommendations, large percentages of VLBW babies continue to be born in lower-level hospitals in some regions. The analysis concluded that for VLBW babies, failure of the birth to occur in a level III hospital was significantly linked with increased chance of neonatal death.

Low levels of coverage persist for interventions for which there is strong evidence. Health information systems need investment and support in order to improve the quantity and quality of data available to guide and track progress. Additional progress can only be realised if context-specific implementation challenges are taken into consideration, particularly in the areas that have until today been neglected. Neglected areas include continued investment in training; evaluating health workers' skills; quality improvement; provision of budgeting and health financing; and firming up of health information systems (Kinney, Cocoman, Dickson, Daelmans, Zaka, Rhoda, Moxon, Kak, Lawn, Khadka & Darmstadt 2015:326-337).

2.3.5 Interventions and health outcomes for preterm babies in Kenya

Preterm births are a leading cause of newborn mortality in Kenya, with other leading causes include neonatal sepsis and birth asphyxia. In the year 2012, 183,600 babies were born too soon in Kenya. In most cases premature labour arise without a clear risk or cause, which makes its prevention difficult. Premature infants are at risk for demise due to respiratory conditions hypoglycaemia and hypothermia, and also the long-term consequences of being born preterm. (Lee et al 2013:e26-e36).

An analysis by Friberg et al (2010:e1000295) revealed that in Kenya, as with other low- and middle-income countries, despite improvements made in the last decade, there is still a critical need to accelerate the progress of reducing newborn deaths and preterm births to contribute to achieving Sustainable Development Goals. Kenya was ranked 15th of 85 countries for preterm birth rates. The Kenya MOH indicated that of the 1.5 million live births in Kenya annually, 193,000 (12.8%) are born preterm (before 37 weeks of gestation).

The Kenya Demographic Health Report (2014) indicated that complications related to preterm birth were the primary cause of mortality among children below the age of 5 years in the 5 years preceding the report. According to Blencowe et al (2012:2162-2172), coverage of interventions to improve preterm babies' outcomes has been challenging, especially in remote counties in Kenya. Scaling up and integrating existing health interventions in counties that have a high burden of neonatal deaths has potential to save lives (Aluvaala et al 2015:255-259). In Kenya, 60% of infant mortality and 40% of all under-5 mortality occur during the neonatal period (English, Gathara, Mwinga, Ayieko,

Opondo, Aluvaala, Kihuba, Mwaniki, Were, Irimu & Wasunna 2014:452-456). The Kenyan MOH has initiated strategies to prioritise interventions and investments to promote newborn (especially preterm) health, based on an essential newborn care package that includes a number of low-cost, high-impact interventions.

Four preterm care interventions that are supported by evidence and associated with better health outcomes have been implemented sub-optimally across Kenya. These interventions are: immediate and continuous feeding, warmth provision (including KMC), resuscitation, and use of antiseptic for cord care. All these interventions are listed for lower-level health facilities and can be delivered at higher levels. Likewise, each level of facility represents a range and diversity of abilities (Black et al 2016:2811-2824). This study results suggest a need for comprehensive use of the high-evidence and widely available practices could result in considerable gains in preterm babies' survival without severe disability for these babies at risk (Zeitlin et al 2016:i2976).

Payne, Finkelstein, Liu, Kaempf, Sharek and Olsen (2010:437-446) indicated that the promotion of practical evidence-based care might be an vital switch for attaining better outcomes in this high-risk populace, as depicted in other areas of medicine. It is therefore necessary to educate clinicians and health coordinators on the use of interventions and their influence in non-designated populations (Payne et al 2010:437-446). Effective implementation of policies and guidelines for preterm care may require reorganisation of care and restructuring of healthcare resources, mainly in low- and middle-income regions (WHO 2015).

In a 'countdown to 2015' review, Barros, Ronsmans, Axelson, Loaiza, Bertoldi, França, Bryce, Boerma and Victora (2012:1225-1233) reported that the achievement of high, sustained and equitable coverage of life-saving interventions for preterm babies is insufficient. Apart from coverage gaps, there are massive inequalities in intervention coverage, although some progress has occurred in country-level evidence-based policies and strategies to improve neonatal outcomes. As well as gaps in coverage of crucial interventions for women and babies, there are equity gaps between rich and poor, public and private health sectors, provinces and districts and among rural, urban and peri-urban populations (Whitworth, Sewankambo & Snewin 2010:e1000299).

Many African and South Asian countries have increased births in health facilities, some very speedily (Requejo & Bhutta 2015:S76-S81). Nonetheless, the quality of care has not kept stride with coverage. This leaves a quality gap, but also offers cost-effective opportunities for care that is lifesaving (Barros et al 2012:1225-1233).

Many disabilities and deaths related to preterm births could be avoided by implementing current interventions (Whitworth et al 2010:e1000299; Black et al 2016:2811-2824). Therefore, a priority is ensuring the survival of preterm babies by solving implementation problems (e.g. how to scale up and assess interventions inside complex health structures), rather than advancing of new technologies. Recommended actions include improving decision-making, enhancing efficiency and building understanding of why some interventions work while others do not in regard to improving neonatal outcomes. Blencowe et al (2012:2162-2172) and Carlo, McClure, Chomba, Chakraborty, Hartwell, Harris, Lincetto and Wright (2010:e1064-e1071) concluded that the high levels of term and preterm mortality and morbidity in Africa demand an urgent response in terms of implementing interventions. These studies highlighted that there is a need to address bottlenecks to scaling up effective interventions without delay. In turn, this challenge requires substantial and speedy investment through support by African scientists, institutions and systems that focuses on answers to African problems.

The present study focuses on five interventions: neonatal resuscitation and use of oxygen; thermal care; hygienic cord care; hospital-based KMC; and early exclusive breastfeeding/extra support for feeding. The following subsections discuss each of the above interventions in detail.

2.3.2.1 Resuscitation

According to American Heart Association guidelines for neonatal cardiopulmonary resuscitation and emergency cardiovascular care, neonatal resuscitation is defined as a 'set of interventions at the time of birth to support the establishment of breathing and circulation' (Kattwinkel, Perlman, Aziz, Colby, Fairchild, Gallagher, Hazinski, Halamek, Kumar, Little & McGowan 2010:S909-S919; (Wrammert, Kc, Ewald & Målqvist 2017:1280-1285). Initiation of breathing is critical in the physiological adaptation from intra-uterine to extra-uterine life. About 5%–10% of all newborns require assistance to establish breathing at birth. Simple warming, drying, stimulation, basic neonatal

resuscitation (including positioning and clearing the airway) and resuscitation using bag-mask may substantially decrease neonatal mortality and morbidity (Wall, Lee, Niermeyer, English, Keenan, Carlo and Lawn 2009:S47-62)

In a Delphi estimation, meta-analysis and systematic review, Lee, Cousens, Wall, Niermeyer, Darmstadt, Carlo, Keenan, Bhutta, Gill & Lawn (2011:S12) reported that neonatal resuscitation might reduce both full-term mortality rates during the intrapartum and preterm by 10%. They further indicated that newborn resuscitation training in health facilities was related to a further 30% reduction in neonatal mortality during the time surrounding labour and delivery for both full-term and preterm babies. The review concluded that although the included studies had not consistently evaluated the effects on preterm babies' mortality and high or moderate quality evidence addressing this was lacking, a 10% reduction in preterm-related neonatal deaths was estimated after resuscitation in healthcare facilities.

Wall et al (2009:S47-62) demonstrated that most non-breathing newborns could only respond to simple steps, and the cost of such interventions was likely to be low as no equipment was needed. A recent study by Wrammert et al (2017:1280-1285) established that neonatal resuscitation, if implemented consistently by healthcare providers using standard guidelines and competency-based training, may prevent 5%-10% of deaths related to complications of preterm birth.

Although preparation for new-born resuscitation in healthcare facilities reduces term and preterm intrapartum-related deaths, intervention coverage remains low in nations where the most newborn mortality occurs, representing a lost chance to save lives (Carlo et al 2010:e1064-e1071). However, further evaluation is required regarding the impact, cost and implementation strategies in various contexts (Carlo et al 2010:e1064-e1071).

A series of reviews by Lawn, Kerber, Enweronu-Laryea and Masee Bateman (2009:49-59) summarised evidence and programmatic experiences related to the practicalities of reducing the problem of preterm births in low-resource settings, including ongoing debates regarding community level of care and linkages. That study highlighted that the lack of simple essential newborn care or resuscitation for the estimated 10 million babies per year who need attention at birth represent important missed opportunities in locations where skilled attendance and obstetric care at birth needs to be reinforced. In addition,

essential and extra care for preterm babies to prevent or treat likely complications is crucial for the survival of newborns without severe morbidity (Lawn et al 2009:49-59).

Many questions remain unanswered regarding newborn resuscitation, from better descriptions through to development of interventions principally with regard to delivery of high-impact low-cost interventions in locations that are affected by high burdens of preterm morbidity and mortality but have the weak healthcare systems (Wall et al 2009:S47-62). Effective strategies may vary across settings, and can be strongly connected to the cadres of health care workers available to deliver high coverage during the intrapartum period. Conversely, an infant born in rural Africa or South Asia currently has little chance of resuscitation after birth if they do not establish respirations, which is a contrast to the careful attention given at the time of birth for infants born in the high-income countries (Wall et al 2009:S47-62).

A number of reviews of newborn resuscitation in low-middle income countries established that newborn resuscitation has likelihood of saving lives. However, there is a lack of estimates of mortality reduction that could inform program planners about the number of lives that could be saved through rapid evaluation and stimulation (which could be achievable with few skilled healthcare workers and little technology) and the further effect on preterm outcomes (Berglund & Nilsson 2010:230-237). There is an immediate opportunity for facility-centred resuscitation, although equipment is lacking in many facilities and a small number of healthcare providers have neonatal resuscitation training (Lee et al 2011:S12). Considering these challenges, realising great coverage of basic newborn resuscitation ought to be a priority. Advanced resuscitation is rarely needed and might have limited added mortality impact in countries that have low resources. Beginning training pre-service resuscitation for midwives, doctors and nurses who take care of newborns is an important step in achieving high coverage of basic neonatal resuscitation (Carlo et al 2010:e1064-e1071). Obstetric care has been invested on, and the investment is yet to be match the implementation, sustainability and scaling up of immediate newborn care together with basic newborn resuscitation (Lee et al 2011:S12). Current advances in simple training and robust, equipment that are low-cost offer possible and speedy scale up (Wall et al 2009:S47-62).

The WHO (2015) guidelines on administration of oxygen for preterm newborns during ventilation at or before 32 weeks of gestation recommend starting oxygen therapy with

30% oxygen or air (if blended oxygen is unavailable) instead of 100% oxygen. The guidelines further recommend that use of higher oxygen concentrations should be considered for preterm babies receiving supplemental oxygen only if they have a heart rate that is less than 60 beats per minute after ventilation with 30% oxygen or air for 30 seconds. Conversely, saturation levels measurement should not supersede early efforts to resuscitate a preterm infant, and oxygen saturation-level should be commenced two minutes following birth.

Requejo, Bryce and Victora (2012:56-56) suggested that many healthcare providers (e.g. midwives and nurses) are equipped and skilled to deliver essential newborn care, including resuscitation where necessary. Nevertheless, important commodities or measures of infection prevention are often missing. Perinatal review data can be provide important information on improving quality of care in resuscitation and other cares, and may also be compared and used for subnational or national improvement in neonatal care (Requejo et al 2012:56-56). Current scientific evidence suggests delayed cord clamping during resuscitation elevates early hemoglobin concentration and iron stores in the newborn. Nonetheless, early clamping of the cord is still practiced routinely (Madhavanprabhakaran, Wittmann, Vaidyanathan, Aldughaishi & Shaji Thomas 2018:1-9). The WHO (2012) in their recommendations for basic newborn resuscitation, confirmed that delayed clamping of the cord should be done for term or preterm babies who do not require resuscitation. The clamping and cutting of the should be delayed for at least one minute following birth.

2.3.1.2 Feeding

Initiation of breastfeeding within 1 hour after birth and breastfeeding exclusively for the first six months decreases neonatal daeths (Bhutta et al 2014:347-370; Edmond et al 2006:e380-e386; Mullany et al 2008:599-603). Breast milk is beneficial to preterm infants immunologically, nutritionally and developmentally (Barros et al 2012:1225-1233; Lee et al 2011:S12). Both long- and short- term benefits of breastfeeding in comparison feeding with formula have been supported in previous research findings (Barros et al 2012:1225-1233; Lee et al 2011:S12). All new-born babies require careful monitoring of nutritional intake, but most preterm infants need extra support for feeding with devices such as gastric tubes (either oral or nasal) or a cup and spoon (Griffin, McClure, Kamath-Rayne, Hepler, Rouse, Jobe & Goldenberg 2017:1286-1295; WHO 2011a). Similarly, the mother

may need support to express her breast milk, and where this may not suffice, donor milk can be an option (WHO 2011).

A mother's own breast milk is superlative for preterm babies. However, given the often prolonged period of time between birth and breastfeeding for most preterm infants, some challenges exist for the mothers, midwives and other caregivers in helping to establish lactation, giving the mother's own breast milk and achieving breastfeeding (Hurst, 2007:234-239). A challenge posed for the mother and health care caregivers is getting the essential resources for ensuring there is sufficient production of breast milk until direct breastfeeding is completely established.

2.3.1.3 Cord care

As stated by Barros et al (2012:1225-1233), preterm infants are at high risk for sepsis. Washing hands in newborn care units is critical; though, the practices of basic hygiene, such as washing hands and maintenance of an environment that is clean, are poorly performed much as they are well known. Separating the baby from the mother unnecessary as well as sharing of incubators among preterm infants ought to be avoided. This is because these practices increase the spread of microorganisms causing infection.

Recent cluster-randomised trials have revealed benefit of topical application of chlorhexidine cream to the baby's umbilical cord, without adverse effects. About half of the published trials to date have shown a significant reduction in neonatal deaths with chlorhexidine use, especially for preterm babies — mainly with early application, which might be challenging for births that occur home (Soofi, Cousens, Imdad, Bhutto, Ali & Bhutta 2013:1029-1036). Additional possible advantage of chlorhexidine is as a behaviour change agent. In many African cultures, harmful substances are applied to the cord, and a policy of chlorhexidine application has a potential to accelerate change by substituting a harmful substance for one that is safe (Imdad, Mullany, Baqui, El Arifeen, Tielsch, Khatry, Shah, Cousens, Black & Bhutta 2013:S15).

The widespread use of harmful substances on the umbilical stump practiced in many poor urban and rural settings may facilitate the entrance of microbes and skin flora into the bloodstream, causing infection and cord stump infection (omphalitis) (Soofi et al 2013:1029-1036). High proportions of low birth weight and preterm births in these settings

further compound the problem, which is frequently associated with increased risk for infections due to lowered immunity. Omphalitis is a risk factor for neonatal sepsis and neonatal death in low-resource countries where home deliveries are prevalent (Soofi et al 2013:1029-1036). Several studies in health facilities and community settings in developing countries have shown the importance of chlorhexidine application on cord stumps for umbilical cord care. For example, a study conducted in Pakistan (Imdad et al 2013:S15) suggested that application of 4% chlorhexidine to newborn umbilical cords can substantially reduce cord infection and newborn mortality. That study further noted that this simple low-cost intervention could save a substantial number of newborn lives in developing countries.

Similarly, a study conducted by Soofi et al (2013:1029-1036) that assessed the effect of umbilical-cord cleansing with 4% chlorhexidine solution (with or without hand washing with antiseptic soap) on the incidence of omphalitis and neonatal mortality concluded that it was effective in reducing the risk for omphalitis and neonatal mortality in rural areas. That study also suggested provision of chlorhexidine in birth kits could be a useful approach for preventing neonatal deaths in high-mortality settings. Fanaroff, Hascoët, Hansen, Levene, Norman, Papageorgiou, Shinwell, Van de Bor, Stevenson & International Perinatal Collegium (IPC) (2014:701-708) also noted that providing 4% chlorhexidine in birth kits in low resource settings was a feasible and low-cost approach, and documented high rates of acceptability and usage. That study concluded that this could be a quick and easy approach for scaling up intervention coverage for term and preterm babies in community settings and public sector health facilities.

2.3.1.4 Thermal protection

Neonates depend on external assistance to maintain body and skin temperature, mainly in the first 12 hours after birth. In particular, vulnerable babies born prematurely are prone to abnormally low body temperature; this is a global issue across all settings that can lead to a variety of illnesses and even death among preterm babies (Howson et al 2013:S1; Liu et al 2015:430-440).

A Cochrane review of interventions to prevent hypothermia at birth in preterm and/or low birth weight babies, Valizadeh, Mahallei, Safaiyan, Ghorbani and Peyghami, (2017:24-30) indicated that intervention to prevent low body temperature at birth in these babies is

central to their survival and improved outcomes. The review outlined several cautionary steps that should be performed routinely: a warm labour room; drying the neonate immediately, especially the head; covering in pre-warmed dry clothing that cover the head; pre-warming surfaces; and reducing draughts. Similarly, in a systematic review of causes of preterm babies' deaths, Liu et al (2015:430-440) indicated that low-cost interventions to prevent hypothermia (e.g. warm delivery rooms, immediate drying, covering and skin-to-skin contact) can be carried out even in lower-level health facilities, and can significantly improve preterm babies' outcomes.

Newborns that are unstable and weigh 2,000 g or less at the time of birth and stable newborns with a weight of less than 2,000 g who are unable to receive KMC need to be taken care of in an environment that is thermo-neutral, either in incubators or under radiant warmers (WHO 2015). A thermo-neutral environment refers to "... environmental conditions under which an infant keeps the temperature in a normal range at lowest metabolic rate" (Lawn et al 2013:S5). The results of that study further noted that there was inadequate proof to support the advantage of either radiant warmers or incubators for the care of preterm babies. Healthcare workers' preferences and costs must be considered when making a choice between the two methods. In addition, the choice of device for achieving a thermo-neutral environment and the approach to its use should be carefully considered in the relevant context; that is, the patient population (size, gestational age and coexisting illnesses), physical surroundings, personnel, costs and other available resources (WHO 2015). Hypothermia increases the chances of morbidity and mortality for babies who are preterm. Therefore adequate temperature management is vital during stabilisation (Knol, Brouwer, Vernooij, Klumper, DeKoninck, Hooper & Te Pas 2018:323).

Limited evidence is available on the efficacy of plastic wraps/bags when providing thermal care for the preterm neonates following birth. Nevertheless, during stabilisation and referral to expert newborn care facilities, plastic bags/wraps could be used to prevent hypothermia as an alternative (WHO 2015).

2.3.1.5 KMC

The (WHO 2015) defines KMC as the care of preterm babies weighing below 2,000 g carried skin-to-skin. It comprises thermal care through continuous and prolonged skin-to-

skin contact between the mother and baby, support for exclusive breastfeeding (ideally) or other appropriate feeding and early recognition of and response to illness. This method has been demonstrated to have a high impact in the care of preterm babies (Howson et al 2013:S1). Lawn et al (2014:185-209) further reported that use of low cost interventions such as KMC could yield a 51% decrease in the deaths of newborns weighing less than 2,000 g. Nevertheless, health facilities challenges relating to KMC (e.g. health system requirements, human resources and skills, discharge conditions and continuation of care thereafter) should be included in manuals or guidelines for implementation of KMC (WHO 2015). The WHO strongly recommends that preterm newborns weighing $\leq 2,000$ g at delivery be given as close to continuous KMC as possible. Intermittent KMC is recommended for preterm babies weighing 2,000 g or less at delivery if continuous KMC is not feasible, instead of conventional care.

KMC is considered a vital component of developmental and family-centred care to further support the role of the mother, father and members of the healthcare team (Hendricks-Muñoz, Li, Kim, Prendergast, Mayers & Louie 2013:875-880). Interestingly, KMC provided by fathers has been linked with improved confidence in the father role. Despite the well-known benefits, barriers to delivery of this care modality exist, notably associated with provider perception of value, neonatal unit culture and perceived difficulty in performing KMC for preterm babies (Hendricks-Muñoz et al 2013:875-880). Those authors also noted that as parent educators for provision of KMC, the midwife/neonatal nurse is a critical advocate for the use of KMC in the unit, directs the team, and must have a high level of understanding of the benefits of KMC as well as the skills to safely transfer babies to different levels of care as appropriate.

Previous evaluation of barriers to the use of KMC in neonatal units (Alleman et al 2013:e175-e184) indicated that a major challenge was neonatal nurses' comfort level with transferring preterm babies' from an incubator to begin KMC on the parent's chest (particularly in those babies receiving respiratory support). It is essential to recognise factors linked with KMC immediately after the birth of a preterm baby. Higman, Wallace, Law, Bartle and Blake (2015:72-82) investigated the opinions of labour room midwives regarding enabling factors for KMC immediately after birth. The findings highlighted that enabling factors paved the way for behavioural or environmental adjustments that permitted realisation of motivation and affected the person's behaviour either indirectly or

directly through environmental factors, for example regulations, health plans, availability of services, laws, skills and access to necessary resources.

2.4 POLICIES AND GUIDELINES FOR IMPROVING PRETERM BABIES' HEALTH OUTCOMES

Guidelines on interventions are supposed to bridge the gap between research and up-to-date practice, thereby reducing inappropriate variability in clinical practice (Rauh, Arnold, Braga, Curca, Eckert, Fröbe, Karamouzis, Lakatos & Molitor 2018:e000385). In an American-based evaluation study (Melnik, Bullock, McGrath, Jacobson, Kelly & Baba 2010:74-80), numerous evidence-based interventions to improve preterm babies' outcomes were reported to barely reach clinical practice. They concluded that strategies to hasten the translation of evidence-based interventions into clinical practice and generate a culture to support evidence-based care in health structures are urgently needed. Nearly all of these essential interventions can be delivered by healthcare workers in the community or in primary healthcare centres, which can increase population access to these essential services. Although intensive care may be needed to save most babies born before 28 gestational weeks, it is important to note that these babies are the minority (about 5% of preterm babies). However, in many countries, families and healthcare providers still perceive the death of any preterm baby as inevitable.

As noted by Zeitlin et al (2016:i2976), there are gaps between research evidence and clinical application. Practices are sometimes not consistent with up-to-date scientific evidence, which includes failure to use treatment demonstrated to be safe and effective, as well as use of others for whose evidence is inadequate or where safety is of concern. A systematic literature search indicated that the main challenge in reducing the burden of preterm births is increasing coverage of evidence-based interventions known to be simple and cost-effective. Implementers should consider health system needs for implementing such interventions in health service, communities, primary health centres and secondary and tertiary referral hospitals (Zeitlin et al 2016:i2976). Another consideration is the cost-effectiveness of interventions for which data exist (Horton & Levin 2016:32-41).

In a study investigating interventions that improve preterm babies' survival in sub-Saharan Africa, Griffin et al (2017:1286-1295) reported that maximising the number of preterm babies that receive a comprehensive set of low-cost high-impact interventions

may yield considerable gains in survival without increasing preterm morbidity in those who survive. Similarly, Zeitlin et al (2016:i2976) suggested that better infrastructure and training for the care of preterm babies is needed to reduce mortality from preterm births. Furthermore, reducing infection-related deaths requires little infrastructure and can be performed by lower-level healthcare providers (Horton & Levin 2016:32-41).

2.4.1 Barriers and enablers for healthcare workers in implementing policies and guidelines

Studies from several medical fields have highlighted drawbacks of translating scientific evidence into practice which relate to cultural, personal or organisational barriers (Zeitlin et al 2016:i2976). Likewise, while evidence-based interventions have shown effectiveness in clinical trials, the criteria applied for selection to achieve equipoise and ensure rigorous protocol implementation may limit the ability to generalise results to the entire patient population.

Barriers arising from organisational, cultural and personal factors can impede implementation of basic interventions that have been shown to improve preterm babies' outcomes. It is therefore critical that we overcome these barriers to improve patient outcomes (Lee et al 2011:S12). Many previous studies (Barros et al 2012:1225-1233; Lassi et al 2015:985-1000; Lawn et al 2013:S5; Payne et al 2010:437-446) have highlighted various difficulties in translating effective interventions into routine clinical practice. Those studies outlined barriers including: physician education, knowledge and attitudes; institutional obstacles inside units, such as lack of good leadership; lack of written protocols and guidelines; insufficient in-service training; lack of administration backing; and the scope of the healthcare facility.

A systematic review covering 49 developed countries (Guillén, Weiss, Munson, Maton, Jefferies, Norman, Naulaers, Mendes, Da Silva & Zaban 2015:343-350) demonstrated that differences in ethical attitudes that influence active management of preterm babies could be another contributing factor, although that study excluded births before 24 gestational weeks and intrapartum deaths, which might have minimised the effect. Swinton and Lantos (2010:1773-1781) investigated neonatal bioethics and found that the regulatory context of implementation may be a driver for these interventions, although the connection between the presence of guidelines and practice was complex. Those authors

concluded that numerous factors contribute to variability in evidence-based care across different regions. These findings were consistent with other reports of widespread practice inconsistency in the care of very preterm babies among countries and across healthcare settings within countries (Fanaroff et al 2014:701-708; Guillén et al 2015:343-350; Kattwinkel et al 2010:S909-S919).

According to Fanaroff et al (2014:701-708), preterm babies who are at the limits of viability raise challenging social, economic, legal and ethical questions. Among midwives, nurses and neonatologists surveyed about labour room behaviour and the methods used by selected individuals for the immediate care of preterm babies, there was a strong inclination for comfort care at 22 gestational weeks and active resuscitation of preterm babies over 24 gestational weeks; resuscitation at 23 weeks of gestation was a grey area (Alleman 2014).

WHO (2015) guidelines for implementation of interventions for preterm babies outline a number of obstacles to implementation. These barriers include: lack of or few human capacity with the required skills and expertise to implement recommended practices and also monitor clinical response (e.g. application use of oxygen therapy); lack of or an unbalanced supply of necessary medicines, non-availability of equipment and supplies (e.g. oxygen, masks, incubators and radiant warmers); non-existence of operational referral mechanisms and care paths that guarantee management of preterm babies within a continuum; and little certainty of gestational age estimation, principally in low resource countries. To address these barriers and improve preterm newborn survival, Lassi et al (2015:985-1000) explained that it is necessary to use the best method available in dating of pregnancy during early prenatal care visits. In addition, healthcare providers ought to be equipped with skills on how to best approximate the gestational age and clinical characteristics of preterm babies. Zeitlin et al (2016:i2976) and Swinton and Lantos (2010:1773-1781) concluded that attention should be given to all facets of preterm babies quality of care at the healthcare level, including the availing of radiant warmers and KMC. These studies suggested that clear referral pathways for preterm babies should be established to link community and lower-level facilities with higher-level care.

2.5 CONCLUSION

In conclusion, this chapter discussed the interventions implemented to enhance outcomes for preterm babies. In particular, five low-cost high-impact interventions were discussed: neonatal resuscitation, thermal care, KMC, initiation of breastfeeding and exclusive breastfeeding and use of chlorhexidine to prevent omphalitis. This chapter also discussed knowledge about and understanding of these interventions, the possible barriers and enablers to implementation and the theoretical framework that guided this study. Chapter 3 discusses the methodology used in this study.

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

This chapter discusses the perspectives that directed this study, methodological approaches, and study design, focus, sampling technique, data-collection instruments and the techniques used for data analysis. The chapter also discusses validity, reliability and ethical considerations related to the study.

3.2 RESEARCH PARADIGM

A research paradigm is described as a worldview that is informed by three aspects. These are: philosophical assumptions around the nature of realities in social science (also called ontology, or what one believes about the nature of reality); the ways of knowing that reality (also called epistemology, or how one knows what they know); and beliefs and value systems (also called axiology, or what one believes is true) (Shannon-Baker 2016:319-334). Therefore, a paradigm can be said to guide a researcher in asking specific questions and choosing suitable approaches for a logical research inquiry, which is the methodology, or how one goes about finding out the answers (Castro, Kellison, Boyd & Kopak 2010:342-360).

Several research paradigms exist. Creswell and Creswell (2017:286-291) described three main paradigms. First, constructivism, which is founded on the belief that a single reality does not exist, meaning reality has to be interpreted. Constructivists are likely to use qualitative approaches to evaluate these various realities. Second, positivism, which is based on a belief that only one reality exists, and this reality is measurable and known. Positivists are likely to use quantitative approaches to quantify reality. Finally, pragmatism, which reflects the belief that reality is continually changing. Pragmatists believe that one can debate, renegotiate and interpret reality differently. Therefore, they are more likely to use more than one method to solve their problem (e.g. mixed methods research) (Creswell & Creswell 2017:286-291; Peck, Olsen & Devore 2015:320; Wahyuni 2012:69-80).

This study used a paradigm based on pragmatism as a philosophical assumption. Previous authors (Sandelowski 2014:3-8; Feilzer 2010:6-16) asserted that the best paradigm to use with a mixed method approach is pragmatism. Paradigms influence the type of research questions that define the topic being investigated and the manner in which a specific study is conducted. This means that the selection of the research paradigm is significant in establishing the basis for adoption of methodology, methods and research designs according to the researcher's philosophical assumptions (Wahyuni 2012:69-80). The present researcher believed that including quantitative data aided in compensating for the lack of generalisability of qualitative data, which may be considered a weakness of qualitative studies. Onwuegbuzie (2003:393-409) noted that the triangulation process that results from combining qualitative and quantitative results is a strength of mixed methods research. When data that captures participants' views (e.g. in an interview process) and data from pre-determined questionnaires are merged into a single study using a pragmatic approach, the research question can be addressed more comprehensively.

3.3 RESEARCH APPROACHES

The choice of study methodology and methods largely depends on the research questions. Three main research approaches are: (a) quantitative research; (b) qualitative research; and (c) mixed methods research. Previous researchers (Sandelowski 2014:3-8; O'Cathain, Murphy & Nicholl 2010:68-71; Almalki 2016:288-296) have noted that qualitative and quantitative methods can be used singly or together, with one method being more dominant than the other or a balanced combination of the two. Differences between qualitative and quantitative methods include the use of numbers for the analysis in quantitative studies and the use words in qualitative studies, and closed questions for quantitative studies and open-ended questions for qualitative studies (Peck et al 2015:320). In addition, data collection in qualitative studies often involves interviews, versus observation and specific questions in quantitative studies (Creswell 2013:24).

In a mixed method study, use of both qualitative and quantitative data reflects the belief that using both methods in a single study increases understanding of the problem and obtains better data than using either method alone (Mugenda & Mugenda 2003:156; Greene 2005:207-211). This study used a mixed methods approach to collect data that

were more complete and trustworthy than data collected using only one method. This approach yielded integrated knowledge that could be supported by figures, images, narratives and words. This offered deeper and potentially more significant answers than may be possible using either approach alone. In this study, equal weight was given to qualitative and quantitative data, and data were collected using both techniques at the same time. By doing so, this study aimed to leverage on the strengths and minimise the weaknesses of each method (Johnson & Onwuegbuzie 2004:14-26, 18; Creswell 2009:95-108). Use of the pragmatist paradigm and a mixed method approach was considered the best method to address the research questions that guided the present study (Creswell 2009:95-108). In this study, the qualitative arm captured participants' perceptions, meaning or phenomenological experiences (Sutton & Austin 2015:226-231). The quantitative arm obtained statistical and numerical data reflecting participants' characteristics and opinions.

3.3.1 Mixed methods approach

A mixed methods approach is an inquiry that associates or combines quantitative and qualitative methods to collect and analyse data in a single study (Sutton & Austin 2015:226-231). The success of mixed methods research depends on a design that complements the strengths and avoids overlapping weaknesses in the selected methodologies (Sandelowski 2014:3-8). This results in a comprehensive way of considering the research problem using many angles, and offers a more complete representation when results are analysed (O'Cathain et al 2010:68-71). This method was considered the most appropriate to answer the research questions by allowing more insight and providing an expanded understanding of low-cost high-impact interventions to enhance health outcomes for preterm babies among nurses and midwives in the study setting. The strengths of each method could be exploited while countering the limitations (Creswell & Creswell 2017:203; Moffatt, White, Mackintosh & Howel 2006:28). The rationale for this approach was that analysis of the quantitative data first provided a general understanding of the research problem. Analysis of the qualitative data then refined and explained the statistical results by exploring nurses' and midwives' experiences in more depth (Romm & Ngulube 2015:223-224; Creswell 2013:24; Creswell & Plano Clark 2011).

This mixed method approach was supported by the triangulation principle, wherein the researcher did not rely on a single approach to the research (Peck et al 2015:320). The combination of methods used in this study (Creswell & Creswell 2017:203) promoted 'multiple ways of seeing and hearing' relating to the research questions (Sandelowski 2014:3-8).

3.3.2 Research design

There are four major research designs in mixed methods approaches: exploratory sequential, convergent parallel, explanatory sequential and embedded designs (Creswell & Plano Clark 2011:53-106). This study used a convergent parallel design. This involved collecting qualitative and quantitative data contemporaneously, analysing the data from both arms separately and then integrating and interpreting both sets of results to answer the research questions (Romm & Ngulube 2015:223; Creswell 2013:24). Focus group interviews with nurses and midwives and in-depth interviews with key informants were conducted at almost the same time as nurses and midwives were completing questionnaires. At the same time, this study assessed the availability of guidelines, medicines and equipment in participating facilities using a checklist and unstructured observation. The quantitative and qualitative results were then integrated during the interpretation stage of the study. The research design is presented in Figure 3.1.

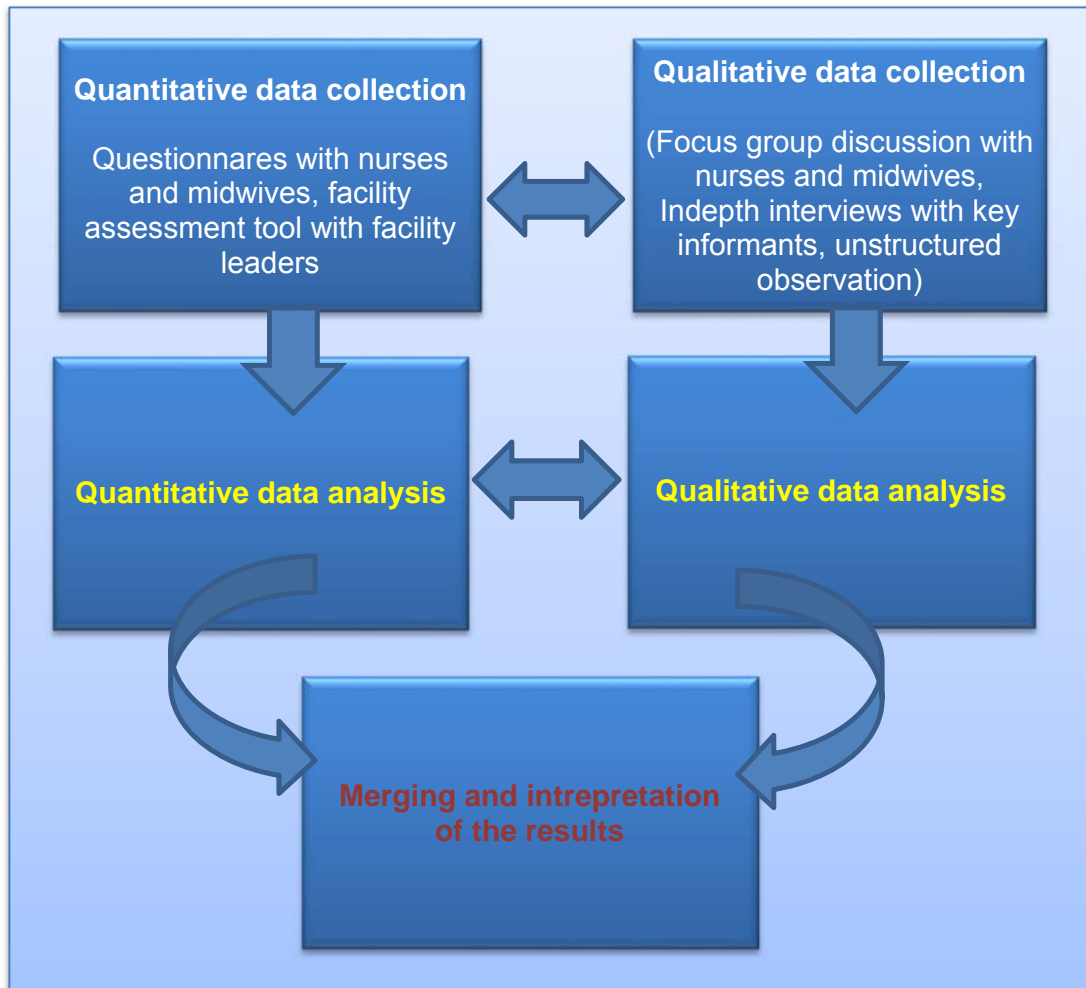


Figure 3.1 Research design

3.3.3 Sampling

3.3.3.1 Study area

This study was conducted in five health facilities in Kilifi County, which is located in the coastal region of Kenya. All participating health facilities were public and categorised as level three (health centres) or level four (sub-county) according to the Ministry of Health Kenya (2014).

3.3.3.2 Study population

A study population is defined as a whole group or every member of a group.

(Babbie 2013:194; Peck et al 2015:320). According to Mugenda and Mugenda (2003:9-10), a study population denotes a group that the investigator uses to draw conclusions. Babbie (2013:194) defined a study population as the summation of items, events or persons investigated by a researcher. Another definition of a study population suggested by Kothari (2004:55) is the total of the elements from which a study sample can be selected. According to Babbie (2013:194), a sampling frame is used to categorise and give access to discrete features for every sampling unit, which are also called units of analysis. The present study used the Kilifi County demographics register as the sampling frame.

The study population for the present study included public health facilities that offered services for pregnant women in Kilifi County, Kenya. Seventeen health facilities were purposely selected. The present study population also included the 146 nurses and midwives who worked in these health facilities at the time of data collection, selected by a census method. In addition, the population included seven key informants from the same study area that were purposely selected because of their expertise in the area of research (Table 3.1).

Table 3.1 Study population

Health facility category	Number	Nurses and midwives
Sub-county hospitals	4	55
Health centres	11	87
Dispensaries	3	4
Total	17	146

3.3.3.3 Sampling procedures

Peck et al (2015:320) defined a sample as a subset of the population that shares similar characteristics. Babbie (2013:194) defined a sample as a 'set of elements selected in some way from a population'. Creswell and Clark (2011:69-72) defined a sample as a "collection of sampling units drawn from a sampling frame". Therefore, sampling can be considered to denote the selection of a portion of the population to represent a complete picture. Sampling for a particular research study can be based on context or participants (Bryman 2017:57-78), although sampling based on context should ideally come before participants are sampled, particularly in qualitative research. Choice of a sampling strategy must always be justified by the researcher, and can be influenced by the study

rationale, size of the study population and sampling error that may be allowed (Creswell 2009:119-121).

Two common sampling procedures are probability and non-probability sampling. Probability sampling means that every unit included in the study population has an equal opportunity of being chosen for the sample. In contrast, non-probability sampling is used where the sample is chosen depending on the researcher's judgment (Creswell & Creswell 2017:203).

The present study used census and purposive sampling methods because these methods enabled collection of the kind of data that were needed to answer the research questions. A census study refers to inclusion of the entire population in the sample. This occurs if the population is very small or it is reasonable to include the entire population (for other reasons). This method attempts to collect information from every person of importance, meaning that the whole study population is contacted (Polit & Beck 2010:1451-1458). Census sampling was used for the quantitative arm of the study as relatively few nurses and midwives were employed in the selected facilities at the time of data collection.

Purposeful sampling is largely used in qualitative research to identify and select participants that may offer rich information related to the phenomenon of importance (Wahyuni 2012:69-80). Patton (2002:261-283) noted that the logic and power of purposeful sampling is in the selection of participants with rich information to provide in-depth data. These participants comprise those from which a researcher can learn a lot about the matters of importance to the study objective (Wahyuni 2012:69-80). The present study used purposeful sampling to select 17 government health facilities based on the level of care and availability of delivery services. This method was also used to sample nurses and midwives working in these health facilities for inclusion in the focus group discussions, and identify key informants for in-depth interviews. This sampling method helped the researcher identify information-rich participants that would yield insights and support an in-depth understanding compared with quantitative generalisations.

3.3.3.4 Data collection methods and approach

Polit and Beck (2010:1451-1458) described data as the fundamental material that a researcher uses. The main objective of collecting data is to measure the study variables (Creswell & Creswell 2017:203). As explained by Babbie (2013:194), the choice of data collection methods depends on the information and type of data that need to be collected. The present study used multiple methods of data collection and tools (both qualitative and quantitative), including observation, in-depth interviews, questionnaires and focus group discussions. Qualitative and quantitative data were collected contemporaneously.

3.3.3.4.1 Interviews

Interviews are the most common method of collecting qualitative data for several reasons, including: ease of collecting a large amount of information in a short period; ability to collect a range of data; and stimulating people's experiences (Bryman 2008:87-100). Interviews may be structured, where a particular order is used in asking questions, or unstructured, where no specific order is used for the questions (Peck et al 2015:320). The decision regarding the type of interview used depends on the research question and the researcher's knowledge of the topic (Murphy & Dingwall 2003:341).

3.3.3.4.2 In-depth interviews

In-depth interviews are a technique used in qualitative research that involves conducting rigorous individual interviews that explore participants' viewpoints on a particular issue or situation (Tong, Sainsbury & Craig 2007:349-357). The interview is often intended to stimulate a clear picture of a participant's perspective regarding the research question. During this process, the interviewee is considered the expert and the interviewer the student (Castro et al 2010:342-360). In-depth interviews are useful when a researcher wants to gain detailed information about a person's thoughts and explore issues in a deeper way. This method of gathering qualitative data is often used in combination with other data to provide context, giving a more complete representation of the issue under investigation (Cox 2003:45). In-depth interviews may replace focus group discussions if the target participants are not comfortable talking openly in a group, or when a researcher wishes to differentiate individual (as opposed to group) views about the research question (Castro et al 2010:342-360). In the present study, the researcher used in-depth interviews

to obtain subjective views by uncovering and describing participants' perspectives of their experiences of evidence-based practices to improve the care of preterm babies.

Two sets of interview questions were prepared, one set for focus group discussions and the other for key informant interviews. The themes used for the interview questions were mainly guided by the research questions.

3.3.3.4.3 *Focus group discussions*

Collecting data through focus group discussions is considered efficient as the researcher can collect information about several individuals in one session. According to Tong et al (2007:349-357), focus groups should be used in combination with other data-gathering techniques. Focus groups are frequently homogeneous. Patton (2005:64-71) claimed that focus group interviews may offer quality control because participants tend to provide checks and balances for each other that can serve to control false or extreme views. A focus group interview guide was developed from the literature and research questions, and used to collect qualitative data regarding participants' experiences of implementing relevant policies and guidelines. Three focus groups were conducted, each including 5-8 nurses and midwives. Most of the discussions were held during lunch time when more nurses and midwives were available. Rooms were reserved in advance to ensure privacy and minimise interruptions. During the focus group discussion, the researcher did not try to persuade the group to reach consensus, but created an environment that stimulated individuals to rethink their views.

3.3.3.4.4 *Questionnaire*

A researcher-administered semi-structured questionnaire with vignettes was developed to collect quantitative data from nurses and midwives (Sapsford & Jupp 2006:208-243). The questionnaire used both closed and open-ended questions. Babbie (2012:261) noted that although questionnaires are best situated with survey research, they can also be useful in other approaches. The questions developed for this study were partly based on the SARA tool (modified to fit the present study) and partly directed by the study questions.

The questionnaire collected information regarding knowledge about and understanding and use of the relevant policies/guidelines among nurses and midwives. Vignette scores were used to assess correct practice. The questions were simple and specific to gather the information needed to answer the research question. Double-barrelled and long questions were avoided (Rubin & Babbie 2008:202-204).

The questionnaire also covered participants' demographic information, availability of guidelines, vignettes concerning knowledge about and practice of implementation of guidelines, barriers to implementation and suggestions to improve implementation. As noted by Babbie (2012:261), the present researcher believed that the questionnaire was appropriate as a data collection tool as it provided a uniform way of gathering responses that enabled quick quantification using SPSS for data analysis. Face and content validity ratio, content validity index and item impact method were used to evaluate the instrument's validity.

The researcher conducted a pilot test involving a sample of 10 nurses and midwives, one neonatologist and one reproductive health coordinator. Pilot test participants were not otherwise participating in the study. This test aimed to ensure that the questions and accompanying instructions were comprehensive, precise and understandable for the target population. After the study, the questions on the questionnaire and interview guide were found to be clear requiring no major amendment. However, a few questions had typographical errors and incorrect numbering which were corrected.

3.3.3.4.5 *Checklist*

A checklist is a data collection tool that is quick and easy to use to record data or identify actions or requirements (Sapsford & Jupp 2006:208-243). Checklists are particularly effective for capturing the occurrence of incidents, events, tasks or problems in real time. In the present study, a health assessment checklist adapted from the SARA tool was used to assess the implementation and coverage of policies and guidelines to improve preterm outcomes in participating health facilities. This allowed the researcher to gain an understanding of the extent of implementation in each facility.

3.3.3.4.6 *Unstructured observation*

The use of observation in qualitative enquiry encompasses spending an extended time in the study setting. As another form of data collection, the researcher took field notes throughout unstructured observations, and focused on what was seen to determine the meaning of what was observed. These notes were also used to answer a research question during subsequent data analysis (Pitney & Parker 2009:63-65). Field notes helped the researcher to capture observational data on behaviours, environmental contexts, impressions and nonverbal cues that might not have been sufficiently captured by other methods. Frequently, the notes were used to provide more in-depth background or assist the observer to recall significant events. The descriptions in the field notes were factual, accurate and thorough, and avoided judgment and trivialities. The date and time of each observation was noted, and everything that the observer believed was relevant was included. Figure 3.2 presents the data collection methods.

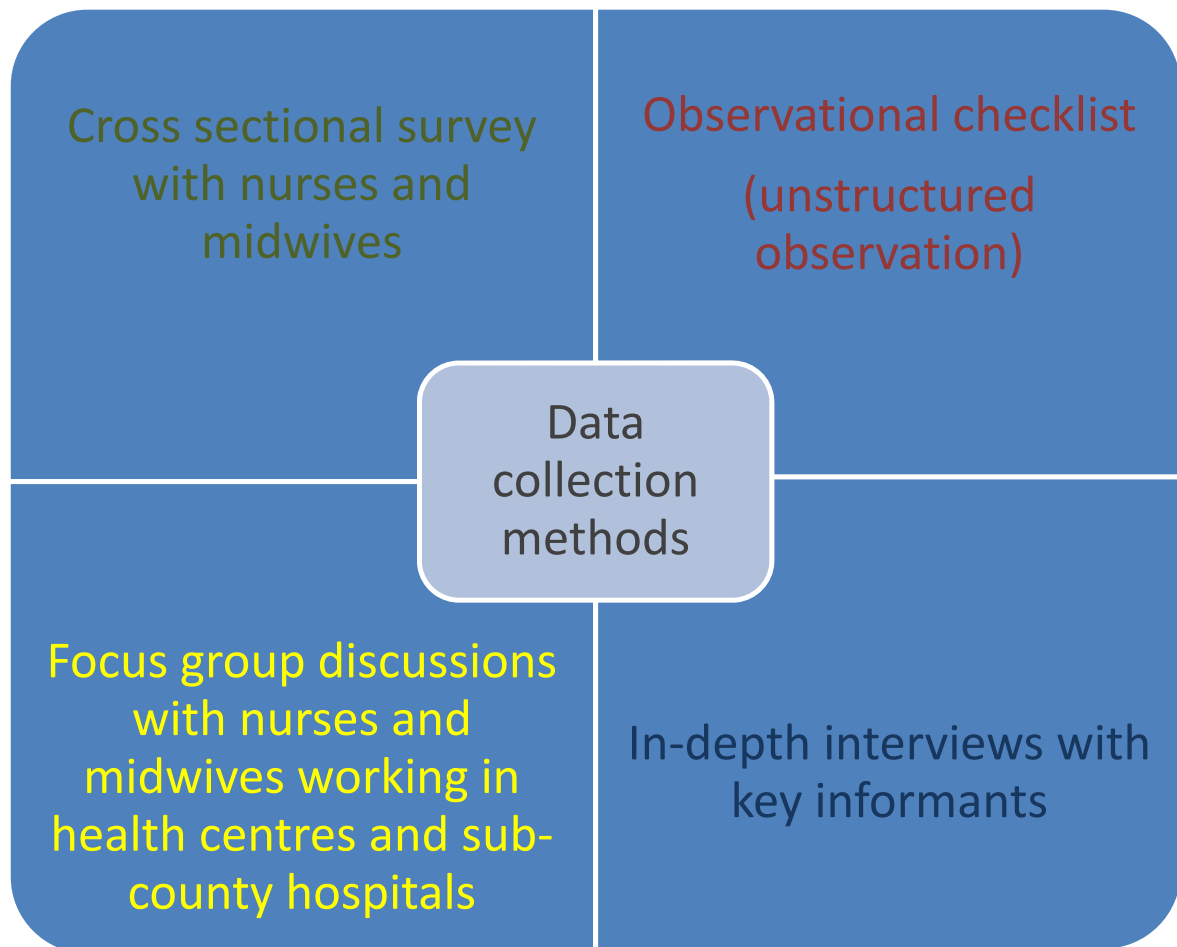


Figure 3.2 Data collection methods

3.3.3.5 Pre-testing of data collection instruments

Pre-testing of the data collection instruments was done to ensure that they produced the expected results. This involved administering each instrument to a small number of participants with similar characteristics to the study sample (Mugenda & Mugenda 2003:78). Rubin and Babbie (2008:2011) cautioned that even if a researcher uses stringent measures in developing a questionnaire, there are still chances of making errors or developing questions that are not clear. However, pre-testing data collection tools helps to remove ambiguities and ensure questions are appropriate and clearly understood (Babbie, 2004:217; Rubin & Babbie 2008:2011). Ten nurses and midwives, one neonatologist and one reproductive health coordinator were sampled for pre-testing the instruments, based on their relevance to the study and accessibility.

3.3.3.6 Data quality control

Research assistants were selected, trained and used in pre-testing the questionnaire and data collection. All data collectors agreed on the data to be gathered to ensure that collected were reliable. A questionnaire was distributed to each participant to complete. The researcher and research assistant were available to assist participants who needed clarification or explanations. Completed questionnaires were evaluated for missing data.

3.3.3.7 Ethical considerations

Ethical issues require serious consideration when conducting a study to guarantee that participants' rights are not violated. In the research process, ethical considerations require adhering to strict ethical standards during planning, collection and analysis of data and the eventual use of the findings (Mugenda 2008:293-294; Teddlie & Tashakkori 2009:199). These issues include confidentiality and anonymity participants, possible risks and benefits, research purpose, privacy, participation on a voluntary basis and participants' consent (Rubin & Babbie 2008:70-80; Mugenda 2008:293-294).

Ethical clearance to conduct this study was obtained from the UNISA Research Ethics Committee (Annexure A) and the AKU Research and Ethics Committee (Annexure B). Approval was also sought from the County Government of Kilifi, and the medical

superintendents of participating health facilities (Annexure E). The head of health in the County was also approached and informed of the intent to conduct this research in that area. The processes, purpose, benefits and any potential risks of participating in the study were explained and their consent sought. Any questions or requests for clarifications were addressed honestly. A copy of the official request letter was provided for record purposes.

Participation in this study was voluntary, and written informed consent was obtained from all participants. An informed consent form was given to participants to sign after they received an explanation of the purpose of the study (Annexure F). Participants' voluntary agreement to participate was encouraged. Confidentiality and anonymity were assured by not recording any identifying details in study documents or reports. All data were kept securely in a locked cabinet accessible only by the researcher. The questionnaires and audio recordings will be destroyed 2–3 years after data analysis and report writing are completed.

The researcher identified and sampled respondents, and explained the purpose of the study along with the benefits and possible risks of participation before seeking informed consent. Confidentiality and anonymity were maintained throughout the process by ensuring that no names or numbers relating to participants could be traced to individuals at the health facilities. There were no anticipated risks associated with participating in this study; however, there was a possibility that some questions might make a participant uncomfortable. In such cases, participants were informed that they could choose not to answer that question without penalty.

There were no direct benefits or compensation given to participants as individuals. However, administrators and other stakeholders may use the results of this study to inform the development of strategies to improve the quality of care and health outcomes for preterm babies through enhanced guideline implementation.

3.3.4 Data analysis

Analysis of data is the 'procedures, including coding, categorization, concept mapping and theme generation, which facilitate organization and interpretation of data in order to produce findings and an overall understanding of the case' (Simons 2009:117). Mugenda (2008:288) noted that analysis and correct interpretation of data help in changing it into

knowledge. The aim of data analysis is to determine the characteristics of the data gathered and patterns which point to a hypothetical understanding (Babbie 2004:217). Qualitative and quantitative datasets were analysed independently, and only compared when both analyses were complete. Quantitative data were entered into SPSS version 23. Descriptive analysis of the variables was performed to obtain proportions, percentages, medians, means and standard deviations. Bivariate statistics (e.g. chi-square tests and t-tests) were used to make comparisons between facilities and cadres. A logistic regression model was implemented to test for associations between variables that were significant. Statistical significance was set at $p < 0.05$ to ensure the results reflect universally accepted levels of accuracy. Quantitative data were also presented using of tables, graphs and charts. Qualitative data (including focus groups discussions and in-depth interviews) were coded and categorised into themes, and analysed using NVivo 10. Descriptive/interpretive procedures were performed (including content analysis), then interpreted, and presented narratively.

3.4 INTERNAL AND EXTERNAL VALIDITY OF THE STUDY

Reliability and validity are of utmost importance in both qualitative and quantitative studies. These are the measures taken to safeguard the credibility, believability and truthfulness of the study findings (Neuman 2006:188). Research credibility depends on how well the issues of concern are measured. If the measurement tools or techniques have inaccuracies, the findings are likely to portray a wrong picture of the research topic. Sheppard (2004:242) suggested that it is generally impossible to achieve research findings that are 100% error free. This is because quantitative studies always have inbuilt standard inaccuracy, whereas qualitative studies can have bias related to opinions, subjectivity and attitudes.

3.4.1 Validity

In this study, validity was founded on established definitions. For the quantitative arm of this study, two major characteristics of validity are accuracy and that the study measures what it aims to measure. Validity is equally important in both qualitative and quantitative research to ensure that the study is measuring what it expects to measure (Creswell & Creswell 2017:286). Descriptive, interpretative, evaluative and generalisability or external validity were evaluated in this study. Descriptive validity involved the depiction of the

methodology and procedures of data collection and analysis. Interpretative validity was ensured by a structured and clear presentation and interpretation of the study results. The findings reported in this study only relate to the issue under investigation, and not to any other intervening variables, which justifies internal validity. Research findings are judged to be valid, stable and replicable based on generalisability. In this study, the ability to generalise results to a broader population was mostly applicable to the quantitative arm. An adequate amount of data is included in reporting the findings to permit the reader to judge if the interpretation presented is sufficiently supported by available data.

3.4.2 Reliability

This refers to the replicability and stability of a study, or the ability to dependably replicate the measurement using a similar tool (Creswell & Creswell 2017:286). Reliability of the instruments ensures that data being collected from the similar or comparable sources at different timelines, by use of the same instruments adhering to the same conditions, would produce the similar results. Reliability in the current study was attained by testing the data collecting instruments to minimise errors in their construction. Pre-testing was carried out in a public health facility. The facility was selected since it is not among the health facilities where the actual study was carried out and subjects have comparable characteristics to the subjects chosen for this study. The pre-testing was an approach of ensuring that questions contained in the instruments are well stated, understood and produce the same kind of responses from diverse respondents. Some questions were revised and modified after pretesting to remove vagueness and inaccuracies in the instrument that could adversely affect quality data collected.

3.4.3 Trustworthiness

Trustworthiness in the qualitative arm of this study included the direct involvement of participants in negotiating the truth by use of subjective explanations of their personal experiences and perspectives on the meaning of reality. In a qualitative approach, the representative description is what matters in justifying the findings. Measures to confirm trustworthiness included triangulation of sources of data and methods, peer review, member checking, provision of a thick description of the study process, participant validation, inter-coder agreement reflexivity, dealing with collected data fairly and paying close attention to cases that were negative.

Triangulation was achieved by the use of a mixed methods approach, various data collection methods, gathering data from multiple sources and analysing quantitative and qualitative data separately. Triangulation meant that the limitations of one method were balanced by the strengths of the other method (Peck et al 2015:320). This study includes a clear description of the methods, data collection and data analysis processes. In addition, a second researcher coded the same data using previously agreed coding criteria to validate the themes. Probing participants for further information during the focus group interviews validated responses from participants and allowed comparison of similar information from different data sources. The researcher also kept a personal diary for personal reflection and recording events that transpired during the data collection process that were relevant to the research context. The overall validity of the quantitative and qualitative approaches was ensured by presenting the research proposal to the AKU Research and Ethics Committee and review of the research proposal by internal and external examiners.

3.5 CONCLUSION

This chapter focused on the methodology used in this research. It explained the research design and presented the rationale for use of the pragmatist paradigm that informed the research process. The chapter also elaborated on the study population, sampling procedures, data collection instruments, data analysis approaches, validity, reliability and trustworthiness. Finally, the chapter described ethical considerations relating to this research. The next chapter describes the quantitative data analysis and presents the quantitative results.

CHAPTER 4

PRESENTATION AND DISCUSSION OF QUANTITATIVE DATA

4.1 INTRODUCTION

This chapter reports the findings of the quantitative data analysis. It discusses the data sources and analysis, response rate, respondents' demographic characteristics, availability of guidelines, availability of equipment/essential drugs and knowledge and practice among nurses and midwives regarding key interventions. The chapter also presents the factors associated with implementation of interventions by nurses and midwives, challenges in implementation and suggested ways to improve implementation.

4.2 DATA SOURCES AND ANALYSIS

A semi-structured researcher-administered questionnaire was used to collect data from nurses and midwives in 16 public health facilities in Kilifi County. The questionnaire assessed nurses' and midwives' knowledge and understanding of existing policies and guidelines aimed at improving health outcomes for preterm babies. The questionnaire also included five vignettes, which were designed as purposely-simplified assessments of key basic preterm baby care on the first day of life. These vignettes aimed to emphasise the most obvious gaps and examine best practice by asking about intended care (Evans, Roberts, Keeley, Blossom, Amaro, Garcia, Stough, Canter, Robles & Reed 2015:160-170).

A health facility assessment tool was used to assess the extent to which policies and guidelines to enhance health outcomes for preterm babies were implemented in the sampled health facilities. The tool was administered to the head of each facility's joint maternity/newborn unit or the most senior nurse/midwife on duty in the unit. The data were analysed using SPSS version 23. Descriptive statistics (i.e. mean and standard deviation for continuous variables, frequencies and percentages for discrete variables) and inferential statistics were used to answer the research questions.

4.3 RESPONSE RATE

Of the 146 nurses and midwives sampled for this study, 37 were not available for interview, 109 nurses and midwives were interviewed and seven questionnaires were spoilt. Therefore 102 questionnaires were used for analysis representing a 69.8% response rate. Seventeen health facilities were targeted (four sub-county hospitals, 11 health centres and two dispensaries). However, respondents from one dispensary were not interviewed because of unavailability during data collection. Sixteen of the targeted 17 health facility assessments were conducted. The overall response rate from the questionnaires and facility assessments was 81.4% (118/145*100). The high response rate might have been associated with support from the health facility administrators and county and sub-county health management teams, and the fact that the questionnaire was researcher-administered. Table 4.1 presents the health facility categories and distribution of nurses and midwives, and Table 4.2 illustrates the sources of quantitative data and responses. Distribution of nurses and midwives per facility is displayed in Table 4.3.

Table 4.1 Health facility categories and distribution of nurses and midwives

Health facility category	Number	Nurses and midwives
Sub-county hospitals	4	55
Health centres	11	87
Dispensaries	2	4
Total	16	146

Table 4.2 Sources of quantitative data and response rates

Source	Administered (N=163)	Responded	Percentage
Nurses and midwives	146	102	69.8
Health facilities	17	16	94.1
Total	163	118	72.4

Table 4.3 Distribution of respondents by health facility

Number	Health facility code	Health facility level	Number of nurses and midwives
1	HF 1	Sub-county hospital	10
2	HF2	Dispensary	2
3	HF3	Health centre	6
4	HF4	Health centre	6
5	HF5	Health centre	5
6	HF 5	Health centre	7
7	HF7	Health centre	6
8	HF8	Sub-county hospital	10
9	HF9	Sub-county hospital	20
10	HF10	Sub-county hospital	15
11	HF1 1	Health centre	8
12	HF12	Health centre	15
13	HF13	Health centre	6
14	HF14	Health centre	10
15	HF15	Health centre	14
16	HF16	Health centre	4
17	HF 17	Health center	2
Total			146

4.4 RESEARCH RESULTS

4.4.1 Sample characteristics

This section provides a summary of respondents' demographic data. This study sought to establish a profile of participating nurses and midwives. Demographic data collected included age, professional qualification, highest level of education attained, years of work experience and any in-service training in newborn care.

4.4.1.1 Respondents' gender

Of the 102 nurses and midwives that completed the questionnaire, 70 (69%) were female and 32 (30.4%) were male (Figure 4.1).

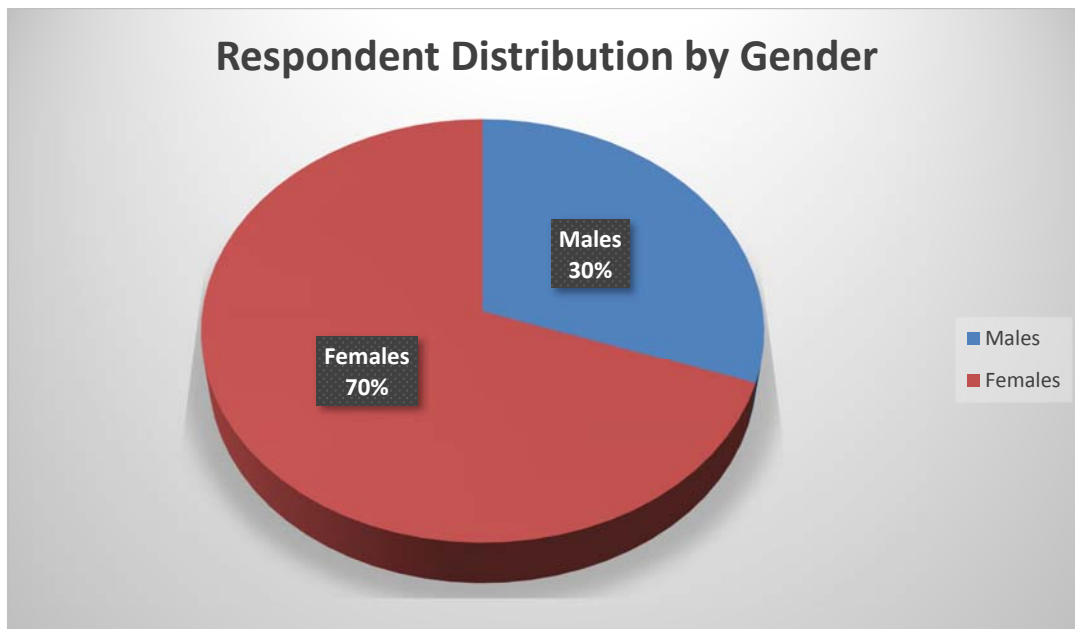


Figure 4.1 Gender of the respondents

4.4.1.2 Professional qualifications

The majority of respondents were registered nurses/midwives (n=67; 66%). The remainder were registered nurses (n=13; 14%), enrolled nurses (n=9; 7%) and enrolled nurse/midwives (n=13; 14%) (Figure 4.2).

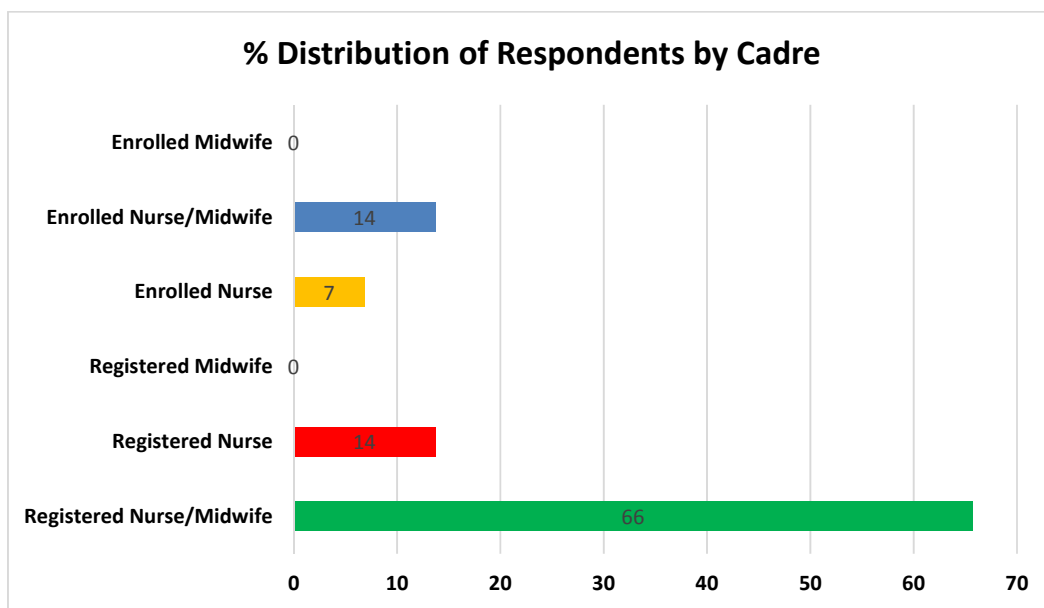


Figure 4.2 Respondents' professional qualifications

4.4.1.3 Education level

The majority of respondents had attained diploma-level education (n=79; 77%), with the highest education level among the remainder being certificate (n=21; 21%) or degree (n=2; 2%) (Figure 4.3).

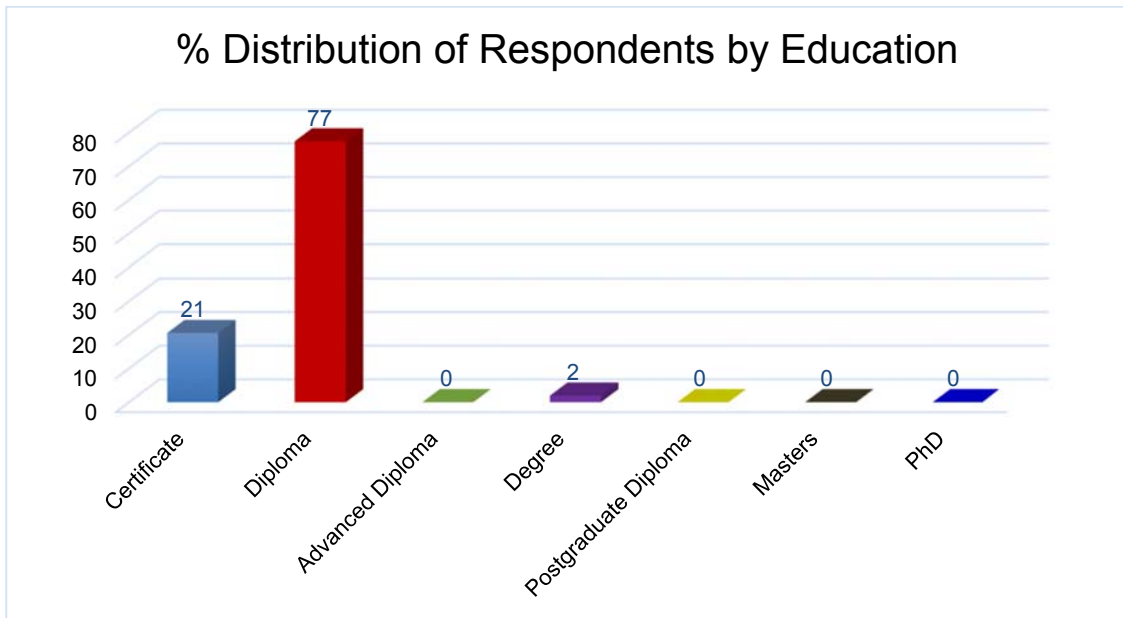


Figure 4.3 Respondents' education level

4.4.1.4 Recent in-service training in newborn care

Three-quarters of the respondents (n=76; 74.5%) had undertaken in-service training in new-born care within the last 2 years. The remaining 26 (25.5%) had not received any current in-service training (Figure 4.4).



Figure 4.4 In-service training in newborn care.

4.4.1.5 Respondents' age distribution

The mean age of the participating nurses and midwives was 36(SD=9) years, with a range of 24-58 years (Figure 4.5).

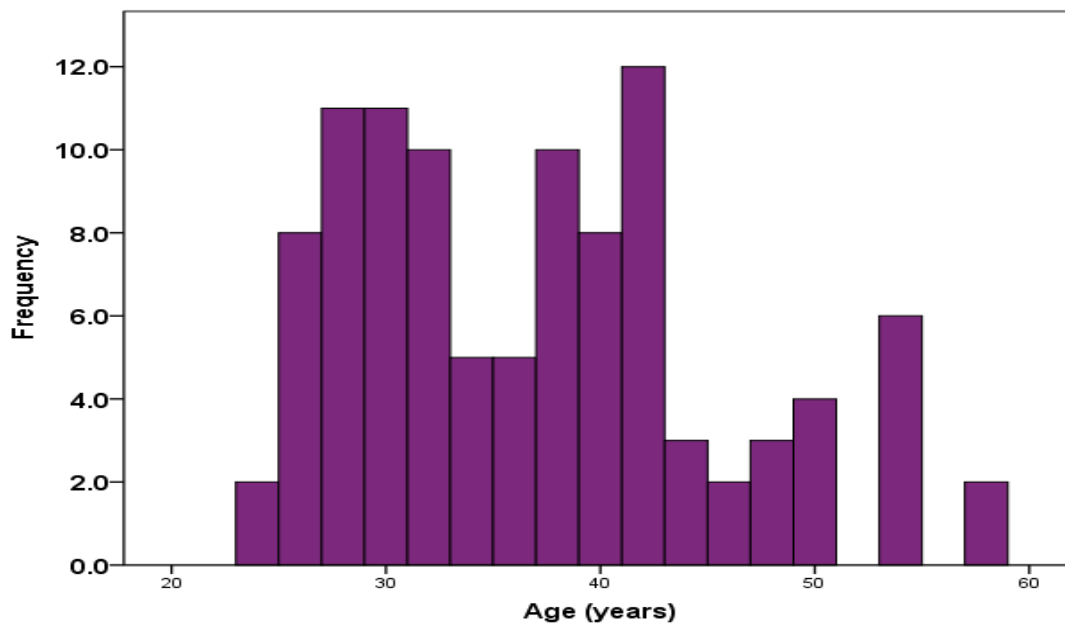


Figure 4.5 Respondents' age distribution

4.4.1.6 Respondents' work experience

The mean number of years worked as a nurse or midwife was 12 (SD=10) years, with a range of 1-36 years and a minimum of 1 year (Figure 4.6).

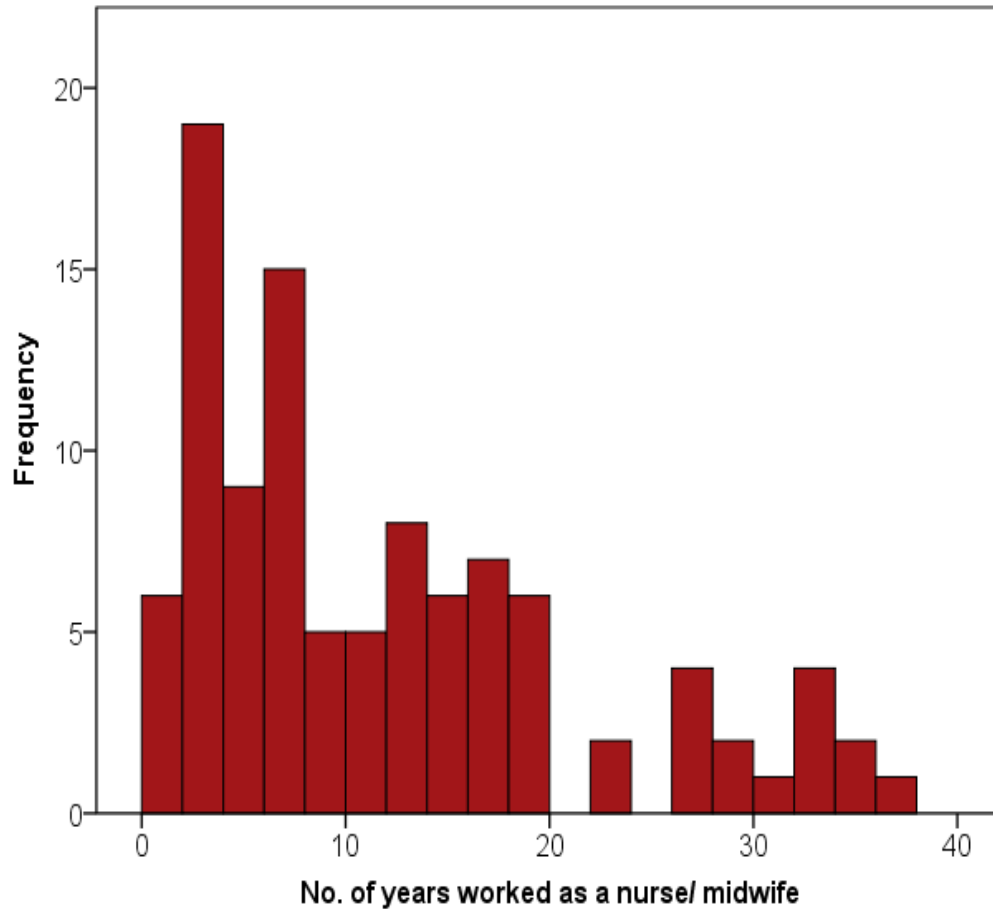


Figure 4.6 Number of years worked as a nurse/midwife

4.4.1.7 Health facility categories

Eleven of the sampled health facilities were health centres (69%), four were sub-county hospitals (25%) and two were dispensaries (6%) (Figure 4.7).

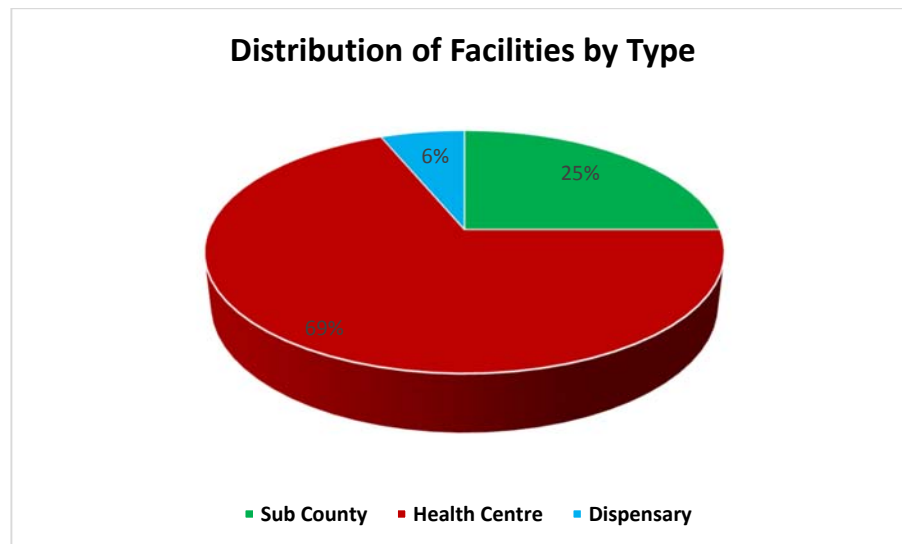


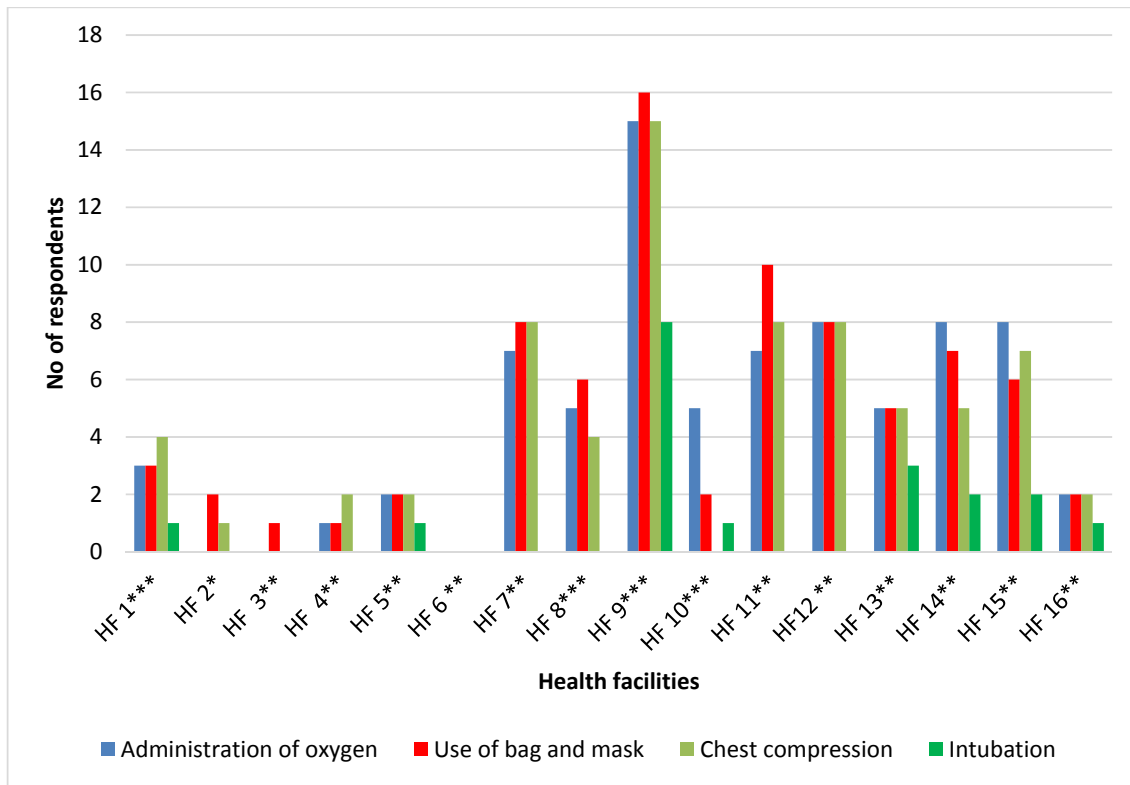
Figure 4.7 Categories of sampled health facilities in Kilifi County

4.4.2 Responses regarding the availability the of guidelines and essential drugs in the sampled health facilities

This study sought to determine the availability of protocols/guidelines and essential drugs in each sampled health facility, as stated by respondents. This information was important to the researcher because implementation of evidence-based interventions is supported by availability of guidelines and essential medications (Baker, Camosso-Stefinovic, Gillies, Shaw, Cheater, Flottorp, Robertson, Wensing, Fiander, Eccles, Godycki-Cwirko, Van Lieshout & Jäger 2015:144-150). Figures 4.8-4.12 illustrate this. These figures only reflect responses where the guidelines/equipment/drugs were available. Those who said they were not available or did not know were omitted to avoid crowding the graphs. However, tables representing all responses are presented as appendices. The health facilities were given pseudonyms to ensure their anonymity and confidentiality (HF1 to HF16).

4.4.2.1 Availability of resuscitation guidelines per facility

Respondents (N=102) were asked to state whether guidelines on resuscitation of a newborn were available in their facility. HF9 had the highest number of respondents (n=54; 53%) who indicated these guidelines were available. Only one participant from HF3 indicated that guidelines were available, and no respondents from HF6 said the guidelines were available (Figure 4.8).

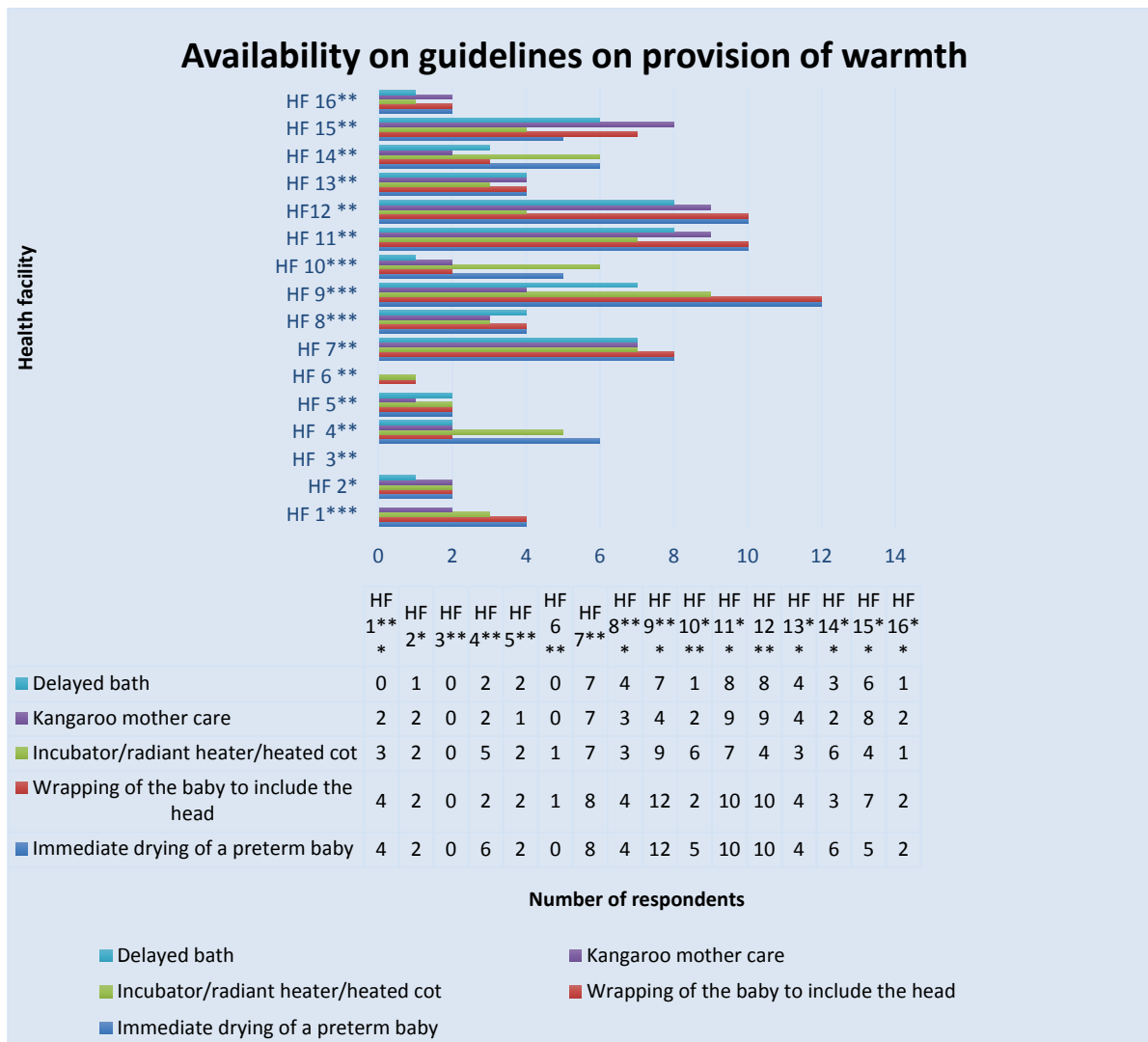


* Dispensary; ** Health centre; *** Sub-county hospital

Figure 4.8 Availability of resuscitation guidelines per facility

4. 4.2.2 Availability of guidelines on provision of warmth per facility

Respondents (N=102) were asked to state whether guidelines on provision of warmth for a preterm baby were available in their facility. HF9 and HF11 had the highest number of respondent (n=44; 43%) who indicated that these guidelines were available. Only one respondent from HF6 indicated that the guidelines were available, and no participants from HF3 reported the guidelines were available (Figure 4.9).

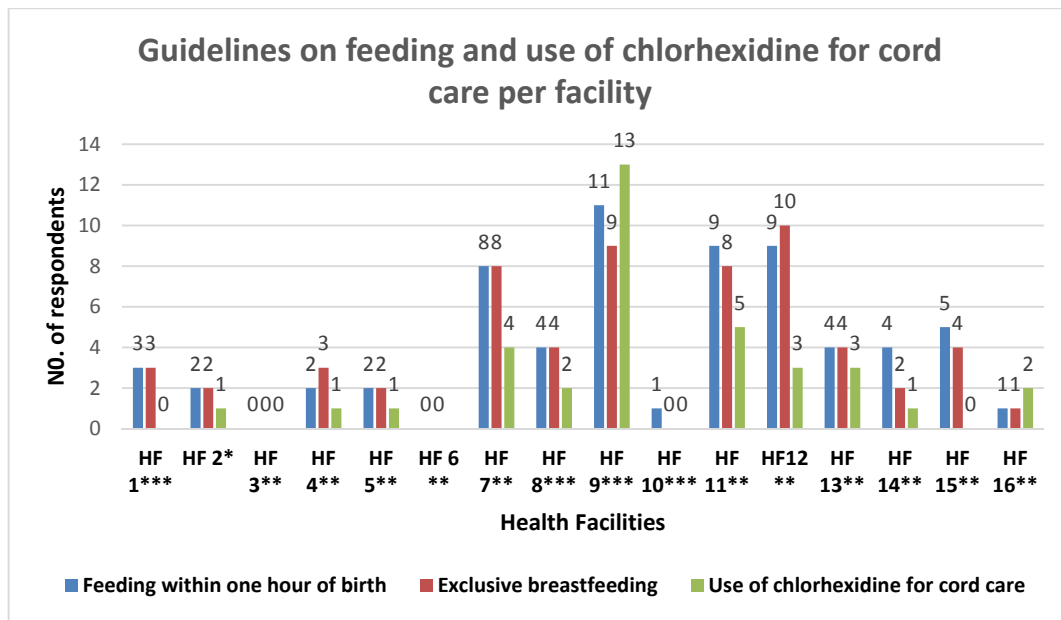


* Dispensary; ** Health centre; *** Sub-county hospital

Figure 4.9 Availability of guidelines for provision of warmth per facility

4. 4.2.3 Availability of guidelines on feeding and use of chlorhexidine for cord care per facility

Respondents (N=102) were asked whether guidelines on feeding and the use of chlorhexidine for cord care were available in their facility (Figure 4.10). HF9 had the highest number of respondents (n=33; 32%) that reported guidelines on both use of chlorhexidine and breastfeeding were available. Only one (1%) participant from HF10 indicated that these guidelines were available (feeding within 1 hour of birth only), and no respondents from HF3 and HF6 reported these guidelines were available.

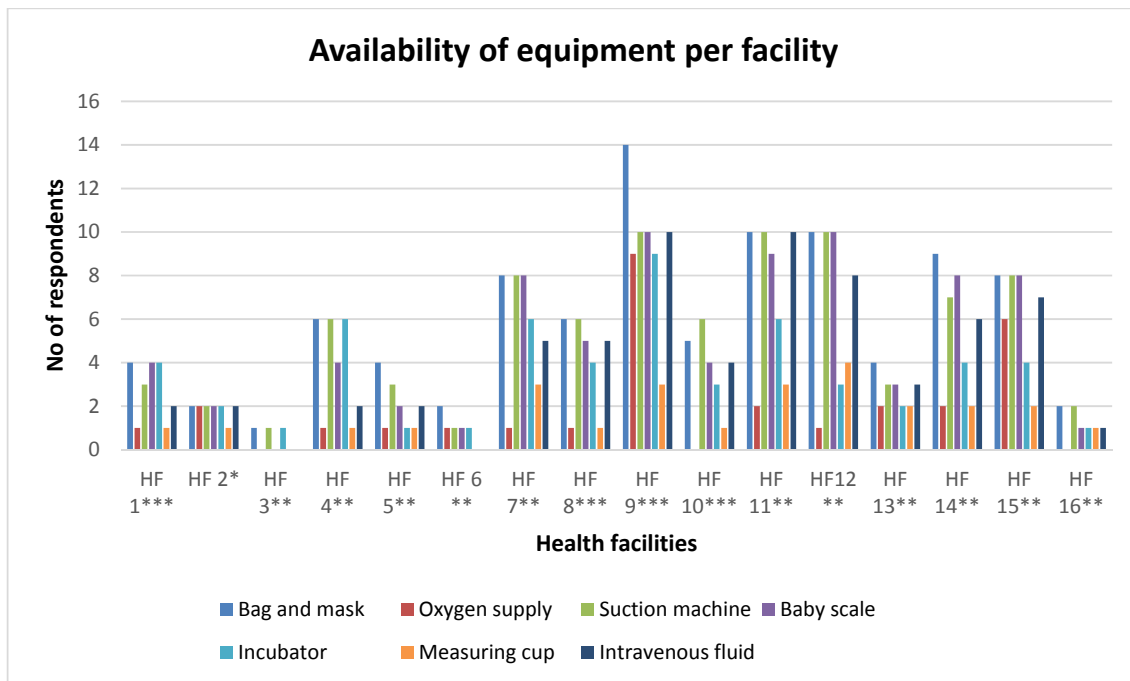


* Dispensary; ** Health centre; *** Sub-county hospital

Figure 4.10 Availability of guidelines on feeding and use of chlorhexidine per facility

4. 4.2.4 Availability of equipment per facility

Some of the sampled health facilities lacked important equipment (Figure 4.11). HF3 lacked oxygen, a baby scale, a measuring cup and intravenous fluid administration equipment. HF6 lacked a suction machine, and both HF10 and HF16 lacked oxygen. Overall, oxygen and measuring cups were missing in the majority of the sampled health facilities.

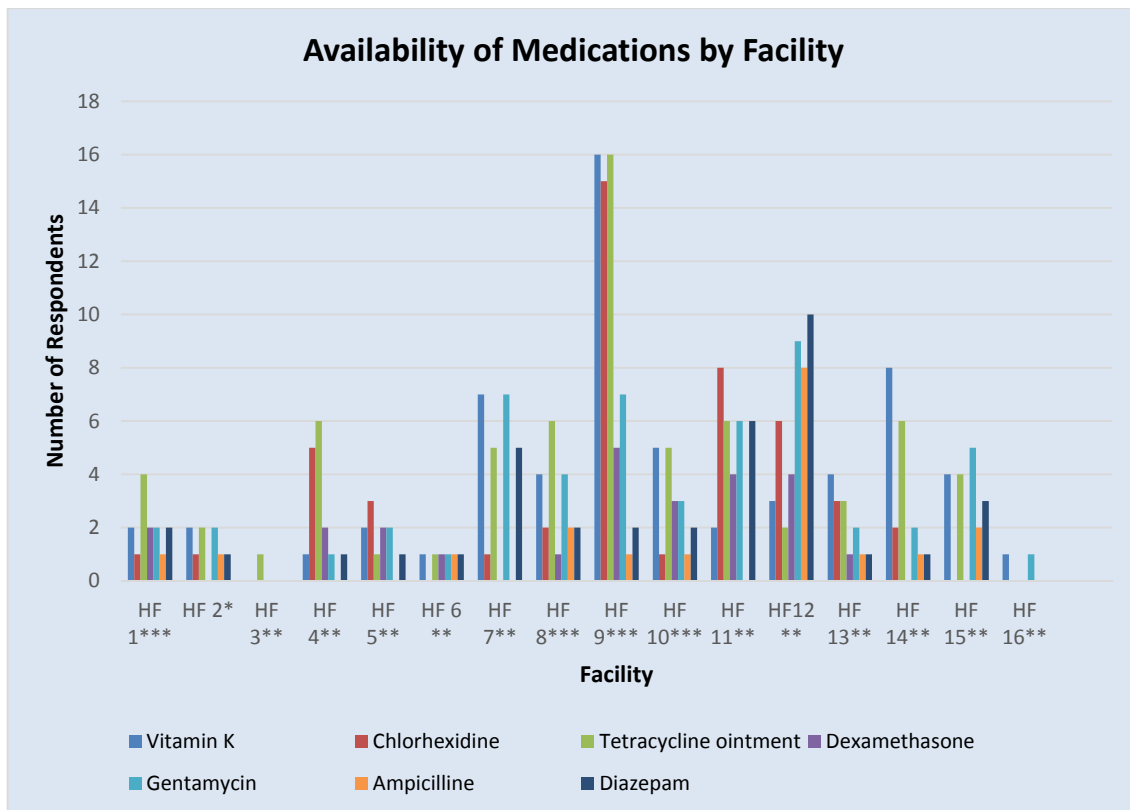


* Dispensary; ** Health centre; *** Sub-county hospital

Figure 4.11 Availability of equipment per facility

4. 4.2.5 Availability of medications per facility

Figure 4.12 shows the availability of medications in each sampled facility. HF9 had the highest number of nurses and midwives who reported that medications were available, and HF3 and HF16 had the lowest number of responses indicating that medications were available.



* Dispensary; ** Health centre; *** Sub-county hospital

Figure 4.12 Availability of medications per facility

4. 4.2.6 Summary of availability of equipment in the sampled health facilities

The overall availability of essential equipment in the sampled facilities as reported respondents was: bag and mask (n=95; 93.1%), suction machine (n=86; 84.3%), baby scale (n=79; 77.5%), incubator/radiant warmer (55.9%) and intravenous fluid and infusion set (n=67; 65.7%). However, measuring cups were only reported to be available by 35 (34.3%) respondents. Of particular concern was oxygen supply, which was only reported to be available by slightly over half (n=57; 55.9%) of the respondents in all health facilities, despite its importance in the care of preterm babies (Table 4.3).

Table 4.4 Equipment availability in the sampled facilities

Equipment	Available and maintained (N=102), n (%)	Available not maintained (N=102), n (%)	Not available (N=102), n (%)	Don't know (N=102), n (%)
Bag and mask	95 (93.1)	2 (2)	2 (2)	3 (2.9)
Oxygen supply	57 (55.9)	30 (29.4)	7 (6.9)	8 (7.8)
Suction-machine/nasal aspirator	86 (84.3)	8 (7.8)	4 (3.9)	4 (3.9)
Baby scale	79 (77.5)	9 (8.8)	8 (7.8)	6 (5.9)
Incubator/radiant warmer	57 (55.9)	17 (16.7)	19 (18.6)	9 (8.8)
Measuring cup	26 (25.5)	33 (32.4)	35 (34.3)	8 (7.8)
Intravenous fluid and infusion set	67 (65.7)	16 (15.7)	8 (7.8)	11 (10.8)

This showed that although some health facilities had most of the equipment necessary for the care of preterm babies, others lacked these essential items. These findings are comparable with a Ghanaian study that showed gaps in availability of equipment and essential life-saving actions in health facilities (Vesel, Manu, Lohela, Gabrysch, Okyere, Ten Asbroek, Hill, Agyemang, Owusu-Agyei & Kirkwood 2013:e002326). That study estimated that only 33.2% of babies born in health facilities had access to high quality, basic resuscitation because necessary equipment was lacking.

4. 4.2.7 Summary of availability of essential drugs in the sampled health facilities

Concerning essential drugs necessary for the care of preterm infants, the majority of respondents stated that vitamin K (60.8%), tetracycline ointment (66.7%), gentamicin (52.9%) and diazepam (37.3%) were available. However, dexamethasone (50%) and ampicillin (55.9%) were available sometimes, and only 47.1% said that chlorhexidine was available all the time (Table 4.4).

Table 4.5 Availability of essential drugs in the sampled health facilities

Essential drugs	Available always (N=102), n (%)	Available sometimes (N=102), n (%)	Not available (N=102), n (%)	Don't know (N=102), n (%)
Vitamin K	62 (60.8)	32 (31.4)	8 (7.8)	0 (0)
Chlorhexidine	48 (47.1)	43 (42.2)	11 (10.8)	0 (0)
Tetracycline ointment	68 (66.7)	25 (24.5)	9 (8.8)	0 (0)
Dexamethasone	25 (24.5)	51 (50)	25 (24.5)	1 (1)
Gentamicin	54 (52.9)	24 (23.5)	23 (22.5)	1 (1)
Ampicillin	19 (18.6)	57 (55.9)	23 (22.5)	3 (2.9)
Diazepam	38 (37.3)	36 (35.3)	24 (23.5)	4 (3.9)

The fact that less than half of the respondents indicated that chlorhexidine was always available suggests a gap in supply of essential drugs for the care of preterm babies. A study conducted in Nigeria to assess the use of chlorhexidine among healthcare providers found that chlorhexidine was not stocked and healthcare providers feared to use it, citing that it lengthened the time of cord separation (Wright, Umar-Farouk & Ricca 2018:12). This suggests that the availability of drugs may sometimes depend on nurses' and midwives' beliefs regarding their use.

When asked about the availability of formal protocols/guidelines on how to admit or refer a preterm baby, most respondents (n=86; 84.3%) said that they did not have any protocols/guidelines regarding admitting or referring cases of preterm babies, and only 16 (15.7%) stated that their health facilities had admission/referral protocols. Similar findings from a systematic review of guidelines for the management of preterm and small-for-gestational-age babies indicated that standardised referral systems were missing to guide healthcare providers regarding referral of preterm babies to a higher level facility (Guillén et al 2015:343-350).

4.4.3 Results of health facility assessment of the availability of guidelines, equipment and medications

Facility assessments were conducted with 16 health facilities: four sub-county hospitals (25%), 11 health centres (69%) and one dispensary (6%). The facility heads indicated

that they received guidelines most of the time (n=4; 23.5%), sometimes (n=10; 58.8%) or hardly ever (n=3; 17.6%).

The researcher noted that in some facilities, some guidelines had been simplified into specific components and rewritten in steps, in the form of job aids and flow charts. This was considered in the assessment; therefore, the availability of each guideline was reported using specific components at the time of the study.

Table 4.6 shows that more than half of the health facilities did not have resuscitation guidelines on chest compression (56.2%) and intubation (68.8%). For warmth provision, 13 (81.2%) health facilities did not have any guideline on wrapping the baby to keep warm, nine (56.2%) had no guideline on KMC and 10 (62.5%) had no guideline on delayed bathing. Guidelines on feeding within 1 hour of birth were missing in 11 (68.8%) facilities and exclusive breastfeeding in eight (50.0%) facilities. Cord care guidelines (use of chlorhexidine) were missing in nine (56.2%) facilities, and 15 (93.8%) facilities did not have a referral guideline. Five facilities (31.3%) did not have intravenous fluid/infusion sets, nine (56.2%) did not have chlorhexidine and three (18.8%) lacked oxygen.

Table 4.6 Health facility assessment of availability of guidelines, medications and equipment

Characteristic	Available (N=16), n (%)	Not available (N=16), n (%)
Resuscitation of a preterm baby		
Administration of oxygen	11 (68.8)	5 (31.3)
Use of bag and mask	13 (81.2)	3 (18.8)
Chest compression	7 (43.8)	9 (56.2)
Intubation	5 (31.2)	11 (68.8)
Provision of warmth		
Immediate drying of a preterm baby	11 (68.8)	5 (31.3)
Wrapping of the baby, including the head	3 (18.8)	13 (81.2)
Incubator/radiant heater/heated cot	10 (62.5)	6 (37.5)
Kangaroo mother care	7 (43.8)	9 (56.2)
Delayed bathing	6 (37.5)	10 (62.5)
Feeding		
Feeding within 1 hour of birth	5 (31.2)	11 (68.8)
Exclusive breastfeeding	8 (50.0)	8 (50.0)
Alternative feeding for baby unable to breastfeed	7 (43.8)	10 (62.5)
Infection prevention		
Cord care	1 (6.3)	15 (93.8)

Characteristic	Available (N=16), n (%)	Not available (N=16), n (%)
Use of chlorhexidine for cord care	7 (43.8)	9 (56.2)
Referral protocol guideline	1 (6.3)	15 (93.8)
Equipment		
Bag and mask	13 (81.2)	3 (18.8)
Oxygen supply	15 (93.8)	1 (6.3)
Suction machine/nasal aspirator	14 (87.5)	2 (12.5)
Intravenous fluid and infusion set	11 (68.8)	5 (31.3)
Essential drugs		
Vitamin K	14 (87.5)	2 (12.5)
Chlorhexidine	7 (43.8)	9 (56.2)
Tetracycline ointment	13 (81.2)	3 (18.8)

The findings from the health facility assessment highlighted constraints in preterm care guidelines, equipment and medicines, which is likely to negatively impact preterm babies' health outcomes. A study by Vesel et al (2013:e002326) that assessed the quality of preterm care in Ghana revealed similar findings, with health facilities lacking important equipment and medicines for the care of preterm babies.

4.4.4 Interventions to enhance health outcomes of preterm babies implemented in Kilifi County

This study sought to identify interventions for the care of preterm babies that were implemented in the sampled health facilities. For resuscitation of a preterm baby, the nurses and midwives indicated that most facilities had implemented administration of oxygen (n=76; 74.5%), use of bag and mask (n=79; 77.5%) and chest compression (n=71; 69.6%), whereas intubation was commonly not implemented (n=67; 65.7%).

A majority of respondents noted that in most facilities, the provision of warmth intervention was implemented: immediate drying of a preterm baby (n=80; 78.4%), wrapping of the baby including the head (n=73; 71.6%), incubator/radiant warmer (n=63; 61.8%), KMC (n=57; 55.9%) and delayed bathing (n=54; 52.9%). With regard to feeding, the majority of respondent reported that feeding within 1 hour (n=65; 63.7%) and exclusive breastfeeding (n=60; 58.8%) were implemented. These findings support results from a previous study by Bick (2012:401-402) that recommended evidence-based interventions should be implemented for all stable preterm babies, including immediate breastfeeding,

thermal care and use of KMC for small babies; the added advantage of these specific interventions being that they were low-cost and low-technology.

Conversely, the majority of respondents reported that use of chlorhexidine for cord care was not implemented (n=43; 42.2%) despite this being best practice. Implementation of protocols/guidelines in the sampled facilities is shown in Table 4.7.

Table 4.7 Protocols/guidelines implemented in Kilifi County

Characteristic	Implemented (N=102), n (%)	Not implemented (N=102), n (%)	I don't know (N=102), n (%)
Resuscitation of a preterm baby			
Administration of oxygen	76 (74.5)	20 (19.6)	6 (5.9)
Use of bag and mask	79 (77.5)	15 (14.7)	8 (7.8)
Chest compression	71 (69.6)	24 (23.5)	7 (6.9)
Intubation	19 (18.6)	67 (65.7)	16 (15.7)
Provision of warmth			
Immediate drying of a preterm baby	80 (78.4)	17 (16.7)	5 (4.9)
Wrapping of the baby including the head	73 (71.6)	19 (18.6)	10 (9.8)
Incubator/radiant heater/heated cot	63 (61.8)	25 (24.5)	14 (13.7)
Kangaroo mother care	57 (55.9)	29 (28.4)	16 (15.7)
Delayed bathing	54 (52.9)	26 (25.5)	22 (21.6)
Feeding			
Feeding within 1 hour of birth	65 (63.7)	21 (20.6)	16 (15.7)
Exclusive breastfeeding	60 (58.8)	15 (14.7)	27 (26.5)
Infection prevention			
Use of chlorhexidine for cord care	37 (36.3)	43 (42.2)	22 (21.6)

When respondents were asked to state what they would offer as an alternative feeding method for a preterm baby who was unable to breastfeed, the majority said they would do nothing (n=61; 59.8%). Thirteen (32.7%) said they would give expressed breast milk by nasal gastric tube and six (5.8%) by cup and spoon. Others said they would give formula milk (3.9%) or refer to a nutritionist (2.9%), and 2.9% said they would either give glucose water or intravenous fluid. Twelve respondents (11.7%) said they did not know.

Similarly, respondents were asked to state what they would use as an alternative to chlorhexidine for cord care. Thirty-nine respondents said they would use surgical spirit (38.2%) and 37 (36.2%) said they would use nothing. Eight (7.8%) felt the cord stump

should be left alone to dry and seven (6.8%) said they would use salt water/saline. Use of soap and water and iodine each accounted for 2.9%, and eight (7.8%) said they did not know.

These findings show a discrepancy in the implementation of evidence-based interventions among nurses and midwives in Kilifi County. Dissimilarities in the implementation of evidence-based care represents failure to implement evidence-based best practices, which may adversely affect preterm babies' health outcomes (Payne, Finkelstein, Liu, Kaempf, Sharek & Olsen 2010:437-446). Discrepancies may occur between research evidence and clinical practice. These differences may lead to inappropriate use of interventions that are not reinforced by scientific evidence, or inadequate use of interventions that could be favourable (Brok, Greisen, Madsen, Tilma, Faerk, Børch, Garne, Christesen, Stanchev, Jacobsen, Nielsen, Henriksen & Gluud 2008:F225-F229).

4.4.5 Knowledge and practice regarding the care of preterm babies

This study sought to establish nurses' and midwives' knowledge and practice of the care of preterm babies using vignettes. When asked what action they would take if a 34-week-old preterm baby did not cry immediately after delivery, the majority of respondents said they would suction the mouth (n=23; 22.5%) or use a bag and mask to ventilate (n=23; 22.5%). A notable proportion (n=21; 20.6%) said that they did not know what to do. Only 18 (17.6%) gave the best response, which was drying and rubbing the baby gently. In addition, the majority of respondents would give the first bath to a 36-week-old preterm baby after 24 hours (n=48; 47.1%), although almost one-third said soon after birth (n=31; 30.4%). When asked what action they would take when a 25-week-old preterm baby was not able to breastfeed, the majority said that they would insert an oral or nasal gastric tube and give expressed breast milk (n=37; 36.3%). A notable number said that they did not know what to do (n=18; 17.6%).

Fifty-three respondents (52%) stated that would clamp the cord of newly delivered, stable preterm baby soon after delivery, and 30 (29%) reported that they would clamp the cord 2–3 minutes after delivery. Others said after 50 seconds (n=13; 12.7%), after 30 seconds (n=4; 3.9%) or after 5 minutes (n=2; 2%). In terms of knowledge and practice regarding cord care, a majority of respondents said that application of antiseptic cream for cord care

was the best practice (n=33; 32.4%). Others stated they would clean with salt water/saline (n=27; 26.5%), leave it alone to dry (n=21; 20.6%), apply surgical spirit (n=17; 16.7%) or wash with soap and water (2%) (Table 4.6).

Table 4.8 Knowledge and practice regarding care of preterm babies among the nurses and midwives

Characteristic	Frequency (N=102), n (%)
Action to take when a 34-week-old preterm baby does not cry after delivery	
Dry and rub the baby gently	18 (17.6)
Examine and suction the mouth	23 (22.5)
Ensure extra warmth for the baby	17 (16.9)
Use a bag and mask to ventilate	23 (22.5)
Don't know	21 (20.6)
When to give first bath to a 36-week-old preterm baby	
Soon after birth	31 (30.4)
After 2 hours	3 (2.9)
Within 4–6 hours	6 (5.9)
After 24 hours	48 (47.1)
Don't know	14 (13.7)
Action to take when a 25-week-old preterm baby is unable to breastfeed	
Wait for some hours then try again	13 (12.7)
Insert an intravenous line and give fluids	9 (8.8)
Give glucose via cup	16 (15.7)
Insert an oral/nasogastric tube and give expressed breast milk	37 (36.3)
Feed expressed breast milk with a cup	9 (8.8)
Don't know	18 (17.6)
When to clamp the cord after birth of a stable, preterm baby	
Soon after delivery	53 (52)
After 30 seconds	4 (3.9)
After 50 seconds	13 (12.7)
After 2–3 minutes	30 (29.4)
After 5 minutes	2 (2.0)
Best practice for cord care to prevent infection	
Leave it alone to dry	21 (20.6)
Apply surgical spirit	17 (16.7)
Wash with soap and water	2 (2.0)
Apply antiseptic cream/ointment	33 (32.4)
Clean with saline	27 (26.5)
Don't know	2 (2.0)

Table 4.6 highlighted key actionable gaps and revealed heterogeneity in the knowledge and practice regarding the care of preterm babies among nurses and midwives. In a multi-country study to review progress in neonatal survival, Lawn et al (2014:189-205) stated that care of premature babies was principally an action gap, with a 'know-do' gap, or a gap between what is known to work and what is done in practice. Similarly, a study in 19 public and private hospitals in Europe on care of very preterm infants showed that practices were sometimes not consistent with up-to-date scientific evidence (Zeitlin et al 2016:i2976). This included non-use of interventions shown to be safe and effective and practice of others where evidence was limited or there were concerns about safety.

Optimal timing of clamping and cutting the cord has potential to reduce major morbidities and mortality in preterm babies (Knol et al 2018:323; Vento & Lista 2015:151-156). The fact that a majority of respondents indicated that they would clamp the cord immediately after birth shows a gap in implementation of evidence-based practice that supports delayed cord clamping. These findings were similar to those reported by Madhavanprabhakaran et al (2018:1-9), which showed that although most maternity care providers knew about the new guidelines regarding delayed cord clamping, they still practiced early cord clamping.

Only slightly above one-third of the respondents demonstrated correct knowledge regarding the promotion of early initiation of breastfeeding, and slightly above one-quarter did not know how to feed a preterm baby who was unable to breastfeed. In contrast, Vesel et al (2013:e002326) reported that early initiation of breastfeeding was adequate in the health facilities they studied. One-third of the respondents in the present study stated that a stable preterm baby should be bathed soon after birth, which showed a gap in knowledge and practice. A facility-based study in Ghana also showed that delayed bathing was inadequately implemented for births that occurred in health facilities (Vesel et al 2013:e002326). In healthcare, emphasis should be placed on reducing variations in the care of preterm babies, advocating for best care practices (e.g. implementation of evidence-based practice) and adherence to clinical practice guidelines to improve their health outcomes (Kleinpell & Zimmerman 2014:114).

The latest Countdown report taking stock of maternal, newborn and child survival, stressed a significant gap in evidence concerning quality of facility care for newborns, including those that are small and sick, in low- and middle-income countries immediately

after birth and in the postnatal period (Vesel et al 2013:e002326). Evidence obtained from clinical enquiries should be taken to the bedside in an equitable and efficient manner. Regrettably, despite widespread agreement on this point, it does not necessarily cause change of practice at the bedside, where variable and delayed implementation is common. Acknowledgement of the gap that exists has led to a new discipline called 'implementation science' which seeks to understand reasons for slow adoption of clinical interventions and try to discover strategies that may be effective to accelerate change in practice (Weinert & Mann 2008:460-465).

4.4.6 Factors associated with guideline implementation among nurses and midwives in Kilifi County

4.4.6.1 Implementation by demographic factors

Pearson's chi-square tests were used to determine any associations between guideline implementation and respondents' demographic factors. Table 4.9 shows the implementation status in association with each of the factors. More nurses and midwives working in the sampled health centres had implemented the guidelines compared with those in sub-county hospitals and dispensaries. However, there was no significant association between the level of health facility and implementation ($p=0.603$). The findings were similar for professional qualification ($p=0.756$), in-service training in newborn care ($p=0.565$), age ($p=0.333$) and years of experience ($p=0.079$). This study established that there were associations between implementation and gender ($p=0.019$) and scores for knowledge and practice ($p=0.003$).

Table 4.9 Guideline implementation by demographic factors among nurses and midwives in Kilifi County

Variable	Guidelines Implementation			P-value
	Yes (n=75), n (%)	No (n=27), n (%)	Total (N=102), n (%)	
Health facility				
Sub-county	23 (69.7)	10 (30.3)	33 (32.3)	0.603
Health centre	50 (74.6)	17 (25.4)	67 (65.7)	
Dispensary	0 (0.0)	2 (100.0)	2 (2.0)	
Gender				
Female	57(80.3)	14(19.7)	71 (69.6)	0.019
Male	18(58.1)	13(41.9)	31 (30.4)	
Professional qualification				
Registered nurse	59 (72.8)	22 (27.2)	81 (79.4)	0.756
Enrolled nurse	16 (76.2)	5 (23.8)	21 (20.6)	
Level of education				
Certification	15 (71.4)	6 (28.6)	21 (20.6)	
Diploma	58 (73.4)	21 (26.6)	79 (77.4)	0.681
Degree	0 (0.0)	2 (100.0)	2 (2.0)	
In-service newborn training				
Yes	57 (75.0)	19 (25.0)	76 (74.5)	0.565
No	18 (69.2)	8 (30.8)	26 (25.5)	
Mean±SD age	35.9±8.4	37.7±9.3	36.4±8.6	0.333
Mean±SD years of experience	10.5±8.6	14.3±11.6	11.5±9.6	0.079
Score for knowledge and practice				
Poor	10 (45.4)	12 (54.6)	22 (21.6)	
Moderate	37 (80.4)	9 (19.6)	46 (45.1)	0.003
Good	28 (82.4)	6 (17.6)	34 (33.3)	

SD, standard deviation.

Further analysis of each guideline implementation item was performed to show which of the specific sub-components of the guidelines contributed to the significant association of implementation with gender. The proportions were compared using two-sample tests of independent proportions (Table 4.10). The results showed that administration of oxygen (p=0.005), chest compression (p=0.048) and delayed bathing (p=0.001) contributed to the significant association between gender and guideline implementation.

Table 4.10 Components of the implementation by gender among nurses and midwives in Kilifi County

Policy guidelines	Female (n=71), n (%)	Male (n=31), n (%)	P-value
Administration of oxygen	59 (83.1)	17 (54.8)	0.005
Use of bag and mask	57 (80.3)	22 (71.0)	0.581
Chest compression	53 (74.6)	18 (58.1)	0.048
Intubation	13 (18.3)	6 (19.3)	0.878
Immediate drying	56 (78.9)	24 (77.4)	0.293
Wrapping head	53 (74.6)	20 (64.5)	0.100
Incubator/radiant heater	46 (64.8)	17 (54.8)	0.495
Kangaroo mother care	42 (59.1)	15 (48.4)	0.598
Delayed bathing	46 (64.8)	8 (25.8)	0.001
Feeding within 1 hour	47 (66.2)	18 (58.1)	0.324
Exclusive breastfeeding	45 (63.4)	15 (48.4)	0.448
Use of chlorhexidine for cord care	24 (33.8)	13 (41.9)	0.394
Other methods of cord care	41 (57.7)	15 (48.4)	0.407

4.4.6.2 Factors associated with implementation of guidelines among nurses and midwives

Table 4.11 presents the results of the factors associated with guideline implementation among nurses and midwives. The odds of a male implementing the guidelines were 0.28 times less likely compared with females, and this was significantly associated with guideline implementation (odds ratio [OR]=0.28; 95% confidence interval [CI]:0.093–0.822; p=0.021). The odds of nurses and midwives with average knowledge regarding care of preterm babies implementing guidelines were 5.13 times higher compared with those with poor knowledge (OR=5.13; 95% CI:1.522–17.295; p=0.008). Similarly, the odds of nurses and midwives with good knowledge regarding care of preterm babies implementing guidelines were 5.05 times higher compared with those with poor knowledge (OR=5.05; 95% CI:1.319–19.349; p=0.018).

Table 4.11 Factors associated with the implementation of guidelines among nurses and midwives in Kilifi County

Factors	OR	P-value	95% CI
Gender			
Female	Reference		
Male	0.28	0.021	0.093–0.822
Years of experience			
Age	0.93	0.128	0.852–1.020
Professional qualifications	1.04	0.478	0.940–1.143
Registered nurse			
Registered nurse	Reference		
Enrolled nurse	2.18	0.305	0.492–9.645
In-service new-born training			
Yes	Reference		
No	0.55	0.316	0.173–1.761
Health facility			
Sub-county	Reference		
Health centre and dispensary	1.77	0.296	0.607–5.132
Knowledge and practice score			
Poor	Reference		
Average	5.13	0.008	1.522–17.295
Good	5.05	0.018	1.319–19.349

OR, odds ratio; CI, confidence interval

As shown in Table 4.10, several factors were associated with implementation of guidelines concerning cost effective interventions to enhance preterm babies' outcomes. Factors or determinants of guideline implementation may differ by healthcare settings, healthcare professionals and demographic characteristics of caregivers (Colquhoun, Squires, Kolehmainen, Fraser & Grimshaw 2017:30).

4.4.7 Barriers to the implementation of evidence-based interventions

Respondents were asked to state the major barriers to implementation of evidence-based interventions. The major issues highlighted were:

- Inadequate staffing levels in the facilities
- Poor skills in how to care for preterm babies
- Unavailable guidelines
- Limited supplies and equipment

- Lack of or non-functioning equipment
- Lack of understanding of the guidelines
- Ineffective referral systems
- Poor infrastructure
- Fear of changing the old practice
- Lack of space in newborn units
- Lack of refresher training
- Cultural beliefs
- Poor staff motivation

Lack of correct knowledge regarding guidelines has previously been mentioned as a barrier to implementation of best practices to improve care (Stokes, Shaw, Camosso-Stefinovic, Imamura, Kanguru & Hussein 2016:144). From the present results, it was clear that there were major barriers that hindered nurses and midwives implementing evidence-based interventions in the study setting. A recent study by Kleinpell and Zimmerman (2017:437) showed that barriers to implementation included failure of staff to buy-in due to anticipated work/time required for the new intervention, lack of awareness and interest, and concerns about readiness to change. Similarly, a study conducted in Nigeria showed that the main barrier among health providers regarding use of chlorhexidine was the belief that it caused delayed cord separation, thereby interfering with cultural norms (Wright et al 2018:12). These barriers to effective and continuous guideline implementation must be acknowledged and addressed to improve health outcomes for preterm babies (Bick 2012:401-402).

4.4.8 Suggested strategies for ensuring policies/guidelines are implemented

Respondents' views were sought regarding the potential strategies to ensure policies/guidelines are implemented. Some suggested strategies were:

- Motivation of healthcare workers
- Adequate staffing for better staff-to-patient ratios
- Periodic meetings for updates
- Supportive supervision and awards for the best performers
- Regular and timely supplies of essential drugs, equipment and guidelines

- Regular training for nurses and midwives especially on preterm care
- Streamlining the referral system to ensure timely referral of preterm babies to the next level of care
- Clinical audits

These suggestions were supported by Lawn et al (2013b:S5), who indicated that the improvement of health outcomes for preterm babies largely does not require sophisticated technology. Ensuring essential supplies and regular training and support are available for healthcare workers would significantly impact on the outcomes. Ideally, nurses and midwives should be skilled with essential competences and motivated to adhere to evidence-based practices to prevent unnecessary complications among preterm babies (Berglund & Nilsson 2016:230-241). The findings from the present research were comparable with those reported by other researchers who suggested other ways of improving implementation included enhanced and standardised referral systems, community and caregiver sensitisation on guidelines for preterm care (such as early exclusive breastfeeding) and regular maintenance of equipment (Guillén et al 2015:343-350). Similarly, Baker et al (2015:144-150) argued that audit and feedback plus approaches for reminding healthcare workers about the guidelines were mostly effective as strategies to improve implementation.

Another study reported that strategies identified by respondents to address barriers to implementation of evidence-based interventions included monthly meetings to review implementation and plan next steps, use of email and other staff communication methods to provide recent updates and reinforcement by the management team (Kleinpell & Zimmerman 2017:437; Kleinpell & Zimmerman 2014:114). A key strategy to embed effective interventions into routine clinical practice is developing and implementing evidence-based clinical practice guidelines and ensuring implementation support is available from key stakeholders (Stokes et al 2016:144). Findings from studies by Okello and Gilson (2015:16) and Belizán, Bergh, Cilliers, Pattinson and Voce (2011:243) showed that intrinsic motivation among staff was an enabler to implementation.

4.5 CONCLUSION

This chapter provided the analysis and findings of the quantitative data collected, including descriptive and inferential statistics. It demonstrates the results of the availability

of importance resources to support care of preterm babies, the implementation of various interventions, factors associated with implementation and possible barriers and enablers to implementation. The results also show suggested ways of improving implementation.

The next chapter presents a description and analysis of the qualitative findings.

CHAPTER 5

DESCRIPTION AND ANALYSIS OF QUALITATIVE FINDINGS

5.1 INTRODUCTION

This chapter presents a description and analysis of the qualitative data. An outline of the data collection and analysis is presented, followed by the findings from the focus group discussions with nurses and midwives at participating health centres and sub-county hospitals, in-depth interviews with key informants and unstructured observations. The chapter also presents conclusions based on a consideration of these findings.

5.2 DATA COLLECTION AND ANALYSIS

Qualitative data collection can be described as an ongoing and interactive process of making sense of research participants' views and opinions about the topic under study, and corresponding patterns, themes, categories and regular similarities (Sutton & Austin 2015:226-231). Qualitative data were obtained through in-depth interviews, focus group discussions and unstructured observations.

Data collection was shaped by an interview guide that included questions grouped into four categories: the experience of implementing policies/guidelines, enablers to implementation, challenges/barriers to implementation and possible ways to improve implementation.

The data were analysed using a content analysis process, which involved recording data using a digital voice recorder. Notes were taken to serve as a backup for the recordings and provide context for the interviews/focus group discussions. Interview/focus group data were transcribed verbatim by the present researcher with the help of a research assistant.

First, the transcripts and field notes were thoroughly read to obtain an overall and comprehensive impression of the content before the coding process, where names or labels were assigned to specific units identified in the field notes and transcripts. The

transcribed text was then arranged into meaningful themes and categories using NVivo QSR (version 11) for easy organisation, storage and retrieval. NVivo was also used to query and display the relationships between nodes, and create models and charts to visually present the results. As the analysis progressed, further sub-themes and sub-categories were established to identify meaningful connections, relationships and trends (Polit & Beck 2012:9). The codes were finally evaluated for relevance to the research questions. Throughout the data analysis process, themes and relationships between concepts were identified through constant comparison of data.

5.3 RESEARCH RESULTS

5.3.1 Focus group discussions with nurses and midwives

5.3.1.1 Introduction

Focus group discussions were conducted with nurses and midwives working in the maternity units of sub-county hospitals and health centres. These nurses and midwives were conveniently selected to be part of the focus group discussions. All participants signed an informed consent form before the focus group discussion. They were reminded that participation was voluntary and were allowed to withdraw during the session if they so wished. Anonymity was assured throughout the process.

The focus group discussions were guided by semi-structured open-ended questions. The same questions were used with all focus groups, but the order of the questions, exact wording and the type of follow-up questions varied considerably. The semi-structured interview guide used for the focus groups was piloted among midwives working in public maternity units in Nairobi. In the discussions, the researcher explored participating nurses' and midwives' experiences of implementing specific interventions to enhance the care of preterm babies. Most of the focus group discussions were held during lunch time when the majority of participants were available. A few discussions were conducted in the morning before shift hand over and one was held in the late afternoon. Group and across-group saturation was reached after the seventh focus group discussion.

5.3.1.2 Interview process

The discussions took place in selected rooms in each facility. These rooms were away from traffic and had minimal noise, although there were challenges presented by staff and clients going in and out of the interview room. The researcher ensured that informed consent was obtained before the discussions commenced and ground rules were established. These ground rules included: turning off all cell phones and other electronic devices; minimising movements during the session; active participation by all; no need to wait to be called upon to respond — but participants were asked to speak one at a time; everyone's opinion was to be respected; it was alright to disagree with someone else's view in a polite manner; speaking loudly and clearly and confidentiality amongst participants (Annexure J).

The focus group discussions were audio recorded, and each lasted about 45-60 minutes. Field notes were taken by the research assistant, which allowed data to be collected on impressions, environmental contexts, behaviours and nonverbal cues that might not have been adequately captured through audio-recording. These handwritten notes provided important context for interpreting the audio-recorded data and helped remind the researcher of situational factors that may be important during data analysis.

The discussions were conducted in English, but participants were encouraged to use Kiswahili (local language) if they were not comfortable with English. Participants were encouraged to express themselves freely throughout the focus group discussion process. The moderator paid attention to certain group dynamics, such as power struggles and reluctance to state views publicly. The moderator involved all participants to ensure shy and quiet participants were included. Similarly, the moderator respectfully controlled the more dominant participants.

Participants expressed their views freely, and even openly differed in opinions. Their demographic characteristics differed in terms of age and years of experience, but they were homogeneous in terms of socioeconomic characteristics and level of education.

Refreshments were offered to participants. In addition, transport reimbursement was given to participants who were off duty.

5.3.2 Categories of health facilities and number of focus group discussions conducted

Participating health facilities were purposively selected. Facilities with the largest numbers of staff were targeted to ensure numbers were sufficient for the focus group discussions. Table 5.1 presents the selected health facilities.

Table 5.1 Health facility categories and focus groups held in each category

Health facility type	Number	Number of focus groups
Sub-county hospital	3	3
Health centres	4	4
Total	7	7

5.3.3 Findings from the focus group discussions in sub-county hospitals

Three focus group discussions were conducted with nurses and midwives from three sub-county hospitals, one focus group in each purposively selected facility. Data saturation was reached after the third health facility. The facilities were coded as SCH1, SCH2 and SCH3 (Table 5.2).

Table 5.2 Number of focus group participants per sub-county hospital

Sub-county hospital (SCH)	Participants	Number of participants
SCH 1	Nurses and midwives	12
SCH 2	Nurses and midwives	8
SCH 3	Nurses and midwives	11
Total		31

5.3.3.1 Findings from focus group discussions in sub-county hospitals

Four broad themes emerged from these focus group discussions: experiences regarding implementation of interventions, barriers to implementation, enablers to implementation and suggestions to improve the implementation of interventions. Table 5.3 outlines the main themes and subthemes.

Table 5.3 Major themes and sub-themes

Main themes	Sub-themes
Experiences of implementing interventions	<ul style="list-style-type: none">• Resources availability• Knowledge, understanding and practice
Enablers to implementation of interventions	<ul style="list-style-type: none">• In-service training courses• Some guidelines available• Team work and support
Barriers to implementation of interventions	<ul style="list-style-type: none">• Lack medicines, guidelines and equipments• Poor infrastructure• Poor referral system• Low staff-to-patient ratio• Lack of proper skills
Suggestions to improve implementation of interventions	<ul style="list-style-type: none">• Availability of updated guidelines• Improve staffing levels• Continuous medical education• Availability of essential commodities

5.3.3.1.1 Experiences of implementing interventions

A variety of perspectives were expressed by participants regarding their experiences of implementing interventions in the sub-county hospitals. The main subthemes that were identified are discussed below.

- *Resources availability*

Guidelines

A range of responses were elicited from participants regarding the availability of guidelines. According to most participants, guidelines were received from the MOH by the sub-county health team and shared with heads of health facilities.

“We receive guidelines from the Ministry (pause) some are brought (to the health facility) by our facility leader.” (FGD, SCH 1)

“In this health facility, eh...guidelines and policies on evidence-based interventions are received from the Ministry of Health officials.” (FGD, SCH 3)

Participants also reported that some midwives and nurses who attended seminars and updates regarding the guidelines updated the others through continuous medical education (CME), as captured by these excerpts:

“We receive guidelines from the Ministry through seminars. Some are brought (to the health facility) while for some we get them when someone goes for a seminar.” (FGD, SCH1)

“Those who go for seminar come and do a CME by going through what we are supposed to do on that particular amendment although we implement the guidelines through practice.” (FGD, SCH 2)

Some facilities had guidelines in both soft and hard copies. The hard copy guidelines were placed in strategic locations, such as in unlocked cabinets or on notice boards in antenatal care clinics and newborn and maternity units where they were accessible to nurses and midwives for reference. This was reported to have helped nurses and midwives follow the guidelines to enhance outcomes for preterm babies. This was evidenced by the following responses.

“One, we may have a meeting then we share the guidelines. Two, we post them on the walls and those specific areas and areas of jurisdiction.” (FGD, SCH 1)

“They are usually put on boards in the labour ward at a place that some...you can just get the instructions at a glance.” (FGD, SCH 2)

“But then when you go to WhatsApp (social media app) someone like a manager would forward to you the updates and that is it. So the hard copy is not in the facility. Yeah but you have a soft copy.” (FGD, SCH 3)

Some participants observed that sometimes guidelines are available, but not everyone takes time to read them.

“Even here (pause) even here it is just that it's not all of us who have read them up...we know they are there but have not gone through them.” (FGD, SCH 1)

Concern was raised regarding the availability of guidelines by three participants from two different focus group discussions. Interestingly, they were shocked that the policies existed, but they had never seen them in their facilities.

“Sometimes you can hear about an update of something...like I heard about this chlorhexidine thing from a friend...but how do I implement it without the document being in the health facility? How?” (FGD, SCH 2)

“Okay you are just taught how to do it but you are not given the guidelines that, maybe if you are so keen in that you can even take the full course. But we never have those guidelines here...I have never seen them...” (FGD, SCH 3)

“Yes it is true, we do what we think is correct, or what many people do since guidelines are not there...or if you are not sure.” (FGD, SCH 2)

Strikingly, participants from two separate focus groups reported that guidelines were never within reach when they needed to refer to them or update themselves.

“These guidelines used to be on the wall, but after they did painting, I don’t know where they put them.” (FGD, SCH 1)

“You know they are kept somewhere...in a cupboard in the office...just to keep them safe not to get lost. But can be hard to get them when need arises, for sure.” (FGD, SCH 2)

The above responses support findings from a previous study that showed lack of proper guidelines to guide practice among healthcare providers was a bottleneck in delivery of quality healthcare (Dickson et al 2014:438-454).

Equipment and essential drugs

Oxygen machines and incubators were reported as some of the necessary equipment that determined guideline implementation. Some participants reiterated that without the necessary equipment, it was challenging to implement the guidelines, even when available. This was supported by the following responses.

“For instance, if you are taking care of preterm infant after birth, it’s difficult to keep the baby warm without an incubator in the health facility, or even an overhead warmer...very tricky indeed.” (FGD, SCH 3)

“Here we even miss the essential...drugs like Vitamin K and other commodities.” (FGD, SCH 1)

“This facility has oxygen on and off...how do you take care of prematures without oxygen? We refuse to deliver prematures here because of challenges of equipment.” (FGD, SCH 2)

These comments show that availability of equipment and medication was a major problem. Similar findings were found in a study investigating staff experiences in the provision of maternity care in Tanzania, with participants reporting lack of equipment, medications and supplies (Penfold, Shamba, Hanson, Jaribu, Manzi, Marchant, Tanner, Ramsey, Schellenberg & Schellenberg 2013:61).

- *Knowledge, understanding and practice*

Participants were asked how they had implemented the guidelines for four specific interventions in their respective facilities. Various responses were provided by participants, and are presented below for each intervention.

Resuscitation

There were varied views on how resuscitation guidelines were implemented.

Concern was raised by the majority of participants that the guidelines were not clear and therefore not implemented correctly across health facilities in the county.

“I will give you an example of resuscitation of a neonate with asphyxia...I hear different things, some say you don’t suction, others say you start bagging, and others...do nothing, I don’t know for how long. So if I don’t know which is which, if the guideline is not there, then what to do?” (FGD, SCH 2)

“Yes it is true, we do what we think is correct, or what many people do since guidelines are not there...and you don’t understand what it says or if you are not sure.” (FGD, SCH 3)

There was a sense of confusion among the participants as to whether preterm babies should be resuscitated using guidelines for all newborns.

“I think the guidelines I know are not for preterm”, (FGD, SCH 1) “what guidelines are you talking about? (Asking the rest of participants) we only have guidelines for normal newborns.” (FGD, SCH 1)

“...guidelines are the same only that for preterm, you bag differently.” (FGD, SCH 2)

Participants in all three focus groups noted that resuscitation guidelines were implemented together with provision of warmth.

“In that resuscitation guideline sort of a circle, there are guidelines, there are steps. So provision of warmth is among the steps in the in...in fact among the first steps in resuscitation.” (FGD, SCH 2)

Surprisingly, one participant noted that staff members were very competent with resuscitation of a preterm baby.

“So as far as resuscitation is concerned that one we can testify we are very much okay...Very competent, except now for the equipment sometimes.” (FGD, SCH 3)

These responses showed a discrepancy in the implementation of resuscitation guidelines among nurses and midwives. Dissimilarities in the implementation of correct guidelines represent failure to implement evidence-based best practices, which may adversely affect preterm babies’ health outcomes (Payne et al 2010:437-446).

Early feeding of preterm babies

Opinions differed regarding the implementation of early feeding for preterm babies. Some participants alleged to have implemented the guidelines on preterm feeding, as supported by the following quotes.

“All information is in the guideline, yeah. Like feeding a pre-term baby weighing 1 kilo to 1.5 kilograms... (Not audible) what feed it should be and which frequency, and again maybe from which weight should we feed... 1.25 to 1.5 kilos should be at which range or amount of food. So it's all in the guideline and we follow this.” (FGD, SCH 3)

“We have that guideline, how to feed an infant that one which, that big one I don't know how it is called but it called first—infant feeding guidelines that one, we use it to feed prematures.” (FGD, SCH 2)

A variety of perspectives were raised on how preterm infants should be fed, amount of feed, duration and frequency of feeding.

“In this facility we assist the mothers to breastfeed them (Referring to preterm babies) every 3 hours”, “I always give them glucose water first...to avoid hypoglycaemia”, “we feed them every two hours with mother's milk, or formula milk.” Our practice here is to start intravenous fluids for a day or so...” (FGD, SCH 3)

Many participants were concerned that in the event the preterm baby was unable to breastfeed, they faced challenges in deciding what to do to take care of the baby's nutritional needs.

“Sometimes we get those very small prematures who cannot even breastfeed, you know, and you do not know how to feed them, with what especially when the mother has no breast milk.” (FGD, SCH 2)

“Here we do not know how to feed them...it is difficult. We always call the doctor or nutritionist.” (FGD, SCH 2)

Participants noted that feeding guidelines in the facility did not prepare the nurses and midwives to take care of the nutritional needs of preterm babies.

“In fact what we have in the moment they are not clear. They are just, for normal infant feeding but we don’t have an actual guideline that we follow...Yeah.” (FGD, SCH 2)

Overall, the findings pointed to a failure in the implementation of feeding guidelines for preterm babies.

Cord care for infection prevention

There was controversy among participants regarding the best guidelines for cord care to prevent infection. There were differences in responses about whether or not to apply anything on the cord stump. Some nurses and midwives did not have knowledge of the updated guideline for cord care. Consequently, they did what they deemed right, as reflected below.

“Because when you go for the trainings you are told about the updates. Like for the chlorhexidine I heard it in a training but then I’ve never seen the guideline in the facility hence hard to implement.” (FGD, SCH 2)

“There’s a lot of controversy when it comes to cord care. Some say you don’t apply anything, some say use spirit, some say use normal saline, some say nothing. So there’s confusion...yeah you don’t know what to do.” (FGD, SCH 2)

The findings suggested there were gaps in knowledge and practice regarding evidence-based interventions for prevention of cord infection. Similar findings were reported in Nigeria, in a study evaluating chlorhexidine use for the purpose of scaling up its use (Wright et al 2018:12).

5.3.3.1.2 Enablers to implementation of interventions

Frequent training through workshops and seminars on guidelines updates organised by the County Health Management Team was viewed as an efficient way to ensure that nurses and midwives were up to date with the guidelines, and enable them to efficiently

implement the interventions. One such training was “emergency obstetric and neonatal care” (EmONC), which most participants cited as an enabler.

“Course called the EmONC — so as far as those things (referring to guidelines) are concerned everybody is trained in basic requirement during resuscitation and also the steps to follow. Yeah.” (FGD, SCH 2)

Frequent updates on the guidelines through monthly meetings with health facility leaders were also seen as a way of enabling nurses and midwives in the implementation process. Organised Continuous Medical Education (CME), where new updates on guidelines pertaining to management of preterm babies were presented was also reported to be helpful, as described by the following excerpts.

“Yeah, in case there’s any update the in-charges are given then they come offer us the updates. On the same note about updates we also share, because we have a network for our staff here.” (FGD SCH 3)

“Also CMEs have been used as a platform to share updates and to inform each other on the required practices.” (FGD, SCH 2)

Availability of guidelines as soft copies and hard copies on the walls of antenatal rooms, newborn units and delivery rooms were also reported to have helped nurses and midwives follow the guidelines for the care of the preterm babies on resuscitation, feeding and provision of warmth.

“They are usually put on boards in the labour ward at a place that some — you can just get the instructions at a glance.” (FGD, SCH 2)

“But then when you go to WhatsApp someone like a manager would forward to you the updates and that is it. So the hard copy is not in the facility. Yeah but you have a soft copy.” (FGD, SCH 2)

Other responses mentioned in a few focus group discussions included teamwork and support by management; for example,

“There is team work among the staff and management supports us.” (FGD, SCH 3)

These views regarding enablers of implementation of interventions can be compared with the results of a systematic review conducted to identify determinants of implementation. Those authors highlighted enablers such as continuous training, availability of policies and management support (Flottorp, Oxman, Krause, Musila, Wensing, Godycki-Cwirko, Baker & Eccles 2013:35-35).

5.3.3.1.3 *Barriers in implementing guidelines*

Participants highlighted several challenges that made it difficult for them to implement the evidence-based interventions. These findings are presented below.

- *Availability of equipment and essential medicine supply*

A notable challenge was the supply of essential medicines and equipment in health facilities. Participants noted that the delay in the procurement of drugs and the absence of basic equipment were challenges to guideline implementation. The equipment available was also not adequate to meet the demands of preterm babies.

“Sometimes we have oxygen that runs out. We only have one resuscitaire. And there can be two that need to be resuscitated so it becomes also a challenge.” (FGD, SCH 1)

“And in other cases we have no oxygen for example. So there are quite some challenges.” (FGD, SCH 2)

“We know the updates but we don’t have the, let me say the resources or the drug but we know of chlorhexidine ointment but we’ve never seen it.” (FGD, SCH 2)

Some facilities had non-functional equipment, such as oxygen concentrators and heaters, rendering staff unable to take care of preterm babies as per the guidelines.

“Like for us, currently our oxygen cylinder is not functioning. So when you get an infant, a preterm infant, who needs oxygen, it becomes a challenge for us to attend to that neonate. And for that matter we refer.” (FGD, SCH 2)

Lack of equipment was viewed as a deterrent to correctly implementing the guidelines, as reflected in the statement below.

“Practice on what is in the guidelines; some are not implemented correctly due to lack of some of the equipment like heaters or incubators.” (FGD, SCH 2)

There was also concern about broken down equipment being sent for repair but not returned on time.

“Yes and in fact, equipment like suction machines go for repair and might not come, it can take forever until someone is sent to get it...that is if they have repaired it.” (FGD, SCH 2)

A common view among participants was that although some facilities had newborn units (NBUs), they lacked necessary equipment, which made them more like observation rooms.

“To be honest with you, our NBU is only a name...it lacks necessary equipment to be able to take care of these preterm babies, such a pity.” (FGD, SCH 2)

“We do have an NBU, which is not really an NBU it's more of an observation room you know because we lack the basic equipment.” (FGD SCH 2)

These findings highlighted some important barriers to implementation of interventions to improve outcomes for preterm babies. The results were consistent with other findings that suggested addressing barriers to implementation (e.g. lack of equipment, essential supplies and medications) to improve utilisation of evidence-based care (Colquhoun et al 2017:30). Similarly, another study reported that a typical NBU at a community hospital in Africa was staffed by dedicated clinicians but lacked even the most basic medical technology, such as oxygen concentrators or radiant warmers (Richards-Kortum 2017:39).

- *Infrastructure*

Lack of space and proper infrastructure in maternity units was also seen as a challenge for implementing interventions. This forced nurses to refer preterm babies to the county referral hospital.

“Space is not enough. We can only accommodate five incubators and we have several preterm babies, more than eight most of the time. Sometimes we exceed the number that an incubator can accommodate, which is a challenge when it comes to infection prevention.” (FGD, SCH 2)

“Because we don’t have a neonatal unit, a preterm unit even, it is difficult to handle preterm, we have to refer.” (FGD, SCH 3)

These findings were consistent with a systematic review that investigated qualitative evidence regarding barriers to implementation of obstetric practices; those authors argued that lack of proper infrastructure was a major deterrent (Stokes et al 2016:144).

- *Staffing and skills*

The inadequate number of skilled nurses and midwives was recounted as a challenge because staff was overwhelmed by multitasking when left alone on duty, making it a challenge to handle preterm cases.

“Another challenge I can say is staffing. Sometimes especially in the afternoons once everybody else leaves the facility. It’s only one nurse in the afternoon shift between 4:30 or 7:00 PM. So if a situation like that gets to, at around that time it’s not that easy to deal with it.” (FGD, SCH 2)

“The other thing is just very rare to get a, okay we don’t try to deliver preterm babies even when a mother comes in preterm labour, most of the times, we refer quickly because of shortage.” (FGD, SCH 1)

Lack of skilled staff, especially in the neonatal unit, was reported to be a challenge to implementing the guidelines. Some facilities did not have specialist nurses for neonatal

units and lacked specialised medical doctors such as paediatricians and neonatologists. This presented a major a challenge in implementing the guidelines.

“The other thing I can say is skills is a challenge, because we are not trained to handle prematures, you know...and even to get even paediatrician or paediatric nurses, they are only in the county hospital. It’s just the basic nurses and midwives that we have here.” (FGD, SCH 2)

“Here, some of us have to call the county to for instructions like...Check sugars, give glucose etc. because we do not know what to do. We are not trained to handle these little things...(Laughs).” (FGD, SCH 2)

These findings highlight a paucity of required skills among nurses and midwives. According to the WHO (2015), preterm and low-birth-weight babies must be identified soon after birth and should be given specialised care by skillful health providers as per current guidelines.

- *Referral system*

There was no formal way of referring preterm babies to higher level facilities. The majority of participants reported challenges during referral because receiving facilities were reluctant to receive the preterm babies because of limited space in NBUs.

“Again there is no agreed way on how we should refer the preterm infants...we sometimes do what we think, but you know you can be questioned why you didn’t do this and that.” (FGD, SCH 3)

“The other big challenge is the referring these preterm babies. Sometimes hospitals just refuse to receive them...you know, can be frustrating.” (FGD, SCH 2)

Nurses were also concerned about transport services during the referral process because the ambulance was often not available for emergency referral, had no fuel or was broken down. This delayed the transfer process and threatened the survival of pre-term babies.

“Sometimes there’s a breakdown of the ambulance so you are expected to call it from very far. So if that referral system is not strengthened, then...” (FGD, SCH 2)

The findings from this study suggested a need to improve the referral system. Similar sentiments were echoed by participants in a previous study conducted in Kenya that showed the referral system was a bottleneck in improving newborn survival (Charles, Stephen, John, Jackline, Aggrey, Fred, Annah, Santau, Grace & Mike 2009:1165-1172).

5.3.3.1.4 *Suggestions to improve implementation of interventions*

Participants proposed a number of solutions to make guideline implementation more effective (Table 5.4).

Table 5.4 Suggestions for improving guideline implementation

Suggestion	Excerpt
Availability of the necessary infrastructure and supplies	<p>“If you get the, let’s say the drugs, supplies and equipment, I think some of the things it can easily be implemented rather than modifications, some things you have to do like what it’s supposed to be.”</p> <p>“We need like a new-born unit with all that equipment from resuscitaire, continuous supply of oxygen, all the medication in there and everything.”</p>
Improved staffing ratios and skills	<p>“Staffing is a big issue. I wish we could have more nurses and midwives who are specifically dealing with maternity cases they’ll have a good time with them. Yeah, they’ll...”</p> <p>“We do not have neonatal nurses or a paediatrician, this can be helpful.”</p>
Continuous updates and continuous medical education (CME)	<p>“I think we can improve by doing CME for continuous updates and create job aids of the same according to the guidelines.”</p> <p>“So I think maybe some refresher courses or CME are important for the midwives and even the clients.”</p>

Similar suggestions were highlighted in a previous study, including sustained investment in training and monitoring health worker skills, improving health workforce numbers and supply of context-specific commodities (Kinney et al 2015:326-337).

5.3.3.1.5 Conclusion

In summary, the findings from the focus groups held in sub-county hospitals provided insights into participants' views regarding implementation of interventions as well as barriers and enablers to guideline implementation. Although guidelines to enhance outcomes for preterm babies were available and implemented in some sub-county hospitals, there were major gaps in availability and implementation in other facilities.

5.3.3.2 Findings from focus groups with nurses and midwives from health centres

Four focus group discussions were conducted with nurses and midwives from four health centres; one focus group was held in each health centre. The health centres were selected purposively depending on the staffing level, and coded as HC1, HC2, HC3 and HC4 (Table 5.5).

Table 5.5 Number of focus group participants per health centre

Health centre (HC)	Participants	Number of participants
HC 1	Nurses and midwives	6
HC 2	Nurses and midwives	8
HC 3	Nurses and midwives	11
HC 4	Nurses and midwives	6
Total		31

Four broad themes emerged from these focus groups related to the research questions: experience of implementing interventions, barriers to implementation, enablers to implementation and suggestions to improve the implementation of interventions. Table 5.6 outlines the main themes and subthemes.

Table 5.6 Main themes and subthemes identified from the focus groups in health centres

Main themes	Sub-themes
Experiences of implementing interventions	<ul style="list-style-type: none"> • Resources availability • Knowledge, understanding and practice regarding interventions • Level of involvement in the process of guidelines/policies change or formulation
Enablers to implementation of interventions	<ul style="list-style-type: none"> • In-service training courses • Continuing medical education • Team work
Barriers to implementation of interventions	<ul style="list-style-type: none"> • Poor Infrastructure • Lack of some guidelines • Poor referral system • Low staff-to-patient ratio • Lack of skills/recognition of preterm
Suggestions to improve implementation of interventions	<ul style="list-style-type: none"> • Availability of updated guidelines • Improve staffing levels • Continuing medical education • Availability of essential commodities

5.3.3.2.1 Experiences of implementing interventions

- *Resources availability*

Guidelines

A majority of participants reported that they rarely received guidelines, and relied on being told what to do in cases of revised or new guidelines. They further noted that for a long period of time, they had not seen copies of the guidelines.

“I will give you an example of resuscitation of a preterm with asphyxia...I hear different things, some say you don’t suction, others say you start bagging, and others...do nothing, I don’t know for how long. So if I don’t know which is which, if the guideline is not there, then what to do?” (FGD, HC 1)

“Not always, if they are always available we would not complain. If they are not there we cannot lie and say we have them.” (FGD, HC 4)

These views were echoed by other participants as follows.

“Some of these guidelines (I) am hearing of them today...like delaying the cutting of cord...honestly am hearing first time from you.” (FGD, HC 2)

“Surely, some things about these interventions and guidelines (I) am hearing them now...we must be behind news...” (FGD, HC 3)

In contrast, participants in two focus groups stated that the guidelines were usually made available by the health facility head.

“Our department’s heads bring these guidelines to us once they are out.” (FGD, HC 2)

“We are always updated with the new guidelines as our leaders avail them to us, like the chlorhexidine guideline, which is in soft copy.” (FGD, HC 1)

These comments showed there were disparities in the availability of guidelines to support preterm care. A study conducted in India also indicated that lack of current guidelines for newborn care deterred healthcare providers from providing quality newborn care (Malhotra, Zodpey, Vidyasagaran, Sharma, Raj, Neogi, Pathak & Saraf 2014:130-141). Similarly, a study in Malawi that investigated the availability of protocols and guidelines for care of preterm babies found that healthcare providers faced numerous challenges in caring for preterm babies, including shortage of staff trained in preterm infant care, lack of medications, space, supervision and inefficient referral systems (Gondwe et al 2016:1441-1447).

Equipment and medications

All participants had similar opinions about the availability of equipment and medications used for the care of preterm babies, and agreed that most of the time, important equipment and medications were lacking. This is captured by the following excerpts.

“In some cases preterm babies might need oxygen while, you know...during transfer then we have masks in the ambulance but sometimes no oxygen.” (FGD, HC 1)

“Here, most of the times, I mean, for months now, we don’t have something to keep baby warm, a heater.” (FGD, HC 2)

“As at recently, we got some few tubes of chlorhexidine, but now they are out of stock. So we just refer the preterm since most of the time the warmer and oxygen concentrator are not working.” (FGD, HC 3)

“Most of the times we have oxygen that runs out, lack of vitamin K also at times.” (FGD, HC 4)

“And also on the drugs, we don’t have much control you know, you can order and they are never there.” (FGD, HC 1)

The most notable finding was from one participant who stated in desperation that,

“It is even useless to talk about these equipments...(Laughter), we sing the same song, very little is sorted, for years now.” (FGD, HC 2)

These findings raise concerns regarding availability of equipment and medications to support the care of preterm babies, especially as none of the participants indicated that they were available. A previous study that explored the experience of provision of maternity care in Tanzania indicated that provision of evidenced-based care was compounded by lack of proper equipment and essential medications (Penfold et al 2013:61).

- *Knowledge, understanding and practice*

Views regarding the knowledge and practice of four interventions to improve quality of care for preterm babies through guidelines were sought from participants. Their views are presented below for each guideline.

Early feeding of preterm babies

A variety of perspectives were raised concerning feeding of preterm babies. Different views were voiced in regard to feeding or not feeding, timing of the feeding, type of feed, amount and frequency as stated below.

“We do not feed preterm babies at all...you leave them. It is risky to feed them soon after birth.” (FGD, HC 3)

“These prematures, you have to be careful and feed them immediately...blood sugars can drop.” (FGD, HC 2)

“I know here we feed them with glucose first, about few spoons, then...you observe and see.” (FGD, HC 1)

“The best thing would be to give intravenous infusion but surely I am not sure, may be fix a nasal gastric tube and give a little formula.” (FGD, HC 4)

“Some we encourage the mother to breastfeed, especially the bigger ones then the small ones you do nothing, refer.” (FGD, HC 3)

Some participants noted that they relied on guidance from staff working at higher-level facilities.

“So first we do the blood sugar levels then, they (referral facility) will tell you how much glucose you are going to give the baby.” (FGD, HC 1)

“Here when we get these preterm babies, we call our referral hospital for instructions on what to use for feeding...but we can give glucose as we wait.” (FGD, HC 3)

Variations in participants' views regarding feeding of preterm babies highlighted gaps in understanding and practice regarding preterm care. These findings were consistent with a study by Lawn et al (2013b:S5), who found that guidelines on feeding of preterm babies exist but were not followed consistently across the continents.

Cord care to prevent neonatal infections

Significant differences were revealed in participants' views regarding care of the cord to prevent infections. The majority stated that although they had heard about the guidelines regarding chlorhexidine being the best practice, they continued using other methods because chlorhexidine was never available in the facilities.

“Here, I mean...in the facility, we use soap and water to clean the cord. On discharge, we advise mothers not to apply anything on it. We have never been supplied with chlorhexidine.” (FGD, HC 4)

“In the facility basically we just use saline, we apply the saline, yes. Yeah we have never seen that cream (Chlorhexidine).” (FGD, HC 1)

Two participants from different groups believed chlorhexidine was not superior to other methods of cord care, with one participant stating that,

“What I have noticed is that when you use (chlorhexidine) is, the cord does not fall fast”, and “You know, the truth is we don’t even worry to get it since we have seen it delays drying of the stump.”

A minority of participants did not seem to know the best practice for cord care, as evidenced by the comments below.

“For me it is just a concern about cord care. Okay it’s like we don’t know what the right thing to do is.” (FGD, HC 3)

“We need to know the best thing to do other all of us doing things differently.” (FGD, HC 2)

Interestingly, two participants from different groups had views that the mothers sometimes decide what was to be used on their babies’ cord stumps. One stated,

“These mothers come to give birth and already have decided what to apply on the cord (laughter) you cannot change their mind.”

Another commented that,

“We usually do not apply anything on the cord, the mothers already know what they want, especially, when it’s not first time.”

Findings regarding the use of chlorhexidine in health centres highlighted gaps in the implementation of the guidelines. These findings corroborate those of a study conducted in Nigeria to assess the use of chlorhexidine (Wright et al 2018:12), which found that the current evidence was not implemented as health facilities did not stock chlorhexidine and others felt it was no better than alcohol.

Provision of warmth

Participants' comments indicated that provision of warmth was generally implemented, with most describing ways of thermal care without use of sophisticated technology.

"We use mothers' clothes to wrap the preterm babies to hypothermia since we have no incubators...this is all we can do. We make sure to cover even the head."
(FGD, HC 4)

"So we do our best to provide warmth to this child with the available resources. Especially we have to use mother's "lesos" (women's wraps) and some of them have very few pieces of "lesos." (FGD, HC 3)

Participants commented that they were assisting mothers to use KMC when applicable:

"We always convince them to keep their preterm on skin to skin contact." (FGD, HC 2)

"For the preterm babies weighing especially less than 2 kilograms, we encourage the mothers to do kangaroo mother care, even after discharge." (FGD, HC 1)

These positive findings differed from the results of a study conducted in India where most healthcare providers did not practice optimal thermal care for preterm babies (Malhotra et al 2014:130-141).

Resuscitation of preterm babies

Participants' views revealed inconsistencies regarding knowledge and practice of resuscitation. Participants unanimously agreed that although they had been trained on EmONC, the course did not prepare them well enough to resuscitate preterm babies.

"I must say that as much as most of us did the EmONC course, we do not feel fully prepared to resuscitate these preterm infants." (FGD, HC 3)

"No, you know this pre-term we cannot even attempt anything apart from bagging, because we are not even prepared to resuscitate, and then we cannot follow the EmONC guidelines..." (FGD, HC 1)

"I do not even remember them telling us how to resuscitate a preterm baby." (FGD, HC 2)

Other participants expressed concern that they were not sure if guidelines were available on resuscitating a preterm infant and the process. For example, one participant noted that,

"I do not think I even know how the resuscitation should flow...bag, suction...or suction, then bag...I don't know."

Another participant stated,

"Honestly, I cannot remember the process, are we supposed to suction and bag them? And at what stage?"

The issue of whether to use medication during resuscitation also arose.

"...so managing a preterm during resuscitation, for sure it becomes an issue whether to give drugs or not probably you've forgotten." (FGD, HC1)

"But according to my understanding when doing resuscitation for a pre-term we are not to giving any drug, we only resuscitate to provide warmth we give oxygen and then suction." (FGD, HC 3)

“Because we are told during resuscitation you are not supposed to give any drug.”
(FGD, HC 4)

Overall, these findings denoted a lack of implementation of evidence-based interventions. A study conducted in Malawi to examine knowledge and practice regarding care of preterm babies reported that although healthcare providers highlighted breathing difficulties as the common problem and challenge among preterm babies, they did not know how to resuscitate the baby (Robb-McCord 2017:28).

- *Level of involvement*

Concerns were raised by a majority of participants regarding involvement in the process of changes to guidelines.

“Here... (Pause) we never get to know how things about guidelines are changed. We are told you know, this is the new protocol to follow from now.” (FGD, HC 2)

In my opinion, the important thing is not only to bring the updated guidelines to our facilities. Someone needs to tell us why this new way is better...in details so that we follow.” (FGD, HC 1)

“I think it is good for us in the facilities to have a hint of what is happening before the guidelines are brought and are told...here is the latest guideline to follow.”
(FGD, HC 2)

A participant from one group offered a different view.

“Sometimes...back I remember a time we were called to a seminar, then they told us this guideline was to change, can't remember which one but yes, they did tell us.” (FGD, HC 4)

These results suggest that involvement in the revision of guidelines was lacking in the health centres, and updated guidelines were only available for implementation (with the exception of one participant, who indicated the opposite). As cited in Baker et al

(2015:144-150), a “top down” approach to implementation of guidelines is not uncommon and may contribute to reduced motivation by staff to affect change.

5.3.3.2.2 Enablers to implementation

Participants were asked about their views regarding what they considered as facilitators to implementation of preterm care guidelines. Some participants mentioned facilitators such as courses on neonatal care and CME.

“A course called the EmONC—so as far as those things are concerned everybody is trained in basic requirement during resuscitation and also the steps to follow.” (FGD, HC 2)

“We do CME in as much as they are not about midwifery we update and another on other issues.” (FGD, HC 2)

Other participants noted the availability of some of the guidelines.

“But also we have a hard copy like for example that manual for our kangaroo baby care, we have it in our cupboard here. So if somebody wants to refresh he just goes to the cupboard and have that poster.” (FGD, HC 2)

Some participants also appreciated the spirit of teamwork.

“Here, what saves us is team work; otherwise we would not manage.” (FGD, HC 2)

A systematic review of the effectiveness of training in emergency obstetric care (Van Lonkhuijzen, Dijkman, Van Roosmalen, Zeeman & Scherpbier 2010:777-787) noted that emergency training courses are likely to improve quality of care, but the evidence was not strong. Similarly, Okello and Gilson (2015:16) noted that the availability of protocols improved implementation.

5.3.3.2.3 Barriers to implementation of interventions

When participants were asked about perceived barriers to implementation of evidence-based interventions, they gave various responses (Table 5.7).

Table 5.7 Perceived barriers to implementation

Type of barrier	Excerpt
<p>Lack of equipment</p> <p>Delay repair of equipment</p>	<p>“And in other cases we have no oxygen for example.”</p> <p>“...my challenge was — okay you will need many clothes to keep them until you reach the next hospital since we have no heater.”</p> <p>“Sometimes we have a problem with the resuscitaire like that one in theatre. You’ve gone to get it but sometimes it is not working.”</p> <p>“Like our suction machine broke down several months ago, and you know what they do, they carry it to...for repair and it takes forever...”</p> <p>“This suction machine has been lying here for months without repair.”</p>
<p>Lack of medication</p>	<p>“Even a cheap drug like TOE (tetracycline eye ointment) is missing.”</p> <p>“Sometimes vitamin K goes out of stock so refer them to another facility.”</p>
<p>Unreliable ambulance services</p>	<p>“And sometimes maybe like most of the times like ambulance, there’s no ambulance, I have to organise for private units. So those are some of the challenges.”</p> <p>“When you call for that ambulance you really have to wait so, for long. Sometimes it happens that you may lose the infant because of waiting, yeah.”</p>
<p>Challenges related to clients</p>	<p>“Generally most of the times we have mothers who come without having attended any antenatal clinic. And it is a challenge because you don’t know the investigations done, you just diagnose the mother is in labour at second stage.”</p> <p>“In other instances we have mothers with pre-term babies and you explain the referral system, you want to refer them so that the baby can be in the right hands but they decline.”</p> <p>“They decline to go. So like you tell her the importance of going to the higher level facility but she does not understand and prefers to go home?”</p>

Type of barrier	Excerpt
Skills in care of preterm babies	<p>“Mostly we go by what mothers tell us, no ultrasound here, sometimes you palpate but you are not sure what you feel...”</p> <p>“The diagnosis...it depends, we use the Last Menstrual Period, we also palpate because sometimes the mothers may not be very certain and sure of the LMP but it is a real challenge.”</p> <p>“We don’t even have the knowledge and skills to take care of these babies.”</p> <p>“Most of us here, we have real challenges in competencies for caring for these prematures.”</p>
Lack of space	<p>“No space for taking care of the preterm babies, it is unfortunate.”</p> <p>“Maybe I can talk of sometimes the place is congested so much congested and of course that should also be taken into consideration before we even talk about implementation.”</p>
Ineffective referral system	<p>“I think we need a clear protocol on how to refer them.”</p> <p>“Referral system many of the times it is frustrating, something needs to be done.”</p>
Staff shortage	<p>“Sometimes you take the baby for referral, you leave the unit with nobody. Imagine, maybe with support staff only...”</p> <p>“Most of the times, we work one person per shift, only two in the night, so if one falls sick...you know?”</p>
Lack managerial support	<p>“They (County Management Team) need to visit us regularly and see how they can support the people on the ground, the issues we have.”</p>

These responses described various challenges respondents faced during the implementation of interventions to improve preterm outcomes. A study conducted in eight referral health facilities in Kenya (Charles et al 2009:1165-1172) revealed that staffing was inadequate and at times poorly organised to support the delivery of care of newborns; some important equipment, drugs and consumables were lacking. Those authors also reported a lack of patient management protocols and support from management. Findings from a study conducted in Malawi (Gondwe et al 2016:1441-1447) highlighted that improving the knowledge of healthcare service providers regarding preterm baby care is a vital part of preterm child health.

5.3.3.2.4 Suggestions to improve guideline implementation

Most suggestions to improve implementation focused on the challenges the participants had voiced. Common suggestions included:

- Improved staffing ratio
- More training and updates in preterm care
- Availability of guidelines, equipment and essential medicines
- Improve infrastructure
- Steady supply of supplies
- Streamline referral systems
- Reliable ambulance services
- Support supervision and clinical audits
- Continuous updates on the policies and guidelines

5.3.3.3 Summary of findings from the focus groups

Comparing the findings of the focus groups with nurses and midwives from sub-county hospitals and health centres highlighted similarities and differences. Participants from all the groups aired their dissatisfaction with the availability of protocols and guidelines to manage the preterm babies. However, this issue seemed to affect the health centres more than the sub-county hospitals. A cross sectional study conducted in Burundi that investigated low-tech high-impact interventions implemented in a health facility, noted that providing neonatal care for preterm babies was practicable at a level-three hospital in a resource-limited setting in Africa (Ndelema, Van den Bergh, Manzi, Van den Boogaard, Kosgei, Zuniga, Juvenal & Reid 2016:28). Concerning the knowledge and practice of interventions to improve outcomes for preterm babies, comments from many participants indicated guideline implementation was better in the sub-county health facilities compared with the health centres. However, overall, the findings suggested a gap in implementation. Another study that evaluated use of evidence-based practice to improve outcomes for preterm babies found there were variations in implementation across countries and health facilities that may reflect suboptimal use of evidence-based care (Zeitlin et al 2016:i2976).

The findings from both the sub-county hospitals and health centres highlighted determinants of implementation that included tackling the barriers and ensuring enablers

to implementing evidence-based practices. Similar findings were revealed in the previous study that assessed the rates of survival of preterm babies using low-tech high-impact interventions (Ndelema et al 2016:28). That study indicated that high level of survival can be attained with staff training, standardised guidelines and protocols, availability of simple essential equipment and medications, and provision of neonatal intensive care and KMC units.

In summary, the findings from the focus group discussions provided useful insights regarding use of evidence-based interventions to enhance the outcomes for preterm babies in Kenya.

5.3.4 In-depth Interviews with key stakeholders

5.3.4.1 Introduction

In-depth interviews were conducted with purposely selected key informants. Seven key persons were chosen from a diverse set of representatives: two reproductive health coordinators; two maternity unit heads; one county public health nurse; and two medical officers in charge of health facilities. These participants were believed to have first-hand information regarding the issue under investigation, and their information was believed to increase the credibility of this study. A key informant is an individual (or group of persons) who has distinctive skills or professional experience related to the subject/intervention being evaluated, is informed about the project participants or has access to other information of interest to the assessor. It can also be someone who has a way of communicating that represents or captures the essence of what the participants say and do (Ivankova & Greer 2015:63-81). In this study, the key informants helped the researcher to better understand guideline implementation, as well as the behaviours and attitudes of nurses and midwives regarding evidence-based interventions to enhance health outcomes for preterm babies.

5.3.4.2 Interview process

Participants were interviewed face-to-face, and could schedule a convenient time and place for the interview. Each interview lasted 20-30 minutes. Key questions were designed to elicit more revealing information about the implementation of guidelines to enhance health outcomes for preterm babies. These questions covered: how guidelines and policies were disseminated; perceptions of the implementation of guidelines; and support to ensure implementation. The interview questions were open-ended. The same questions were used with all key informants, but the order of the questions, exact wording and the type of follow-up questions might have differed among participants. The researcher used a degree of systematisation in questioning to help uncover participant's views, but otherwise respected how participants framed and structured their responses.

Confidentiality and anonymity were maintained. Participants were informed that their names or any other potentially identifying information (such as title and organisation) would not be used. They were assured that their responses would be kept confidential — the results would focus on the content of the discussion rather than identifying who said what. This helped to encourage them to participate, and made them more comfortable and willing to openly share their opinions about the topic.

5.3.4.3 Findings from the in-depth interviews

The findings from the key informants are represented as themes and sub-themes (Table 5.8). Participants were coded IDI 1 to IDI 7 to preserve their anonymity.

Table 5.8 Major themes and sub-themes

Main themes	Sub-themes
Dissemination	<ul style="list-style-type: none">• Process of dissemination• Availability of guidelines
Perception regarding implementation	<ul style="list-style-type: none">• Ability to implement• Possible challenges
Perceived barriers to implementation	<ul style="list-style-type: none">• Resources• Lack of buy in• Referral
Supportive role in implementation	<ul style="list-style-type: none">• In-service trainings• New-born units in some hospitals

5.3.4.3.1 *Dissemination of guidelines and policies*

- *Process of dissemination*

Participants reported that guidelines were disseminated to nurses and midwives from the MOH through the county government. They were distributed to health facilities as soon they were available. This was reflected in the statements.

“Most of the time the guidelines and policies are disseminated from the county reproductive health office, sometimes we can also get them from the national office.” (IDI 7)

“We normally get them from the county during dissemination meetings and in case of any management meetings. In case there are some new guidelines that’s when we receive them. We also have monthly meetings, where updates are given... This is usually from the Ministry of Health officials from the reproductive health department.” (IDI 1)

Some participants indicated that email was another way of disseminating the guidelines to key leaders in reproductive health.

The new and updated guidelines are sometimes sent to us through email and then we share with the respective facilities as we follow-up the hard copies.” (IDI 6)

Some participants noted with concern that the process of dissemination was not always straightforward and this resulted in delay, as reflected below.

“We sometimes face challenges on dissemination, especially when sometimes we hear informally that some guidelines have changed. Then you want to follow up and share with the care providers and you are told to wait... sometimes the waiting can be too long.” (IDI 2)

“The department of reproductive sometimes will tell us has something new, they...we are looking for a donor to support us so that we can have a workshop for dissemination.” (IDI 4)

- *Guidelines availability*

A majority of participants indicated that most current guidelines were available in the clinical areas, and nurses and midwives could always refer to them.

Infant feeding protocols have been given...disseminated to the nurses and midwives in maternity unit so they can refer to them.” (IDI 5)

“I can give you an example of some of the guidelines, for example, we have a paediatric protocol; yeah we have a paediatric protocol that actually headsets and yeah especially we call it the “Integrated Management of Childhood Illnesses.” So it gives guidance on issues of newborn and infant feeding.” (IDI 3)

One participant noted that guidelines on provision of warmth were more often disseminated in most health facilities compared with other guidelines for care of preterm babies as stated below.

“For example the guidelines on provision of warmth or warm chain guidelines, I do not think there is a facility that does not have them. We disseminated them recently from the Ministry of Health.” (IDI 6)

One participant stated that the most guidelines were disseminated verbally in meetings, but hard or soft copies could take longer to be distributed to their respective health facilities.

“To get a hard copy or soft copy can take a long period of time, and you know in the health facilities this is what they want to see, for reference...not just word of mouth through seminars.” (IDI 7)

“The staff want something they can see and refer to from time to time...when hard copies are not available, we feel this is not well disseminated.” (IDI 3)

Interestingly, one participant reported that current guidelines regarding use of chlorhexidine had not been disseminated, and they had not been given information about the guideline, as reflected in the excerpt below.

“You know actually to be specific I’ve never seen that guideline, (guideline on use of chlorhexidine) I don’t know if there’s actually a book called guideline on whatever you are saying...the nurses and midwives are not aware.” (IDI1)

This was supported by another participant who stated that:

“Not all guidelines are available to us and I believe the reproductive health office needs to do much more for us to be able to support the nurses and midwives who are taking care of these preterm babies. For example, chlorhexidine guidelines have not trickled to some lower facilities.” (IDI 4)

The findings regarding dissemination of evidence-based guideline to support preterm newborns showed that there were gaps in the process of dissemination and availability of some guidelines. If the guidelines were not disseminated on time and available in the health facilities, there was delay in using the best evidence when caring for preterm babies. This was consistent with a systematic review conducted to assess strategies for the implementation of guidelines in low-and middle-income countries. Those authors reported that for an implementation strategy to work, the dissemination process should be seamless and availability of guidelines be ensured (Stokes et al 2016:144). Similarly, Kinney et al (2015:326-337) evaluated progress in the implementation of guidelines related to care of newborns in 18 countries with high neonatal mortality. They reported that progress will only be made if there is sustained investment in dissemination of current guidelines (Kinney et al 2015:326-337).

5.3.4.3.2 *Perceptions regarding implementation of the guidelines and policies*

Key informants’ views were sought regarding their perceptions of how nurses and midwives had implemented four specific evidence-based interventions to improve preterm babies’ outcomes.

- *Resuscitation*

Varied responses were noted regarding the implementation and institutionalisation of resuscitation guidelines. Issues related to guidelines being unclear and therefore not

consistently implemented were raised by two participants. Their views are reflected as follows.

“Resuscitation guidelines to me are not very clear on handling a preterm baby who needs resuscitation, so I presume the staffs have problems with the same.” (IDI 4)

“Personally, I think the guidelines should be clearer on preterm resuscitation, they say they have problem implementing resuscitation guidelines of preterm.” (IDI 5)

Two other participants felt that resuscitation of a preterm baby was not easy compared with a mature infant, and related this to nurses’ and midwives’ fear of even attempting to resuscitate.

“From what they say, with or without guidelines the resuscitation of the preterm infant is tricky hence not easy to implement, one needs extra skills.” (IDI 1)

“Yes guidelines implementation also has challenges since they say it is tricky to resuscitate a preterm infant.” (IDI 7)

Another participant was of the opinion that nurses and midwives did not embrace change regarding the new evidence available; therefore, it was hard to implement new guidelines.

“Sometimes I think it is just that they do not want to embrace change, they do not want to change from old guidelines that have since changed.” (IDI 5)

Similar views were echoed by another participant, who noted that even though guidelines on resuscitation had been disseminated, some nurses and midwives did not follow them.

“The guidelines for resuscitation are very clear regarding preterm babies, you know, that if the preterm is stable, no hurry to cut the umbilical cord and wait for about a minute...But they will always rush to cut...not sure what the problem is.” (IDI 1)

- *Warmth provision*

Most participants reported that guidelines on promotion of warmth for infants had been well implemented in most health facilities. This is reflected in the comments below.

“Our staff follows these guidelines, or the steps in the warmth chain guideline.” (IDI 1)

“Provision of warmth is implemented as warmth chain guideline...in fact among the first steps in newborn care.” (IDI 7)

“For sure, basically I think the main things that they are able to do is to provide warmth to these infants.” (IDI 3)

Two participants held different views, as indicated in their responses.

“Provision of warmth as much as guidelines are available, it can be a challenge to preterm babies when some of our facilities do not have radiant warmers and incubators hence not implemented as it should be.” (IDI 4)

“I think we are favoured by warm weather in this region, but sometimes these guidelines are not followed the way they should.” (IDI 6)

- *Feeding*

Participants’ responses regarding the implementation of guidelines on preterm feeding by nurses and midwives indicated that some implemented these guidelines while others did not.

“Like feeding a pre-term baby depending on the weight and days, these guidelines are available and very well utilised.” (IDI 6)

“Infant feeding protocols are useful in terms of helping the midwives to feed the prematures, and our nurses and midwives follow them.” (IDI 4)

Two participants expressed concern that some nurses and midwives were not implementing the guidelines correctly.

“Some need to always be reminded that as long as the preterm infant is stable, attempt breastfeeding first before any other feed.” (IDI 1)

“I see them rushing to give glucose water even without checking if mother has breast milk.” (IDI 5)

- *Cord care for infection prevention*

Regarding infection prevention of the cord stump using chlorhexidine versus other methods, a majority of participants noted that many nurses and midwives were not embracing this change.

“Working at the county level I have privilege to get the newest guidelines, like now I know the best practice for cord care is use of chlorhexidine, and this is what we are telling the staff to use, but you still find them doing other things.” (IDI 6)

“But even when you give these updates to the nurses and midwives on the ground, there is tendency to stick to old ways...you know. Till now others are using saline water, surgical spirit and so many other methods...very interesting indeed.” (IDI 1)

“They go back to other methods when chlorhexidine stock runs out, they don’t want to order from the stores.” (IDI 7)

One participant stated that the nurses and midwives were using chlorhexidine, although the supply was not consistent in the health facility.

“Yes, the guidelines on use of chlorhexidine are being followed in the hospital, though we are concerned about consistency in supply.” (IDI 5)

These findings suggested that although some participants stated that the nurses and midwives had implemented the guidelines to support care of preterm babies, others were still using methods not supported by current evidence. A study by Gondwe et al (2016:1441-1447) involving policy makers in Malawi that assessed the implementation of guidelines and policies for preterm care, found that most staff did not implement them despite them being available.

5.3.4.3.3 Perceived barriers to guideline implementation

Participants noted that possible barriers existed to implementation of guidelines and policies by nurses and midwives. These barriers included lack of resources (e.g. equipment and medication), lack of required skills, referral system and negative attitudes by nurses and midwives (Table 5.9).

Table 5.9 Perceived barriers to implementation of guidelines

Barriers	Excerpt
Lack of resources	<p>“We do have new-born units in most of our sub-county hospitals but are not well equipped and staffed to take care of the preterm babies and this strains the workers.”</p> <p>“There was a period of time many health facilities didn’t have vitamin K injection...Imagine. You know what that means to the preterm babies, you can imagine what is likely to happen to these prematures if they miss this critical injection.”</p> <p>“For sure, we know this cream is better for cord care, but it is not in supply all the time, leading to nurses and midwives to use of other methods.”</p> <p>“Oxygen sometimes in not available or oxygen concentrators are non-functional and this is very much needed to take care of these preterm babies, so people taking care these babies can get frustrated...”</p>
Referral system	<p>“We need to increase the number of ambulances and look at the referral system”.</p> <p>“Many health centres for example rely on ambulances from higher level facilities. Sometimes challenges may occur when a couple of them are grounded and an emergency referral is needed.”</p>
Lack of skilled personnel	<p>“The new-born units don’t have neonatal nurses or even paediatric nurses. These areas need to be addressed to improve health outcomes of preterm babies.”</p> <p>“In this health facility we do not have staff specialised in taking care of these babies, they have little knowledge and skills.”</p>
Lack of buy in	<p>“A hindrance of implementation that sometimes I see is failure of buy-in by the care providers, with the perception that this might increase their workload.”</p>

Barriers	Excerpt
	<p>“Sometimes it is about the bad attitude regarding change that they just want to the same old way.”</p> <p>“I think healthcare providers also need to be receptive to change; that way they can appreciate changes in clinical guidelines.”</p>

The findings from the interviews indicated that there were various barriers to implementation of clinical guidelines. These included lack of technical skills, resources and implementers’ buy-in. Similar findings were reported in the United Kingdom and Nigeria, where some highlighted barriers to effective implementation of clinical guidelines were lack of staff buy-in and lack of skills (Kleinpell & Zimmerman 2017:437; Wright et al 2018:12).

5.3.4.3.4 Supportive role for implementation

Participants indicated that they believed they had a supportive role to ensure that the guidelines were implemented by nurses and midwives in the health facilities. Their comments are presented in Table 5.10.

Table 5.10 Major themes on supportive role

Theme	Response
Continuous training of staff	<p>“Recently almost all the nurses and midwives underwent “Emergency Obstetric and Neonatal Care” and “Integrated Management of Childhood Illness” courses. We facilitated this is to equip them with the needed skills.”</p> <p>“Whenever there is an update regarding a new guideline, and we are informed, immediately we disseminate the information...it helps in updating the staff working with the facilities.”</p> <p>“Most health facilities hold regular continuous medical education, at least every month and we support them to do it by visiting them and reminding them.”</p>
Donor funding	<p>“Although sometimes the funds take some time to come, when we have a donor, we disseminate information faster.”</p>

Theme	Response
	“In this area we have an advantage of getting funds from donors...I would say we are lucky. We utilise the funds to disseminate information to the staff.”
Liaison with County Health Management team/Ministry of Health (MOH)	<p data-bbox="732 296 1409 359">“We liaise and ensure support from up the county teams which makes our support supervision work easier.”</p> <p data-bbox="732 401 1409 506">“We are regularly in contact with the Ministry of Health to ensure they understand the problem of our staff so that they can give support.”</p> <p data-bbox="732 548 1409 644">“In the county we have good department heads who ensure that we are supported to be able to support the facilities, though they are few.”</p>

5.3.4.4 Similarities in the focus group and in-depth interview findings

The findings from the focus groups involving nurses and midwives with those of the interviews with key informant’s views regarding the implementation of high-impact low-cost interventions to enhance outcomes for preterm babies were largely comparable. Participants indicated that some guidelines were implemented, but also raised concerns regarding guidelines that had not been implemented consistently across facilities. Lack of guidelines and other resources, and lack of knowledge or understanding of the guidelines were major challenges for implementation. In particular, the health centres experienced major challenges with resources to support implementation. Participants from the interviews raised an important concern about negative staff attitudes towards change of practice not supported by evidence, which impeded the implementation of guidelines.

5.3.4 Unstructured observation

5.3.4.1 Introduction

Observation generally involved spending a prolonged amount of time in the study setting. Field notes are taken throughout the observations. Many researchers also take notes to assist in determining what the observed events might mean and to help answer the research question during subsequent data analysis (Pitney & Parker 2009:63-65).

5.3.4.2 Process

Informal observation was undertaken while interacting with staff in the health facilities, during interviews and during health facility assessment. Detailed, nonjudgmental and concrete descriptions of what was observed were written down in form of field notes. The researcher did not play any role while observing. The researcher noted details such as the buildings and setup of the facilities, general cleanliness of the rooms, any obvious guidelines and equipment available as well as the interviewee's body language and general mood during the interviews.

5.3.4.3 Observations from unstructured observation

Table 5.11 summarises the observations as recorded by the researcher.

Table 5.11 Unstructured observation

Issue	Observation
Buildings	<ul style="list-style-type: none">• All facilities had buildings constructed with stones and in good condition.
Maternity unit	<ul style="list-style-type: none">• In all facilities, there were designated areas for antenatal labour/delivery and postnatal clients.• In three health facilities, they had separate new-born units.• The three units were congested with some neonates sharing cots/incubators.• There was an obvious shortage of staff compared to number of the sick new-borns.
Cleanliness	<ul style="list-style-type: none">• Most of the health facilities employed infection prevention measures and general cleanliness, although in some, waste segregation was an issue and some taps did not have running water.• Soap for washing hands/hand rub was seen in few health facilities.
Guidelines	<ul style="list-style-type: none">• In four health facilities, guidelines were found hanging on maternity unit walls.• Some of these guidelines were outdated.• Others were quite dirty, almost to an extent of being illegible.• Three health facilities had no guidelines on the walls at all relevant to what researcher was looking for.• In three health facilities some of the guidelines were locked in a cupboard.

Issue	Observation
Equipment/drugs	<ul style="list-style-type: none"> • Three health facilities had working equipment, including radiant warmers, suction machines, ambu bags and face masks. • Four had equipment that was malfunctioning while other important equipment was missing. • Four health facilities had essential drugs while the other three did not.
Staffing	<ul style="list-style-type: none"> • In almost all health facilities, nurses and midwives rotated and worked in all the units. • Short staffing was noted.

The unstructured observations confirmed that barriers to guideline implementation existed. There was evidence of a lack of visible clinical guidelines at designated areas, malfunctioning equipment, short staffing and limited resources.

5.4 CONCLUSION

This chapter presented findings from focus group discussions with nurses and midwives, in-depth interviews with key informants and unstructured observations. The chapter highlighted major gaps in implementation of interventions to enhance the quality of care for preterm babies. These gaps were mainly due to lack of important guidelines/protocols, important equipment and medication, knowledge and practice regarding care of preterm babies and poor attitudes among nurses and midwives regarding change of practice not supported by evidence. The findings also highlighted barriers and enablers to implementation, as well as some suggestions for improving implementation.

A detailed discussion and interpretation of the findings from this chapter is presented in Chapter 6.

CHAPTER 6

INTEGRATION AND DISCUSSION OF QUANTITATIVE AND QUALITATIVE FINDINGS

6.1 INTRODUCTION

This chapter presents a synthesis of the quantitative and qualitative data, with the aim of triangulating the data obtained from both methods to enable a comprehensive and integrated understanding of the results. Data triangulation and integration will allow detailed insights based on the present findings.

6.1.1 Focus of this study

The objectives of this study were to:

- Determine the extent to which current policies and guidelines regarding interventions to enhance health outcomes for preterm babies are implemented in public health facilities in Kilifi County.
- Describe the knowledge, understanding and use of policies and guidelines to improve health outcomes for preterm babies among nurses and midwives in health facilities in Kilifi County.
- Identify factors associated with the implementation of policies and guidelines for the management of preterm babies in health facilities in Kilifi County.
- Explore barriers and enablers for healthcare workers in implementing these policies and guidelines in the sampled health facilities.
- Propose instructional strategies to enhance compliance with the national guidelines and policies to improve health outcomes for preterm babies.

The specific research questions this study addressed were:

- What is the extent to which the current national policies and guidelines regarding interventions to improve health outcomes for preterm babies are implemented in health facilities in Kilifi County?

- What is the knowledge and understanding of nurses and midwives in health facilities in Kilifi County regarding national policies and guidelines for improving health outcomes for preterm babies?
- What are factors associated with implementation of national policies and guidelines by nurses and midwives in health facilities in Kilifi County?
- What are the current enablers and barriers for nurses and midwives in implementing these policies and guidelines in health facilities in Kilifi County?
- What strategies can be implemented to enhance the implementation of national policies and guidelines by nurses and midwives to improve health outcomes for preterm babies?

6.2 INTEGRATION IN MIXED METHODS RESEARCH

Data synthesis and integration of methods of enquiry have evolved in research to enable appropriate reporting based on mixed methods research (Fetters et al 2013:2134-2156; Plano Clark 2010:428-440; Teddlie & Tashakkori 2011:285-300 as cited in Fetters et al 2013:2134-2156). These approaches can be employed during research design, data analysis, data synthesis and reporting of research findings (Fetters et al 2013:2134-2156).

6.2.1 Integration during the study design

The present study used a convergent design (also known as a concurrent design), where quantitative and qualitative data were collected and analysed simultaneously (Fetters et al 2013:2134-2156). Data collection for both approaches occurred in a parallel, and analysis began after data collection was underway (with some data collection completed). The two sets of data were analysed separately, and then merged, as illustrated in Figure 6.1.

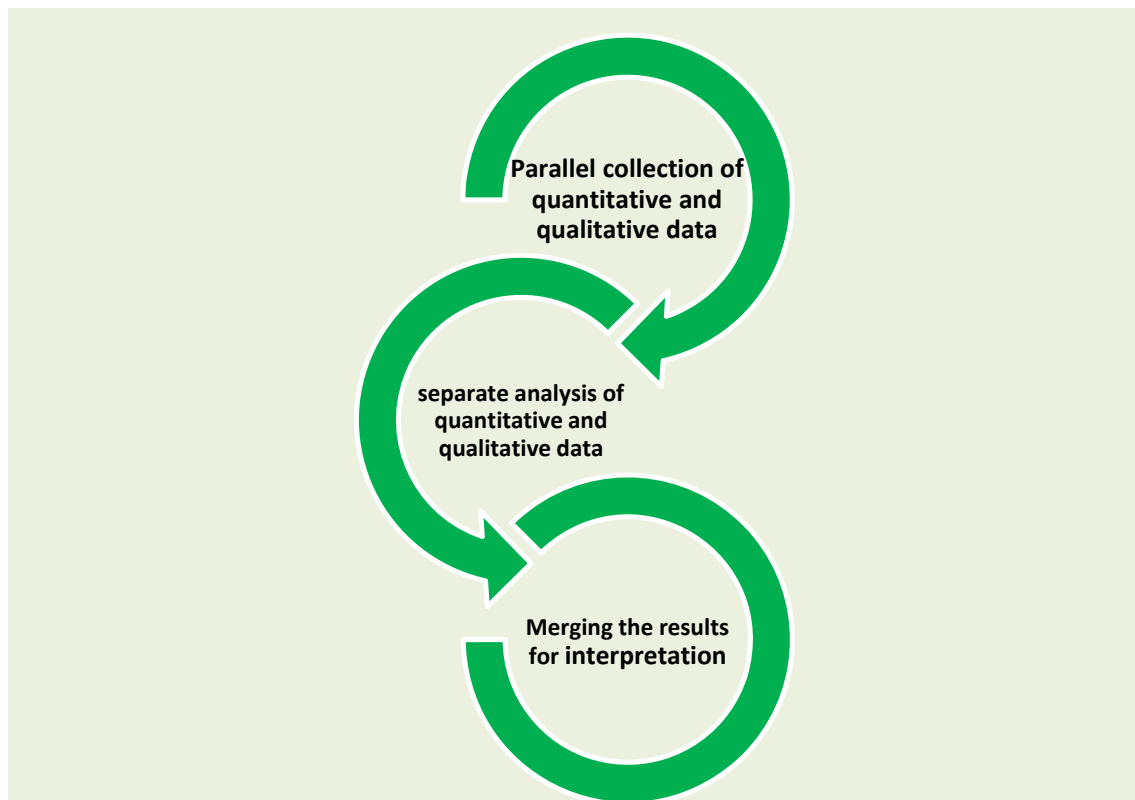


Figure 6.1 Integration through study design

6.2.2 Integration through methods

According to Creswell et al (2014:22-28), integration through methods occurs by linking the methods of data collection and analysis. In the present study, the researcher used a mixed methods approach. The quantitative arm of the study involved a survey administered to sampled nurses and midwives, and a facility checklist administered to facility/unit heads. Data collection methods in the complementary qualitative arm of the study entailed in-depth interviews, focus group discussions and unstructured observation. Focus group respondents were selected from the same population of participants who took part in the survey. Therefore, integration by connecting was ensured during sampling. Data collection and analyses for the survey and interviews/focus groups were conducted simultaneously. The researcher developed an analysis plan at the start of the study that guided the integration of findings, although this plan was reformulated for a better fit after review of the preliminary data. Quantitative data were collected using a questionnaire and qualitative data were collected using an interview guide that covered similar topics to the questionnaire (Creswell & Creswell 2017:203). Merging occurred after

the qualitative analysis of the textual data and statistical analysis of the numerical data, as demonstrated in Figure 6.2.

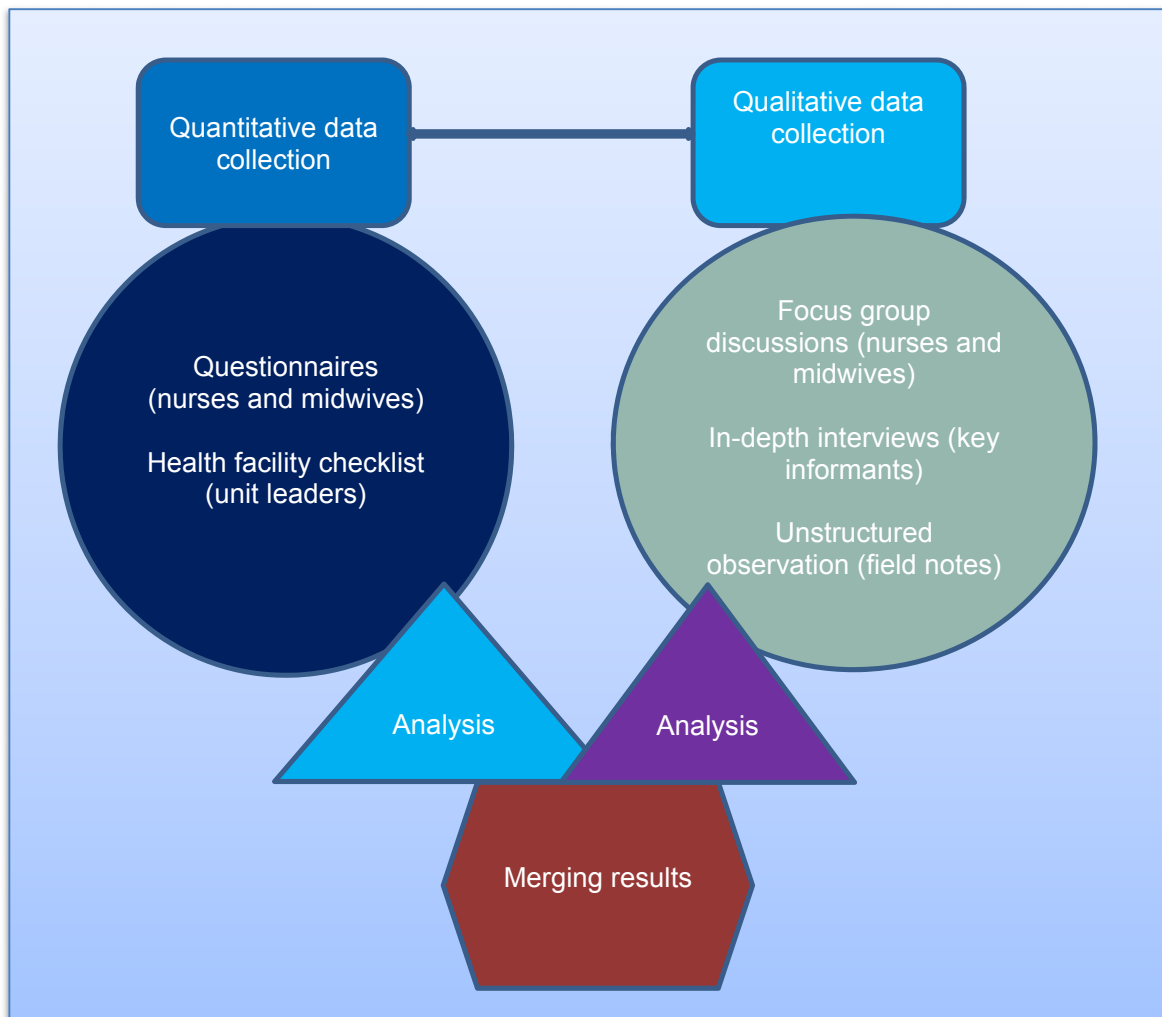


Figure 6.2 Integration through methods

6.2.3 Integration through interpretation and reporting

Integration of findings in mixed methods research is achieved through “meta inferences” regarding the phenomenon being investigated; this involves addressing both qualitative and quantitative questions, and collecting sufficient evidence to support answers from both arms of the study (Fetters et al 2013:2134-2156; Teddlie & Tashakkori 2011:285-300). A meta inference has been described as “an overall conclusion, explanation or understanding developed through and integration of the inferences obtained from the qualitative and quantitative strands of a mixed method study” (Creswell et al 2014:22-28).

Merging two data sets in a convergent approach involves combining qualitative and quantitative data using a side-by-side comparison procedure (Bryman 2008:87-100; Classen, Lopez, Winter, Awadzi, Ferree & Garvan 2007:677; Creswell 2014:22-28). Using narrative, the researcher describes the quantitative and qualitative findings in a single report. Quantitative findings are reported first, followed by the qualitative findings that confirm or disconfirm statistical results. Some qualitative data were converted to quantitative data using data transformation, which were then integrated with quantitative data. In integration through joint displays, data were brought together by visual means (figures, graphs and tables). This drew new insights beyond those that separate qualitative and quantitative data could show. Comparisons were made by presenting first one set of findings then the other, and incorporating the evidence from existing literature, as illustrated in Figure 6.3

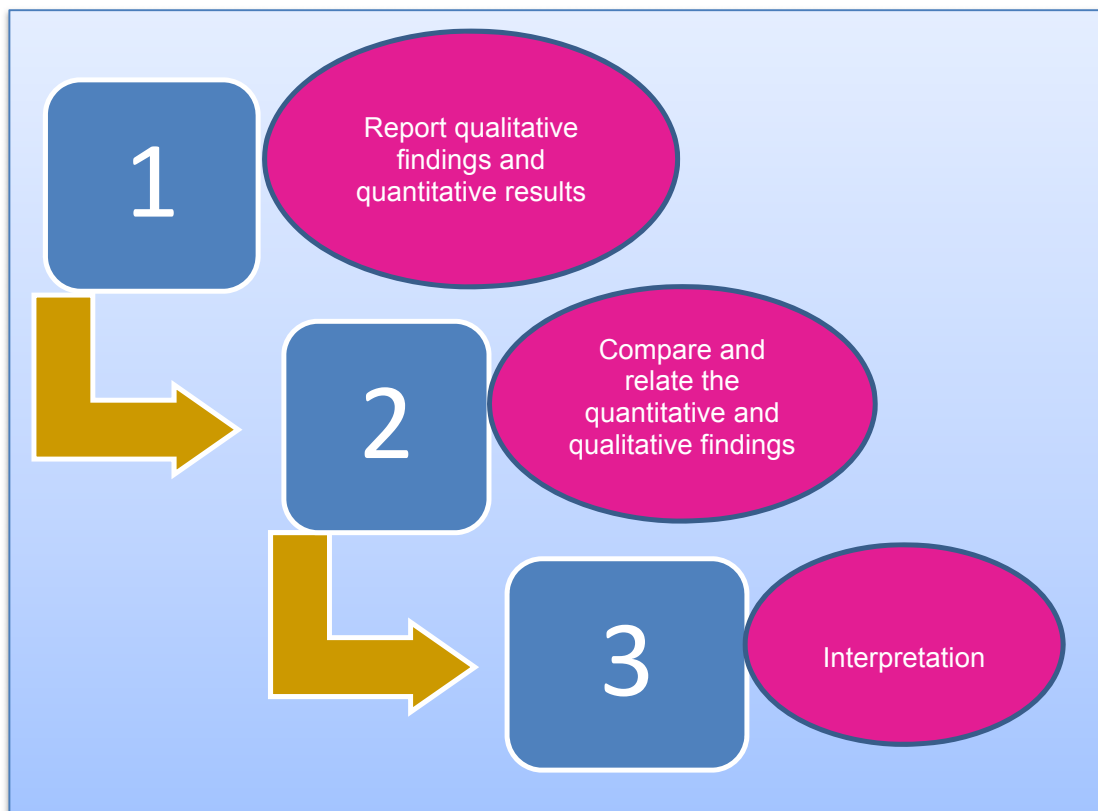


Figure 6.3 Integration of qualitative and quantitative findings

6.3 EXTENT TO WHICH GUIDELINES TO IMPROVE PRETERM BABIES' OUTCOMES WERE IMPLEMENTED BY NURSES AND MIDWIVES

This study aimed to identify the extent to which four interventions for the care of preterm babies were implemented in the studied health facilities. To meet this objective, the researcher needed to assess the availability of the guidelines, equipment and drugs that support the care of preterm babies. Quantitative data relating to this objective were collected using a facility assessment checklist and a survey administered to nurses and midwives. Qualitative data were gathered through focus group discussions with nurses and midwives, in-depth interviews with key informants and unstructured observation.

6.3.1 Availability of essential medication and equipment

Data regarding the availability of essential medication and equipment were collected with a health facility checklist. The checklist included observational aspects that assessed the presence or absence of certain medications and equipment. The questionnaire administered to nurses and midwives also covered availability of medication and equipment. Focus group discussions with nurses and midwives and in-depth interviews with key informants offered qualitative data regarding this aspect. Figure 6.4 presents the results regarding the availability of essential medicines and equipment.

QUANTITATIVE = **Health facility (n=17) assessment:** Oxygen not available: n=5 (29.4%); no suctioning equipment: n=4 (23.5%); no vitamin K: n=3 (17.6%); no chlorhexidine: n=10 (58.8%); and no tetracycline eye ointment: n=4 (23.5%) (Table 4.6).

Survey responses (n=102): Slightly over half (55.9%) of the participants indicated that an incubator or radiant warmer was always available and maintained. Similarly, only 55.9% indicated that oxygen was available, even though it was important in the care of preterm babies (Table 4.3). Only 48 participants (47.1%) indicated that chlorhexidine was available all of the time (Table 4.4).

QUALITATIVE = "This facility has oxygen on and off...how do you take care of prematures without oxygen"? (FGD, SCH 2).

“Here we even miss the essential...drugs like vitamin K and other commodities.” (FGD, SCH 1)

“In some cases preterm babies might need oxygen while, you know...during transfer then we have masks in the ambulance but sometimes no oxygen.” (FGD, HC 1)

“And also on the drugs, we don’t have much control you know, you can order and they are never there.” (FGD, HC 1)

“Health facilities many times miss the commodities which are important for example good antibiotics or even vitamin k to give to these babies which we all know are very important to prevent complication.” (IDI 7)

“When power goes off, especially in health centres, then the oxygen concentrator cannot be used since we have no backup generators...so you refer or lose the baby.” (IDI 5)

Figure 6.4 Availability of equipment and medication

For successful implementation of equipment and medication guidelines, important equipment and essential medications necessary for the care of preterm babies needs to be available and in good working condition. Many of the studied facilities lacked suctioning equipment and radiant warmers. Availability of a suction machine is important to ensure that airway is patent for babies who do not breathe after birth. Similarly, some preterm babies require oxygen supplementation, especially when breathing is not adequate. Tetracycline eye ointment and chlorhexidine are essential medications to prevent eye infections and umbilical cord infections, respectively. These medications and equipment were missing in some facilities, impeding implementation of interventions to improve preterm babies’ outcomes. These findings were comparable with the results of a study conducted in Ghana (Vesel et al 2013:e002326) that revealed key gaps in availability of equipment and essential life-saving actions in health facilities. Those authors reported all four referral hospitals studied were lacking some essential equipment (e.g. incubators, ambu bags and masks, medications). Another study conducted in four referral facilities in India revealed similar trends; two facilities did not have bags and masks, and although the other two facilities had bags and masks, the equipment was not used for the intended purpose (Malhotra et al 2014:130-141). These study results are

congruent with another study (Ndelema et al 2016:28) that suggested the care of preterm babies may be compromised by lack of necessary equipment. Equally, facilities that are ineffectually stocked and equipped are likely to compromise healthcare workers' capability to reduce mortality and morbidity among newborns by affecting them professionally and personally, thereby hindering their delivery of timely and suitable interventions (Penfold et al 2013:61; Richards-Kortum 2017:39).

6.3.2 Availability of guidelines

This study aimed to determine the availability of guidelines that support the care of preterm babies. Quantitative and qualitative data relating to this issue are merged and presented in Figure 6.5.

QUANTITATIVE RESULTS

Health facility assessment (n=17): A majority (n=10, 58.8%) of the facilities sometimes received the guidelines, four (23.5%) received them most of the time and three (17.6%) hardly ever received guidelines. Guidelines missing in the facilities were: resuscitation (n=10; 68.8%), cord care and referral protocol (n=16; 94.1%) and early and exclusive breastfeeding (n=12; 70.6%) (Table 4.6).

Survey (n=102): Participants indicated guidelines were not available for: resuscitation (n=67; 65.7%), warmth provision (n=54; 52.9%), feeding (n=21; 20.6%) and chlorhexidine use (n=43; 42.2%).

QUALITATIVE RESULTS

“Okay you are just taught how to do it but you are not given the guidelines that, maybe if you are so keen in that you can even take the full course. But we never have those guidelines here...I have never seen them...” (FGD, SCH 3)

“Surely, some things about these interventions and guidelines am hearing them now...we must be behind news...” (FGD, HC 3)

“Not all guidelines are available to us and I believe the reproductive health office needs to do much more for us to be able to support the nurses and midwives who are taking care of these preterm babies. For example, chlorhexidine guidelines have not trickled to some lower facilities.” (IDI 4)

Figure 6.5 Availability of guidelines

These findings showed that important guidelines/protocols to support the care of preterm babies were not consistently available in the studied health facilities, and were missing altogether in some facilities. The availability of current guidelines is essential for nurses and midwives to implement evidenced-based care. Stokes et al (2016:144) revealed that practice guidelines to inform care for preterm babies were missing in clinical settings in low- and middle-income countries. That study concluded that making these policies and guidelines available might help in implementing interventions in routine clinical practice. This suggests that if guidelines are not available in the clinical setting, implementation is likely to fail.

Similarly, in a study conducted in Malawi to clarify the existence of policies to guide preterm care, health providers stated that guidelines were not available all the time, and this affected their ability to care for preterm babies (Gondwe et al 2016:1441-1447).

6.3.3 Implementation of resuscitation guidelines

This study investigated whether guidelines on resuscitation of preterm babies were implemented in the studied health facilities. The quantitative findings indicated that although many nurses and midwives said that the resuscitation guideline was implemented, challenges were reported in using bags and masks and performing chest compression when necessary. These responses suggested that resuscitation guidelines were not fully implemented, and were supported by comments from focus group participants, as illustrated in Figure 6.6.

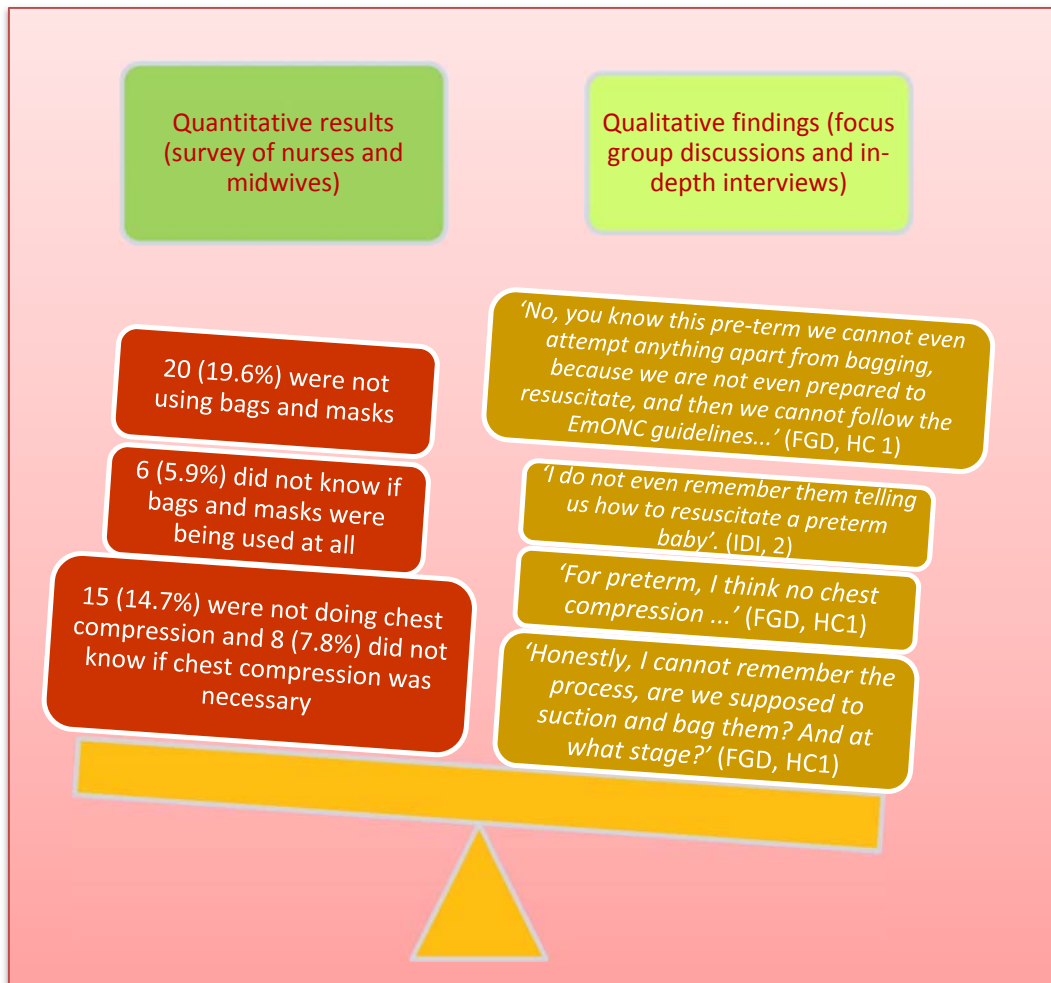


Figure 6.6 Implementation of resuscitation guideline

According to the WHO (2012:7-67), resuscitation is a collection of interventions to support and establish breathing and circulation for babies who require assistance to breathe following birth. The most important intervention is positive pressure ventilation using a bag and mask. This means that bags and masks are vital in the resuscitation of a preterm baby. The fact that survey participants were not using bags and masks and not performing chest compressions indicated that the guidelines for resuscitation of preterm babies were not fully implemented. Responses from the survey along with focus group participants' comments participants' highlighted the lack of implementation of this guideline.

A study conducted in Ghana to assess the quality of newborn care in referral hospitals found that only 33% of babies were born in facilities capable of providing high quality, basic resuscitation (Vesel et al 2013:e002326). Similar to the present study, that study

highlighted gaps in the use of evidence-based guidelines. Several other studies conducted in low-and middle-income countries have shown that when preterm babies are unable to breathe immediately after birth, speedy neonatal resuscitation is critical (Kinney et al 2015:326-337, Lawn et al 2013:S5). Similarly, use of bag and mask or mouth-to-mask (tube and mask) for basic resuscitation may save four out of every five babies who require resuscitation (Lawn et al 2013:S5). Experts also suggest that basic resuscitation for preterm babies together with speedy assessment and stimulation can reduce mortality by about 10% (Lee et al 2011:S12, Ndelema et al 2016:28). Despite this evidence, this study and previous studies highlight failure to initiate immediate resuscitation for preterm babies who require it as the relevant guideline was not fully implemented.

6.3.4 Implementation of the Provision of Warmth Guideline

The survey results suggested that provision of warmth to preterm babies was not fully implemented across the health facilities. These findings were validated by qualitative findings that also indicated provision of warmth was not fully implemented as per the guideline (Figure 6.5).

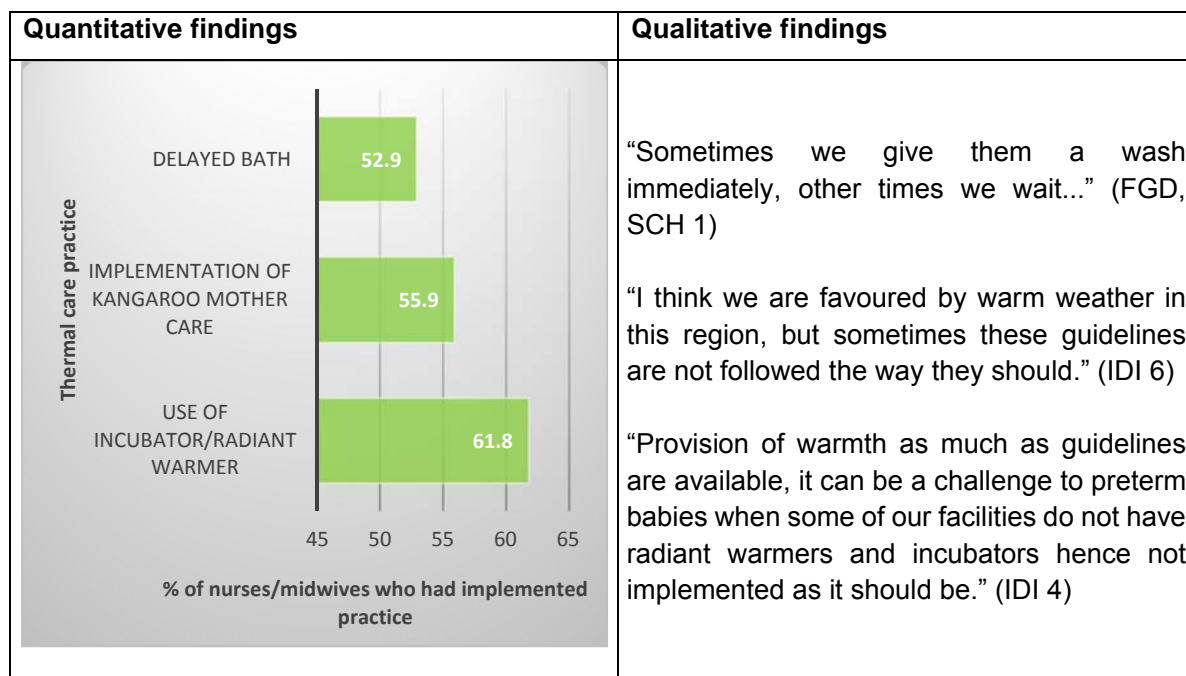


Figure 6.7 Implementation of warmth provision guideline

Thermal care, which includes drying, covering the body and head, warming, skin-to-skin contact and delayed bathing, are simple techniques that can be implemented to improve

outcomes for preterm babies — even in lower level facilities (Lawn et al 2014:189-205, Lawn et al 2013:S5, Ndelema et al 2016:28, WHO 2015:26-28). The findings from the present study revealed a failure of healthcare professionals to implement a simple intervention that is known to improve outcomes for preterm babies. These findings were consistent with an analysis involving 12 countries in Asia and Africa that showed warmth provision interventions were not well implemented in most countries, even though a high level of technology is not required (Enweronu-Laryea, Dickson, Moxon, Simen-Kapeu, Nyange, Niermeyer, Bégin, Sobel, Lee, Von Xylander & Lawn 2015:S4). A study conducted in India to assess healthcare providers' competencies in providing essential newborn care showed most participants scored satisfactorily in provision of warmth (Malhotra et al 2014:130-141). Although knowledge among participating providers was satisfactory in most areas, that study showed there was a lack in performance skills in all professionals assessed. The present study elucidates the failure of healthcare professionals to implement a simple intervention (warmth provision) that improves outcomes for preterm babies.

6.3.5 Implementation of immediate feeding guideline

The current feeding guidelines recommend immediate, exclusive breastfeeding and extra support for preterm in babies weighing less than 2000 g. This study investigated how well these recommendations were implemented in the studied facilities. The quantitative data showed that none of these recommendations was implemented 100% (i.e. by all nurses and midwives). Although exclusive breastfeeding scored highest among the feeding guideline recommendations, this represented slightly above half of the participants (59%), implying that 41% were not emphasising exclusive breastfeeding. Similar proportions were found for breastfeeding within 1 hour (64% implemented guideline recommendations; slightly above average). Immediate feeding of preterm babies scored the lowest, with about 60% of nurses not implementing this practice. With regard to availability of the guideline as a reference document within the facilities, only about one-third of the facilities had the guideline available for reference by staff, meaning that more than two-thirds of the facilities did not have the guideline available. Overall, these findings show poor implementation of the immediate feeding guideline, given that best practice requires 100% implementation of the guideline by all (100%) staff. The qualitative data relating to this guideline confirmed the quantitative findings, which affirmed inadequate implementation of the guideline on immediate feeding (Figure 6.8).

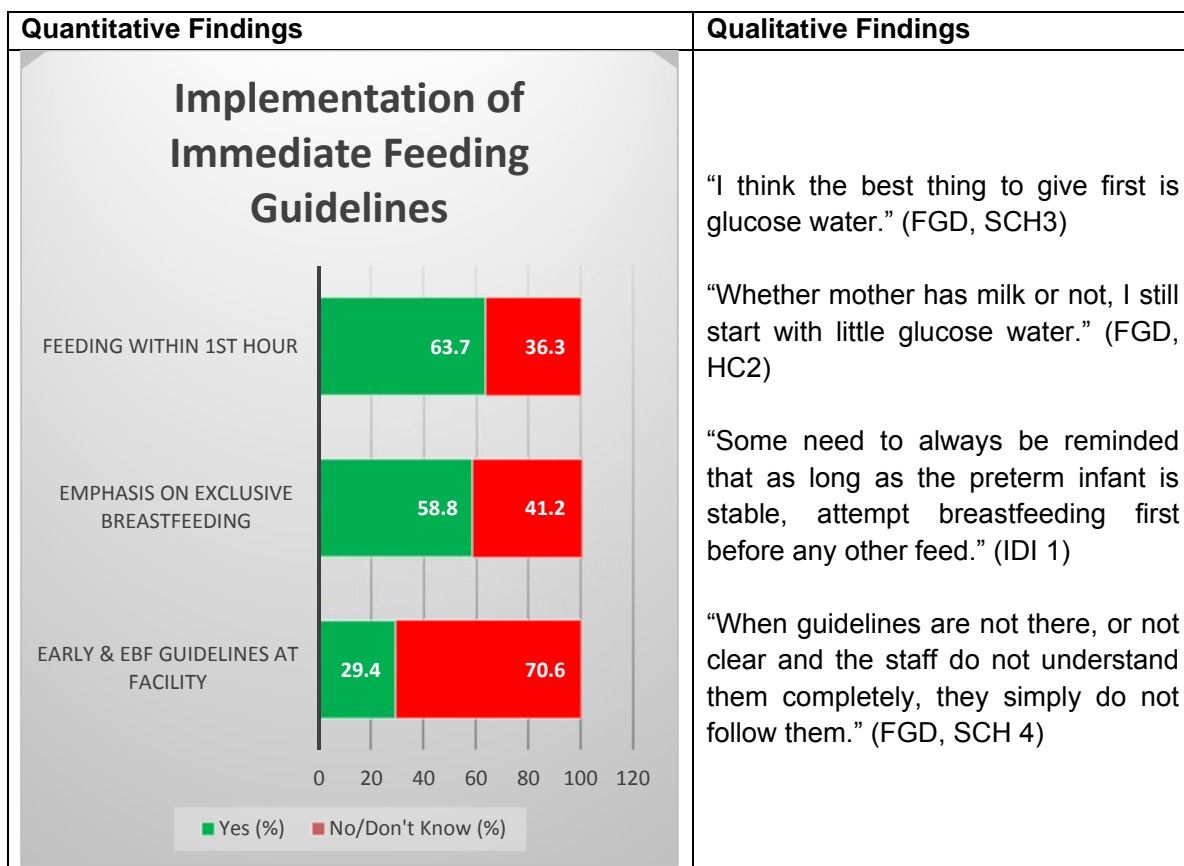


Figure 6.8 Implementation of immediate feeding guideline

Evidence shows that immediate, exclusive breastfeeding and extra feeding support for preterm babies can reduce preterm mortality by half (Aluvaala et al 2015:42-47; WHO 2015:26-28). The Kenyan MOH guidelines recommend expressing breast milk and cup or tube feeding preterm babies that are unable to breastfeed (Ministry of Health Kenya 2014). Similarly, in their multicounty analysis of interventions to improve preterm outcomes, Lawn et al (2014:189-205) concluded that as failure to feed with breast milk was a risk factor for necrotising enterocolitis in preterm babies, feeding stable preterm babies breast milk soon after birth would reduce their risk for developing this complication. The present study highlighted a lack of implementation of feeding guidelines in the study area, and participants reported using practices that were not supported by evidence. In addition, Vesel et al (2013:e002326) noted that feeding preterm babies, especially when they are stable, does not require high-tech equipment, and should be able to be performed by a majority of newborn care providers.

6.3.6 Implementation of cord care guideline

The quantitative findings indicated the majority of participants reported use of chlorhexidine for cord care was not implemented (n=43; 42.2%), despite this being evidence-based practice to prevent neonatal infection (Table 4.5). Participants were asked to state what they would use as an alternative to chlorhexidine for cord care. The majority indicated they would use surgical spirit (n=39; 38.2%) or nothing (n=37; 36.2%). The belief that the cord stump should be left alone to dry was held by eight participants (7.8%), seven (6.8%) said they would use salt water, three (2.9%) would use soap and water and three (2.9%) would use iodine. This was supported by comments from participants in the focus group discussions (Figure 6.9).

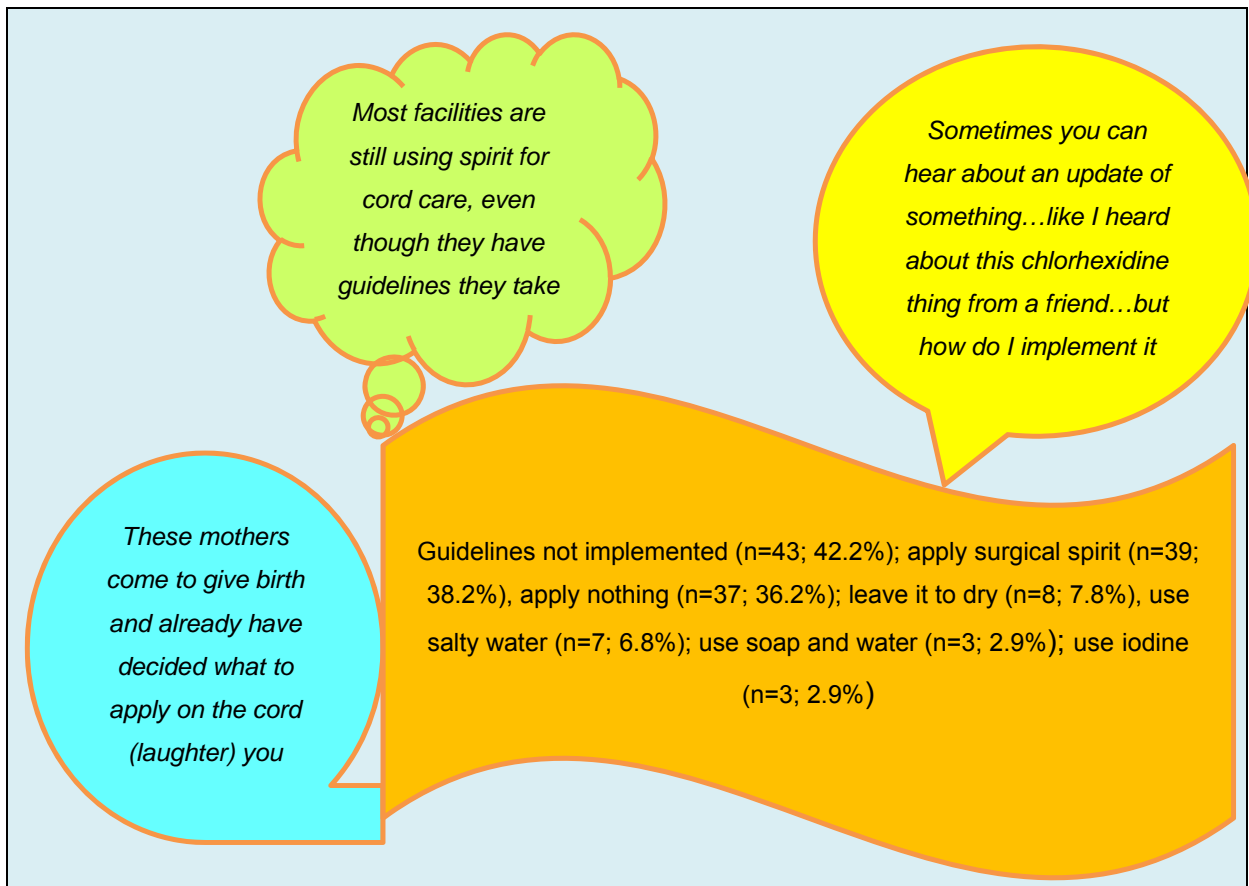


Figure 6.9 Implementation of cord care guideline

These responses show that participants were not following the guideline on use of chlorhexidine for cord care. Qualitative and quantitative studies conducted in sub-

Saharan Africa and Asia revealed culturally diverse practices and beliefs about umbilical cord care. These studies highlighted a need for evidence-based interventions, such as chlorhexidine use to improve neonatal outcomes — especially for those born preterm (Amare 2014:12; Dhingra, Gittelsohn, Moh’d Suleiman, Moh’d Suleiman, Dutta, Ali, Gupta, Black & Sazawal 2014:173; Herlihy, Shaikh, Mazimba, Gagne, Grogan, Mpamba, Sooli, Simamvwa, Mabeta & Shankoti 2013:e79191; Moran, Choudhury, Khan, Karar, Wahed, Rashid & Alam 2009:54). Another study demonstrated that use of interventions that were not backed by scientific evidence could compromise the implementation of correct clinical practices regarding care for preterm babies (Zeitlin et al 2016:i2976). In the present study, best practice for cord care was not implemented in the majority of health facilities, which increased preterm babies’ risk for developing omphalitis.

6.4 KNOWLEDGE, UNDERSTANDING AND PRACTICE OF POLICIES/ GUIDELINES

The third objective of this study was to clarify the knowledge, understanding and practice regarding care of preterm babies. In the quantitative arm of the study, vignettes were used to assess knowledge, understanding and practice regarding evidence-based preterm care interventions (Table 6.1).

Table 6.1 Knowledge, understanding and practice

Vignette	Quantitative findings	Qualitative findings
What to do when a 34-week-old preterm baby doesn’t cry immediately after delivery	<p>Suction the mouth: n=23 (22.5%)</p> <p>Use a bag and mask to ventilate: n=23 (22.5%)</p> <p>Do not know what to do: n=21 (20.6 %)</p> <p>Dry and stimulate/rub the baby gently: n=18 (17.6%)</p>	<p>“I will give you an example of resuscitation of a neonate with asphyxia...I hear different things, some say you don’t suction, others say you start bagging, and others...do nothing, I don’t know for how long.” (FGD, SCH 2)</p> <p>“Now, you see...for preterm babies when born and are depressed, we bag them continuously for a while to open the lungs.” (FGD, HC1)</p> <p>“Personally, I think the guidelines should be clearer on preterm resuscitation they say they have</p>

Vignette	Quantitative findings	Qualitative findings
		problem implementing resuscitation guidelines of preterm.” (IDI 5)
Alternative to feeding method for a stable preterm baby who is unable to breastfeed	<p>Would do nothing: n=61 (59.8%)</p> <p>Would give expressed breast milk by nasal gastric tube: n=13 (32.7%)</p> <p>Would give expressed breast milk by cup and spoon: n= 6 (5.8%)</p> <p>Would give formula milk: n=4 (3.9%)</p> <p>Refer to a nutritionist: n=3 (2.9%)</p> <p>Would either give glucose water or intravenous fluid: n=3 (2.9%)</p>	<p>“It is always a challenge...we don't give anything; we refer.” (FGD, HC3)</p> <p>“Some need to always be reminded that as long as the preterm infant is stable, attempt breastfeeding first before any other feed.” (IDI 1)</p> <p>“I always give them glucose water first...to avoid hypoglycaemia.” (FGD, SCH 4)</p> <p>“I know here we feed them with glucose first, about few spoons, then...you observe and see.” (FGD, HC 1)</p> <p>“Our practice here is to start intravenous fluids for a day or so...” (FGD, SCH 1)</p>
When to give first bath for a 36-week-old preterm baby	<p>Soon after birth: n=31 (30.4%).</p> <p>After 24 hours: n=48 (47.1%) (the best response)</p> <p>After 2 hours: n=3 (2.9%)</p> <p>Within 4–6 hours: n=6 (5.9%)</p> <p>Don't know: n=14 (13.7%)</p>	<p>“We clean them up as soon as they are born, unless they are very tiny.” (FGD, HC3)</p> <p>“After birth, we wash them then...” (FGD, HC1)</p> <p>“Nobody wants to handle them before they are cleaned...so we try and do it soon after birth.” (FGD, SCH 4)</p> <p>“I think we should wait for few hours...well not very sure.” (FGD, SCH1)</p>
When to clamp and cut the umbilical cord of newly delivered, stable preterm baby	<p>Would do it soon after delivery: n=53 (52%)</p> <p>After 2–3 minutes: n=30 (29%)</p> <p>After 50 seconds: n=13 (12.7%)</p> <p>After 30 seconds: n=4 (3.9%)</p>	<p>“For preterm, should be immediately after birth.” (FGD, SCH4)</p> <p>“You know, that if the preterm is stable, no hurry to cut the umbilical cord and wait for about a minute ...” (IDI 1)</p> <p>“Some of these guidelines am hearing of them today...like delaying the cutting of cord...honestly am</p>

Vignette	Quantitative findings	Qualitative findings
	After 5 minutes: n=2 (2%)	hearing first time from you.” (FGD, HC 2)
The best practice for cord care to prevent infection	Application of antiseptic cream: n=33 (32.4%) Clean with saline: n=27 (26.5%) Leave it alone to dry: n=21 (20.6%) Apply spirit: n=17 (16.7%) Wash with soap and water: n=2 (2%)	“We use chlorhexidine when it is available.” (FGD, HC 2) Some say you don’t apply anything, some say use spirit, some say use normal saline, some say nothing. So there’s confusion...yeah you don’t know what to do.” (FGD, SCH 2) “But even when you give these updates...there is tendency to stick to old ways...you know...now others are using saline water, surgical spirit and so many other methods...very interesting indeed.” (IDI 1)

Participants were asked what they would do for a 34-week-old preterm baby that does not cry immediately after delivery. Only 18 (17.6%) gave the best response (drying and stimulating/rubbing the baby gently); 23 (22.5%) said they would suction the mouth, 23 (22.5%) said they would use a bag and mask to ventilate, and 21 (20.6%) did not know what to do. Responses from the focus groups echoed this lack of knowledge of correct practice regarding this guideline (Table 6.1).

Previous research showed that some preterm babies who fail to breath immediately after birth (with primary apnoea) will respond to simple tactile stimulation alone; for example, drying the skin and gentle rubbing (Lassina, Ouattara, Asse, Couitchere, Enoh, Azagoh, Attebi & Oulai 2017:149; Lee et al 2011:S12). Active and vigorous resuscitation is generally not necessary for preterm babies who are stable. The first action for a baby that is not breathing is stimulation by gently rubbing the back, which was not demonstrated by the majority of study participants. The results of the present study were consistent with a study conducted in Côte d’Ivoire to assess the care of preterm babies, which showed that about 43% of the respondents did not know the initial step of stimulating a baby after birth (Lassina et al 2017:149).

When participants were asked to state what they would offer as an alternative feeding method for a stable preterm baby who was unable to breastfeed, a majority said they would do nothing (n=61; 59.8%), and about 13 (32.7%) would give expressed breast milk

by either nasal gastric tube or cup and spoon, 6 (5.8%). Others indicated they would give formula milk (3.9%), refer the baby to a nutritionist (2.9%), or give glucose water (2.9%) or intravenous fluid (2.9%). Similar discrepancies were reflected in the qualitative findings (Table 6.1).

Participants' responses suggested a failure to apply evidence-based care for preterm babies. The fact that only 32.7% of the participants were likely to give expressed breast milk (the best option) clearly shows a gap in the use of a best-practice intervention that compromised the care for preterm babies. Research conducted in two districts in India to assess essential newborn care services in secondary-level facilities found that healthcare providers did not understand the importance of feeding preterm babies with breast milk (Malhotra et al 2014:130-141).

Almost one-third (30.4%) of the present participants said they would give the first bath to a 36-week-old preterm baby soon after birth, and only 47.1% gave the correct response. These responses and the qualitative findings showed that the recommendation for delaying a new-born's first bath (especially preterm babies) as a method of warmth conservation was not well implemented. These findings are comparable with the results of a facility-based study in Ghana that showed delayed bathing was inadequate for births that occurred in health facilities (Vesel et al 2013:e002326).

In terms of knowledge and practice regarding when to clamp and cut the umbilical cord of a newly-delivered, stable preterm baby, 52% of the participants stated they would do this soon after delivery, and only one-third (29%) reported they would clamp the cord after 2–3 minutes. Others said after 50 seconds (12.7%), after 30 seconds (3.9%) and after 5 minutes (2%). The focus group participants echoed this knowledge gap. These findings resonate with those of a study conducted in Oman to assess maternity care providers' practices regarding cord clamping (Madhavanprabhakaran et al 2018:1-9). That study found that although the majority of providers were aware of the new guidelines regarding the timing of cord clamping, they still follow early cord clamping practice. The high prevalence of early cord clamping highlighted the demand for the implementation of a nation- and hospital-wide policy (Madhavanprabhakaran et al 2018:1-9).

In terms of cord care, only 32.4% of the respondents in the present study said that the best practice was application of antiseptic cream for cord care. Others stated they would

clean with saline (26.5%), leave it alone to dry (20.6%), apply spirit (16.7) or wash with soap water (2%) (Table 4.6). Similar findings were reported in the focus group discussions (Table 6.1.).

A study conducted among policy-makers in Malawi showed that protocols and guidelines for preterm babies' care existed in health facilities, but 63.6% of maternity care providers were deficient in knowledge about the use of these documents (Gondwe et al 2016:1441-1447). Similarly, a study that assessed the quality of new-born care in four referral hospitals in Ghana showed healthcare providers lacked understanding about care of the umbilical cord stump to prevent infections (Vesel et al 2013:e002326). In addition, a study that assessed healthcare providers' competencies in providing essential new-born care in India showed most scored satisfactorily for most of the knowledge areas, except breastfeeding and KMC (Malhotra et al 2014:130-141). That study noted that although the participants had satisfactory knowledge in most areas, there was a lack in performance skills in all professionals assessed, with resuscitation and provision of warmth being the weakest areas. Two of the studied referral facilities had no bag and mask, and although these were available in the other two facilities, the health providers did not know how to use them (Malhotra et al 2014:130-141). The present study and previous studies show clear gaps in knowledge and practice regarding care for preterm babies. Discrepancies exist between research evidence and clinical practice, as practices are not always consistent with the latest scientific evidence, including non-use of treatments shown to be effective and safe and use of others for which evidence is limited or where safety is of concern (Brok et al 2008:F225-F229, Zeitlin et al 2016:i2976). Therefore, measures need to be taken to improve health professionals' knowledge, understanding and practice in the use of interventions that are supported by evidence.

6.5 FACTORS ASSOCIATED WITH IMPLEMENTATION OF LOW-COST HIGH-IMPACT INTERVENTIONS FOR PRETERM BABIES

The fourth objective was to describe factors associated with implementation of guidelines among nurses and midwives. Pearson's chi-square tests were used to test for associations among variables. There were no significant associations between the levels of health facilities and implementation ($p=0.603$), professional qualification ($p=0.756$), in-service training in newborn care ($p=0.565$), age ($p=0.333$) and years of experience ($p=0.079$). However, there was an association between participants' gender ($p=0.019$)

and the percentage score for knowledge and practice ($p=0.003$). The odds of a male implementing the guidelines were 0.28 times less likely compared with females, and this was significantly associated with the implementation of the policy guidelines (odds ratio [OR]=0.28; 95% confidence interval [CI]=0.093–0.822; $p=0.021$). The odds of nurses and midwives with average knowledge of preterm care implementing guidelines were 5.13 times higher compared with those with poor knowledge (OR=5.13; 95% CI=1.522–17.295; $p=0.008$). Similarly, the odds of nurses and midwives with good knowledge regarding preterm care implementing the guidelines were 5.05 times higher compared with those with poor knowledge. There were inadequate qualitative data to compare and integrate with the quantitative data. However, participants from the focus groups and interviews were in consensus that equipping nurses and midwives with knowledge and skills would be associated with better implementation of the guidelines. Figure 6.10 illustrates this.

Quantitative Findings	Qualitative Findings
<p>Odds of males implementing the guidelines were 0.28 times less likely compared with females, and this was significantly associated with implementation of the policy guidelines (odds ratio [OR]=0.28; 95% confidence interval [CI]=0.093–0.822; $p=0.021$).</p>	<p>“I think here, continuous medical education (CME) for continuous updates have helped us in this facility to care for them (preterm babies) and also the emergency training...”</p>
<p>Odds of nurses and midwives with average knowledge regarding care of preterm babies implementing guidelines were 5.13 times higher compared with those with poor knowledge (OR=5.13; 95% CI=1.522–17.295; $p=0.008$).</p>	<p>“So I think maybe some refresher courses or done recently have been important for the midwives and even the clients since they can handle the preterm better with more confidence.”</p>
<p>Odds of nurses and midwives with good knowledge regarding care of preterm babies were 5.05 times higher compared with those with poor knowledge (OR=5.05; 95% CI=1.319–19.349; $p=0.018$) (Table 4.9).</p>	<p>“The newborn units don’t have neonatal nurses or even pediatric nurses. I believe if these areas are addressed, we can see some improved health outcomes of preterm babies.”</p>
	<p>“Recently almost all the nurses and midwives underwent EmONC and IMCI courses. We facilitated this is to equip them with the needed skills. This I believe helps them to take care of the preterm babies.”</p>

Figure 6.10 Factors associated with implementation low-cost high-impact interventions for preterm babies

Factors or determinants of guideline implementation may differ among healthcare settings, healthcare professionals and caregivers' demographic characteristics (Colquhoun et al 2017:30). A systematic review investigating the usefulness of in-service training for healthcare providers in managing and care of sick newborns in low- and middle-income countries showed that there was inadequate evidence that health workers' practices when caring for a seriously ill newborn improved following in-service neonatal emergency care courses, although some evidence of benefits existed. That review recommended trials to evaluate the effect of refresher emergency care training on continuing professional practices (Opiyo & English 2010:122-126).

Change may be more likely if implementation strategies are specifically chosen to address these determinants. Tailored interventions to change professional practice are interventions planned following an investigation into the factors that explain current professional practice and any reasons for resisting new practice (Baker et al 2015:144-150).

6.6 BARRIERS AND ENABLERS TO IMPLEMENTATION

6.6.1 Barriers to Implementation

Some of the barriers to implementation highlighted by participants in this study reflected both demand and supply perspectives. The main challenges voiced by participants are presented in Table 6.2.

Table 6.2 Barriers/challenges

Domain	Quantitative: Survey of midwives and nurses (semi-structured questionnaire) N=102	Qualitative: Focus group discussions with midwives and nurses
Staffing	Low staffing ratio n=10 (9.8%)	"Another challenge I can say is staffing. Sometimes especially in the afternoons once everybody else leaves the facility. It's only one nurse in the afternoon shift between 4:30 or 7:00 PM. So if a situation like that gets to, at around that time it's not that easy to deal with it." (FGD, SCH 2)

Domain	Quantitative: Survey of midwives and nurses (semi-structured questionnaire) N=102	Qualitative: Focus group discussions with midwives and nurses
Skills and skills	<p>Inadequate skills</p> <p>Lack of understanding of the guidelines</p> <p>Lack of refresher trainings n=26 (25.5%)</p>	<p>“Here we do not know how to feed them...it is difficult. We always call the doctor or nutritionist.” (FGD, SCH 2)</p> <p>“The other thing I can say is skills is a challenge, because we are not trained to handle prematures, you know...and even to get even paediatrician or paediatric nurses, they are only in the county hospital. It’s just the basic nurses and midwives that we have here.” (FGD, SCH 2)</p> <p>“Some guidelines are not clear, like the one on resuscitation.” (FGD, HC3)</p> <p>“If only we could have some refresher training now and then to be up to date.” (FGD, HC1)</p>
Guidelines	<p>Lack of guidelines n=12 (11.8%)</p>	<p>“Guidelines never come to this facility, only a few times.” (FGD, SCH1)</p> <p>“If we had clear guidelines on how to take care of these prematures, it would be easier.”(FGD,SCH2)</p>
Drugs	<p>Inconsistent supply of medication n=13 (12.8%)</p>	<p>“All the important drugs like chlorhexidine and vitamin K are rarely in stock.” (FGD, HC3)</p>
Equipment	<p>Lack of/non-functioning equipment n=12 (11.8%)</p>	<p>“Like for us, currently our oxygen cylinder is not functioning.” (FGD, HC2)</p> <p>“Yes and in fact, equipment like suction machines go for repair and might not come.” (FGD, HC3)</p>
Referral	<p>Ineffective referral system n=13 (12.8%)</p>	<p>“Ambulance sometimes is broken down.” (FGD, HC1)</p> <p>“Transferring a preterm baby can be a challenge due to delays, the receiving facility has to give an okay.” (FGD, SCH1)</p> <p>“Here, no clear policy on referral.” (FGD, HC3)</p>

Domain	Quantitative: Survey of midwives and nurses (semi-structured questionnaire) N=102	Qualitative: Focus group discussions with midwives and nurses
Infrastructure/ Space	Poor infrastructure Lack of space in newborn units n=10 (9.8%)	“Our new-born unit is too small, almost like and observation room.” (FGD, HC4) “Distance and poor roads sometimes are a huge challenge.” (FGD, SHC1)
Change	Fear of changing n=3 (2.9%)	“Some of the staff is not ready to change, they stick to old ways of doing things even when new evidence is available.” (FGD, HC2)
Culture	Cultural beliefs n=3 (2.9%)	“Some mothers come to the hospital when they have already decided what to apply on the cord, very hard to change them.” (FGD, HC1)

Table 6.2 shows several barriers that impede implementation of guidelines. Similarly, a study undertaken with medical specialties stressed the challenges of translating available conclusive scientific knowledge to clinical practice because of cultural, personal or organisational barriers (Payne et al 2010:437-446; Zeitlin et al 2016:i2976).

A study exploring the experiences among health providers in a maternity facility in Tanzania showed that poorly controlled stock items and lack of proper equipment maintenance affected the delivery of quality care, as it interfered with proper staff working conditions (Penfold et al 2013:61). Similarly, a study in Malawi (Gondwe et al 2016:1441-1147) identified several challenges in caring for preterm babies including lack of skills in preterm baby care among staff, antibiotics, space, supervision and poor referral systems (Gondwe et al 2016:1441-1447).

Barriers that hinder quality care for preterm babies reflect a scarcity of health providers, a lack of skills among the attendants and a shortage of crucial equipment/medicines (e.g. radiant warmers, suction machines and antibiotics) (Lawn et al 2013:S5). The present findings support those of a study conducted in Kenyan private and public hospitals that assessed barriers to effective coverage of essential inpatient care for sick and small babies. That study showed that three-quarters of the babies had no access to quality facility-based care because of facility and health provider factors, including a shortage of staff and commodities (Murphy et al 2018:72). The present study and other studies discussed here show that many challenges exist that may hinder proper guidelines

implementation. Most of these challenges can be addressed by training programmes, although some can be persistent.

6.6.2 Enablers to implementation

In the absence of available quantitative data, some significant qualitative findings on enablers to implementation could not be compared or integrated. Although a majority of participants did not elucidate many enablers to implementation, few indicated that some enablers existed that made implementation easier. Figure 6.4 illustrates the perceived enablers.

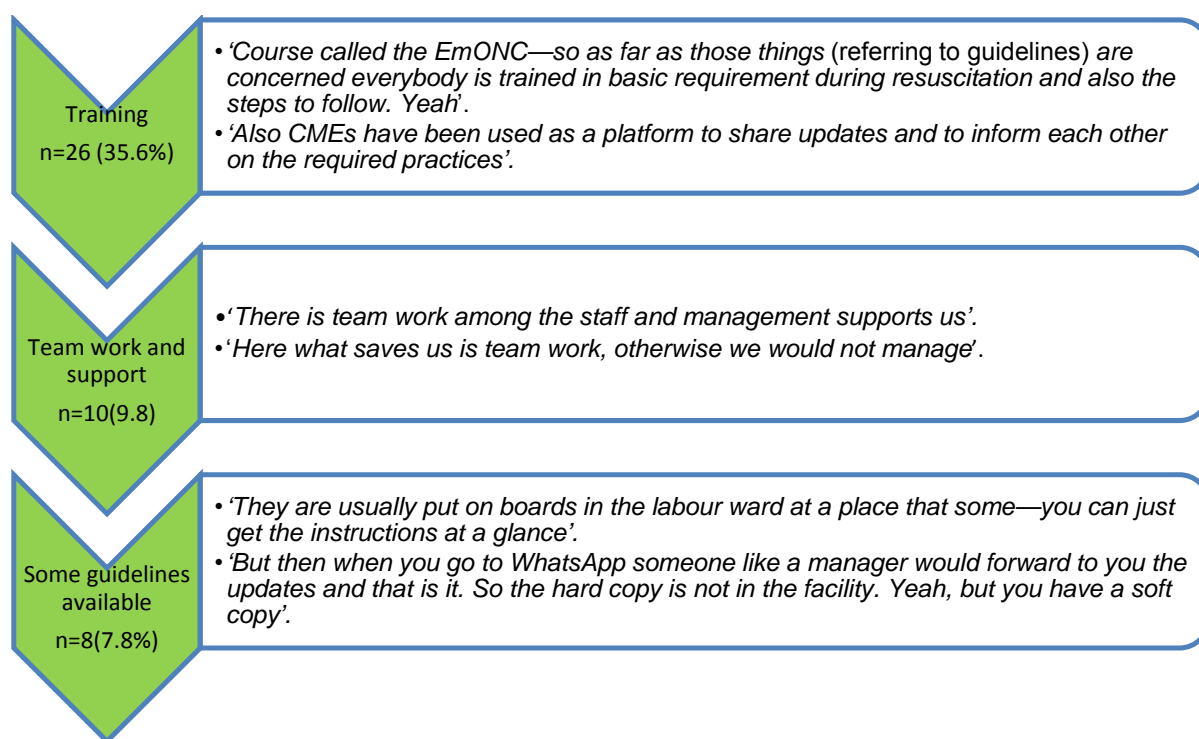


Figure 6.11 Enablers to implementation of guidelines among nurses and midwives

The present findings on enablers to implementation can be compared with the results of a previous study evaluating knowledge and skills following a training programme (Van Lonkhuijzen et al 2010:777-787). That study showed that training can improve quality of care, but recommended evaluation and reporting of this impact. In contrast, another study that evaluated the impact of emergency care training for healthcare providers on lifelong professional practices noted training had little impact (Opiyo & English 2010:122-126).

These two studies highlight gaps in practice may remain even after targeted training. Although some participants in the present study highlighted training as an enabler, many nurses and midwives had undergone refresher training within a period of 2 years before the study, but still demonstrated incorrect practice. An enabler mentioned in previous studies but not the present study was clinical audits (Lawn et al 2014:189-205).

6.7 CONCLUSION

This chapter discussed the integration of the qualitative and quantitative findings and related these findings to existing literature. The findings highlighted gaps in practice of implementation of recommended guidelines, inadequate availability of guidelines and inadequate equipment and drugs in many health facilities. Lack of current guidelines, drugs and equipment made a direct contribution to sub-optimal implementation of the requisite guidelines. Small and sick newborns did not have access to high-quality facility-based care. Substantial improvements in effective coverage will be required to tackle the high neonatal mortality in urban settings that have high levels of poverty. Numerous evidence-based interventions for immediate care of preterm babies were not fully implemented, including thermal care, immediate breastfeeding, resuscitation and the use of chlorhexidine for cord care, despite these interventions being low-cost and low-technology. The data further revealed that knowledge, understanding and practice among nurses and midwives with respect to evidence-based guidelines was largely deficient, despite being an integral part of preterm care.

CHAPTER 7

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

This chapter presents the study's conclusions, recommendations and limitations, grounded on the interpretation of findings discussed in Chapters 4, 5 and 6. As noted by Hamilton College Writing Centre (2015), the main purpose of the concluding chapter of doctoral research is to bring an investigator's argument to a meaningful close, by way of justifying the argument. The final chapter consists of a description of the main points of the research and the significance of the argument. It provides answers to the research questions and further discusses the theoretical and policy implications of the research findings.

7.2 FOCUS OF THIS STUDY

This study was chosen after a literature search that revealed the coverage of low-cost interventions that require low technology (resuscitation, early and continuous feeding, provision of warmth and cord care) to improve outcomes for preterm babies is challenging, especially in remote counties in Kenya. The literature further showed that integrating and scaling up such interventions in counties that have a high number of neonatal deaths has potential to save many lives.

This study aimed to identify national policies and guidelines regarding low-cost high-impact interventions to improve health outcomes for preterm babies that have been implemented in Kilifi County (rural Kenya). The study also aimed to describe the knowledge and understanding of nurses and midwives regarding these policies and guidelines, and identify factors associated with implementation of the identified policies and guidelines. The study further explored the barriers and facilitators to implementation of the policies and guidelines, and finally recommended instructional strategies to enhance implementation of these policies and guidelines.

The present research adopted a mixed method approach using a convergent design, with quantitative and qualitative data collected simultaneously and both arms given equal weight. The qualitative data enriched the quantitative results and provided a deeper understanding of the research questions. Quantitative data were collected using a questionnaire administered to nurses and midwives working in public health facilities (sub-county hospitals and health centres). A health facility assessment using a checklist was also performed to assess the availability of guidelines/policies, equipment and medication to support preterm care in the studied health facilities. Qualitative data were gathered through focus group discussions with nurses and midwives, in-depth interviews with key informants and unstructured observation of the health facilities.

The study specifically sought to answer the following questions:

- What is the extent to which current policies and guidelines regarding interventions to improve health outcomes for preterm babies are implemented in health facilities?
- What is the knowledge, understanding and the use of the policies and guidelines for improving health outcomes for preterm babies among nurses and midwives in Kilifi health facilities?
- What are the factors associated with implementation of the policies and guidelines by nurses and midwives in health facilities in Kilifi County?
- What are current enablers and barriers for nurses and midwives in implementing the policies and guidelines that support care of preterm babies?
- What strategies can be implemented to enhance implementation of policies and guidelines by nurses and midwives in Kilifi County that will improve health outcomes for preterm babies?

7.3 KEY FINDINGS

The main research findings are elaborated in Chapters 4 (quantitative results), 5 (qualitative findings) and 6 (integration of qualitative and quantitative results). This section synthesises the quantitative and qualitative findings to answer the five research questions.

7.3.1 What is the extent to which current policies and guidelines regarding interventions to improve health outcomes for preterm babies are implemented in health facilities?

The objective was to assess the availability of policies and guidelines that support care of preterm babies in the sampled health facilities, and describe the implementation of these policies and guidelines by nurses and midwives. To meet this objective, the researcher also assessed the availability of essential equipment and medication, because availability/unavailability influences the way policies and guidelines are implemented. A facility checklist was used to assess the availability of guidelines/policies, equipment and drugs. To assess the implementation of guidelines and policies, a questionnaire was administered to nurses and midwives working in the sampled health facilities.

Findings

Gaps in the availability of equipment, medications and guidelines/policies were identified in the assessment. Most health facilities lacked important equipment, including incubators/radiant heaters, oxygen and measuring cups (Table 4.3). The findings also revealed that some equipment was malfunctional most of the time; for example, suction machines, ambu bag and oxygen concentrators. Similarly, medications such as chlorhexidine, vitamin K, dexamethasone, gentamicin, diazepam and ampicillin (Table 4.4) were not available in the health facilities most of the time when needed. Most facilities also scored poorly in terms of the availability of guidelines, especially those on immediate and continuous feeding, cord care, referral, resuscitation and KMC (Table 4.5). Policies and guidelines were not well implemented in the study area. Immediate and continuous feeding and the use of antiseptic for cord care were the least implemented. For the provision and maintenance of warmth, the practice of delayed bathing of a preterm baby was poorly implemented, despite its importance for conserving the warmth of the baby's skin. There was also inadequate promotion of immediate initiation of resuscitation, despite overall evidence showing that preterm mortality can be reduced with immediate basic resuscitation using a bag and mask, and only a minority of babies require advanced resuscitation.

Responses from focus group discussions and in-depth interviews also revealed that important equipment, medications and current guidelines were lacking in many health

facilities. This reiterated that implementation is difficult if the necessary equipment, medications and guidelines to guide clinical practice are not available. Comments from participants reflected suboptimal use of evidence-based care because of failure to implement current guidelines and policies that support preterm care.

Conclusion

The findings affirmed major gaps in implementation of clinical guidelines and policies to support the care of preterm babies. Guidelines/policies, important equipment and medications were not always available, which caused frustration among healthcare workers in their efforts to provide care for preterm babies. Successful implementation is associated with availability of guidelines, equipment and medications to support the care of preterm babies. Failure to acquire and maintain key equipment and erratic availability of essential drugs and guidelines to support the care of preterm babies contribute to a shortfall in quality of care. Substantial improvement in effective coverage of these gaps is required to improve the care of preterm babies in this rural area. This study found that guidelines to support preterm care were not implemented consistently across the health facilities. This is a major inadequacy in any facility providing care for preterm babies.

7.3.2 What is the knowledge, understanding and use of the policies and guidelines for improving health outcomes for preterm babies among nurses and midwives in Kilifi health facilities?

This study aimed to investigate the knowledge, understanding and use of guidelines and policies to enhance the care of preterm babies. A questionnaire with vignettes was used to capture correct knowledge and practices. This was administered to nurses and midwives providing care for preterm babies in the studied facilities. Qualitative data were gathered through focus group discussions with nurses and midwives and in-depth interviews were conducted with key informants.

Findings

As depicted in Table 4.6, the majority of participants did not know the proper action to take if a 34-week-old preterm baby did not cry immediately after delivery, and many indicated they would suction the mouth immediately. Only a minority gave the best

response, which was drying and rubbing the baby gently. The findings further showed that almost one-third of participants would give the baby its first bath soon after delivery, highlighting a gap in knowledge of thermal care for preterm babies. On the same note, when asked what action they would take when a 25-week-old preterm baby was not able to breastfeed, only slightly above one-third of the participants knew the best answer as per the guideline recommendation. Similarly, slightly above half of the participants stated that they would clamp the cord of a newly delivered, stable preterm baby soon after delivery, despite the correct practice being 2–5 minutes following birth. Regarding knowledge and practice of cord care, only slightly above one-third of the participants gave the correct response, which was application of antiseptic cream (almost two-thirds answered incorrectly). The study findings highlighted inadequate knowledge and discrepancies in practice among nurses and midwives.

Opinions differed regarding knowledge, understanding and practice among midwives and nurses interviewed during the focus group discussions. These varying perspectives from participants suggested there were gaps in knowledge and practice regarding evidence-based interventions to improve preterm babies' health outcomes.

Conclusion

Slightly above one-third of the participants were able to report knowledge, understanding and correct practice regarding specific aspects of preterm babies' care. This finding highlights a critical gap in the implementation of evidence-based practice to support preterm care. There was a possibility that nurses and midwives did not implement the guidelines because they did not support or agree with them, with some believing that current guidelines were not superior to what they were using previously. This perspective identified nurses/midwives who were more critical of the guidelines and likely to ignore them. This has implications for continuous education and strategies to assist individual nurses and midwives in achieving better adherence to recommended guidelines.

7.3.3 What are the factors associated with implementation of policies and guidelines by the nurses and midwives in health facilities in Kilifi County?

The study's objective was to identify factors associated with implementation of four evidence-based guidelines/policies by nurses and midwives. Pearson's chi-square tests were used to evaluate associations.

Findings

There were no significant associations between implementation and the levels of health facilities, professional qualification, in-service training in newborn care, age and years of experience, consistent with previous studies (Section 4.6.2). However, this study established that there were associations between participants' gender and percentage scores for knowledge and practice and implementation. Gender as a variable was not highlighted by other authors. The odds of male nurses and midwives implementing the guidelines were 0.28 times less likely compared with females, and this was significantly associated with the implementation of policy guidelines. The odds of nurses and midwives with average knowledge regarding care of preterm babies implementing guidelines were 5.13 times higher compared with those whose knowledge was poor. Similarly, the odds of nurses and midwives with good knowledge regarding care of preterm babies implementing guidelines were 5.05 times higher compared with those with poor knowledge.

Implementation was also associated with patients' characteristics. For example, focus group participants argued that some clients seek healthcare too late or come with preconceived ways of how their preterm babies should be cared for, and make demands that are sometimes not supported by evidence. Qualitative data to verify other associated factors were limited; however, focus group and interview participants were in consensus that equipping nurses and midwives with knowledge and skills would be associated with better implementation of the guidelines. Characteristics of the specific guidelines were not assessed to determine if these were associated with implementation, as this was beyond the scope of this study.

Conclusion

Participants' gender and percentage scores for knowledge, understanding and practice were associated with implementation of guidelines/policies that support the care of preterm babies.

7.3.4 What are current enablers and barriers for nurses and midwives in implementing the policies and guidelines?

This study aimed to explore the barriers that hinder adherence to evidence-based guidelines among nurses and midwives. It also intended to describe possible enablers for implementation of guidelines and policies in the sampled health facilities. The survey responses from midwives and nurses were drawn from a semi-structured questionnaire. The barriers and enablers were further quantitatively explored through focus group discussions with nurses and midwives and in-depth interviews with key informants.

Findings

There were several barriers that impeded effective implementation of the guidelines and policies. These included (according to the frequency they were mentioned): inadequate skills, lack of understanding of the guidelines, lack of refresher training, low staff-to-patient ratio, inconsistent supply of medication, ineffective referral systems, lack of current guidelines, lack of/non-functioning equipment, poor infrastructure, lack of space in newborn units, fear of change and uncooperative clients.

The availability of some of the guidelines in both hard and soft copies, in-service training and team work were some facilitators to guidelines implementation reported by participants.

Conclusion

Many barriers to implementation existed compared with enablers. Barriers that may decrease adherence according to study participants were related to the health facility, clients, care providers' attitudes and infrastructure. For effective adoption and use of guidelines/policies, the determinants of implementation of guidelines for preterm care

have to be explored and addressed in a context-specific manner. It is widely assumed that efforts to change professional practice have a lower likelihood of success if these determinants are not identified and taken into account.

7.3.5 What strategies can be used to enhance the implementation of policies and guidelines that will improve health outcomes for preterm babies?

This objective was to recommend implementation strategies to enhance compliance with the national guidelines and policies to improve health outcomes for preterm babies. The scope of this study was not to identify strategies that had been used to ensure dissemination and implementation of the policies and guidelines, but rather to explore participants' views on what strategies would be favourable for implementation of guidelines. This was achieved through the semi-structured questionnaire and focus group discussions with nurses and midwives.

Findings

Strategies echoed by many participants were: motivation of healthcare workers; involvement in guideline reviews; adequate staff-to-patient ratios; periodic meetings for updates; supportive supervision and awards for the best performers; regular and timely supplies of essential drugs, equipment and guidelines; regular training of nurses and midwives, especially on preterm care; clinical audits; and streamlining the referral system.

Conclusion

Effective strategies to improve the implementation of guidelines and policies related to preterm babies' care may include active involvement of practitioners, as highlighted by participants' comments. These strategies need to be considered to improve adherence to clinical guidelines by nurses and midwives providing care for preterm babies.

7.3.5.1 Recommendations for instructional strategies to improve guideline/policy implementation

Implementation strategies are described as approaches or techniques used to improve the acceptance, implementation and sustainability of scientifically proven programmes or

practices (Becker, Held, Redaelli, Chenot, Leonhardt & Keller 2012:211-233, Bekkering, Tulder, Hendriks, Koopmanschap, Knol & Bouter 2005:94-99). For the best use of clinical guidelines/policies in day-to-day practice, ordinary dissemination of guidelines/policies may not be sufficient, and active implementation may be necessary. Effective strategies to implement nursing care guidelines need to involve practitioners and should be clinically orientated. Active strategies are related to better outcomes compared with dissemination by coercion, while passive dissemination shows little success in implementation (Powell, McMillen, Proctor, Carpenter, Griffey, Bungler, Glass & York 2012:123-157).

Components of strategies that are consistently associated with the successful implementation of evidence-based practices include: identification of barriers, leadership, staff involvement, tailoring to context, supportive supervision, communication, education, resources provision, and audit and feedback (Fischer, Lange, Klose, Greiner & Kraemer 2016:36; Flanagan, Ramanujam & Doebbeling 2009:71).

Currently, studies show there is no single reliable method to select strategies that are suitable for implementing guidelines facing diverse barriers (Becker et al 2012:211-233). However, different strategies used in a multi-faceted style of implementation may help to shape provider acceptance of clinical guidelines. Specifically, provider acceptance may be more favourable when more (and diverse) rather than fewer implementation approaches come into play (Rauh et al 2018:e000385). Based on the results of this study, as espoused in the conclusions and extant literature reviewed, the following instructional strategies are proposed by the researcher.

7.3.5.1.1 Provider-focused strategies

The researcher proposes an implementation strategy that involves communication with nurses and midwives about specific guidelines that have a potential to enhance health outcomes for preterm babies. This could be achieved using various strategies such as distributing materials about guidelines to stimulate awareness, as participants voiced a lack of awareness about guidelines in most health facilities at different levels. Focused academic detailing and grand rounds through CME, which provides face-to-face information about evidence-based interventions to providers, can improve knowledge. This gap was identified by the majority of nurses and midwives interviewed. Similarly, guidelines need to be simplified (e.g. job aids or pocket books) when provided in

departments to avoid complexity, as participants cited failure to understand preterm guidelines. Conducting clinical meetings may also be useful to clarify the guidelines, especially after revisions, to help nurses and midwives buy-in and support easier change management. Facility management also needs to identify champions who can informally encourage other nurses and midwives to adopt evidence-based guidelines. As suggested by the participants, these champions can provide supportive supervision to build knowledge and competence. Decision-makers also need to use considerable judgment about how best to use the limited resources they have to improve guideline adoption. Implementation strategies should be directed by local contextual barriers as identified by participants (e.g. provider skills, provision of resources and streamlining the referral system). As such, the strategies should strive to minimise provider-level barriers to adherence as per the research findings and create facilitators to guideline adherence. Decision-makers should consider the likely effectiveness of different dissemination and implementation strategies for the target situation and setting, as well as the resources required to deliver these different strategies. Such initiatives have potential to improve the care provided to preterm infants by promoting interventions of proven benefit and discouraging ineffective interventions.

7.3.5.1.2 Workflow-focused strategy

The researcher further proposes that academic administrators need to be deliberate in facilitating the institutionalisation of policies and guidelines that inform practice by targeting their adoption at individual, departmental and health facility levels. The researcher proposes strategies that involve changes in the task context pertinent to the specific guidelines that support preterm care and likely to improve their survival. An example of such a strategy is introducing a reminder system (simplified and specific to guidelines) that provides timely alerts regarding appropriate actions to help change workflow. Similarly, the researcher suggests changing the work processes of nurses and midwives to incorporate the guidelines. In addition, redefining the responsibilities and roles of nurses and midwives in congruence with guideline requirements to improve health outcomes for preterm infants, and revising forms/procedures may improve adherence to the guidelines. The researcher further suggests organisational involvement in audits and quality feedback as noted by participants, which may improve performance and attitudes in clinical practice among nurses and midwives. These strategies have

potential to introduce changes that facilitate the routine espousal of interventions to support preterm care, while reducing contextual barriers to their adoption.

7.3.5.1.3 Evaluation of the Emergency Obstetric and Neonatal Care Training Programme

Additionally, health facility administrators need to evaluate whether the in-service training given to nurses and midwives translates to better knowledge, understanding and skills in providing care for preterm infants. For example, despite the fact that more than three-quarters of participants had undertaken an emergency obstetric and neonatal care course, knowledge and understanding was low and practice was inconsistent with the guidelines. It is therefore necessary to understand how much preterm care is taught in this course as participants raised concerns that the content did not cover preterm care. Supportive supervision and active monitoring through facility management can also improve nurses' and midwives' competencies and confidence in caring for preterm babies. The researcher further proposes clinical audit and feedback by management to assess quality of care given to preterm babies by nurses and midwives who have completed the training. This will help in evaluating retention and use of knowledge imparted during such training.

7.3.5.2 Recommendations for policy

The importance of skilled nurses and midwives working in a supportive environment is well recognised (Murphy et al 2018:72). It has also been established that skilled nurses and midwives are in short supply in the study area, which is among the rural counties in Kenya with a high burden of preterm deaths. This is compounded by the deficiencies in skills and knowledge among nurses and midwives who routinely provide neonatal care, and negatively impacts on guideline implementation. This needs to be improved for implementation to be realised. For future implementation strategies, an analysis of forces and variables influencing preterm care practice in Kilifi county needs to be conducted.

7.3.5.3 Recommendations for future research

The researcher recognises the need to perform a formative and/or summative endpoint evaluation of health outcomes for preterm babies in Kilifi County to assess the degree to

which implementation is effective to optimise the health benefits of interventions. Existing evidence describes numerous factors influencing guideline use generally, but there is paucity of research conducted in Kilifi County to ascertain which strategies have been used. Future robust research is needed; for example, to identify the implementation strategies used and compare amalgamations of implementation strategies.

Implementation research consisting of scientific investigations that support moving from the clinical knowledge base into routine use, or the systematic uptake of new or underused scientific findings into usual activities in regional healthcare should be considered. There is need for research to gain evidence regarding what strategies increase guideline implementation among nurses and midwives working in Kilifi County.

7.4 LIMITATIONS OF THIS STUDY

The researcher acknowledges the following limitations of the study.

7.4.1 Health facility assessment

Health facility assessments were largely conducted with the maternity unit in charge or highest level nurse/midwife present at the time. This could be interpreted as reflecting the highest knowledge on the availability of equipment, medications and guidelines, especially those kept under lock and key. At the same time, a comparison of the results of the checklist and the survey of nurses and midwives could have validated the findings; however, this was not done as it was outside the scope of this study.

7.4.2 Survey questionnaires with vignettes

The vignettes used were deliberately simplified assessments of essential, basic care for preterm babies in the first day of life targeting the most obvious gaps. Best practice was tested by asking about expected care. This might have differed somewhat from genuine care and could have overestimated guideline use. In addition, because the questionnaire was administered to nurses and midwives during shift hours, there was a possibility that they were sharing the information in the questionnaire, which could have influenced their responses.

7.5 CONTRIBUTIONS TO THE KNOWLEDGE BASE AND ORIGINALITY OF THE STUDY

This study was conducted to investigate the implementation of four evidence-based interventions among nurses and midwives to enhance health outcomes for preterm babies. Creswell (2002:4) described ways that make a study significant in addressing issues or problems and searching for possible solutions. For example, creating new understanding of existing issues, bridging knowledge gaps and exploring an area of research that fills a vacuum in existing evidence by expanding the body of knowledge, extending research to new concepts or practices, replicating knowledge, testing previous findings with new participants or at new sites and adding the voices of persons whose viewpoints have not been heard to the knowledge.

The results of this study contribute to creating awareness with regard to the theory, policy and practical implications of low-cost high-impact interventions that are likely to improve health outcomes for preterm babies in Kenyan public health facilities.

7.5.1 Originality of this study

Understanding the low-cost high-impact interventions that are likely to improve preterm babies' outcomes is an integral part preterm care in Kenya. Such understanding can help in the design of strategies to improve implementation of interventions by nurses and midwives. However, there is a paucity of studies addressing this issue. No studies focused on how interventions have been implemented have been conducted in Africa generally or in Kenya specifically. This study is therefore the first to give voice to how the four selected evidence-based interventions have been implemented in a Kenyan context. Moreover, the few studies focusing on a similar research area in Africa and Kenya considered the general care of the preterm babies.

No previous studies have focused on the extent to which guidelines were implemented, factors associated with implementation, and barriers and enablers, which were all addressed in this study.

7.5.2 Contributions of this research to theory

This research makes a contribution to bridging noted gaps highlighted in the literature and adding to the body of knowledge regarding high-impact low-cost interventions from the perspective of nurses and midwives in the African context. Despite the bulk of literature focused on interventions to improve the care of preterm babies, the present study is context-specific, with questions that were directed at Kenyan public health facilities. To this extent, the present study is ground-breaking in seeking to understand how the guidelines have been implemented in Kenya. Further, this study contributes to the body of knowledge by focusing on an aspect that has not been extensively researched. The results also inform providers regarding improving management of preterm babies' care through implementation of clinical guidelines. In turn, this is likely to improve preterm babies health sequelae by decreasing the long-term health burden related to preterm births.

This study offers a different understanding of preterm care research, by examining the experiences of nurses and midwives in implementing best practice care guidelines. In addition, this study used a mixed methods design, whereas many previous studies were largely qualitative or quantitative. More significant is the focus on multiple methods of data collection (health facility assessment checklist, semi-structured questionnaire, focus group discussions and in-depth interviews) that contributed to the richness of the data. The study findings therefore provide empirical baseline data that is useful to compare with other similar studies (or future studies), to establish whether they corroborate or differ. By exploring and describing the perspectives of nurses and midwives regarding implementation of low-cost high-impact interventions, this study provides a starting point for other researchers intending to use a mixed methods approach to investigate implementation of policies and guidelines. This study has also shown how a pragmatism approach satisfactorily covered the exploration of clinical guidelines implementation in a rural county in Kenya.

This study makes an important contribution to the body of knowledge by suggesting possible strategies to successful implementation. These results add to the argument for further investigation and development of possible strategies to increase the implementation of guidelines/policies in the study area, which can also be tested nationally.

7.5.3 Contributions of this research to policy

The findings of the present study have potential to contribute to policy in different ways and levels, including providing information that may help in expanding knowledge on the topic. This new knowledge will be useful for nurses and midwives, lecturers, librarians and healthcare leaders in their search to improve knowledge in this area. The results will also provide data and information that is critical in informing development of specific guidelines/policies relevant to the area of knowledge.

The results of this study may also be used at the national level to provide a solid foundation for the formulation of a vigorous national low-cost high-impact policy framework in the Kenyan context, which currently does not exist. This study uncovers challenges associated with such framework implementation that would guide discipline-specific curriculum designs and implementation. This could build on the guidelines provided by the MOH. Another contribution to policy is that the results of this study provide empirical data and information on which policy-makers at county and national levels could reflect in formulating a context-specific dissemination and implementation framework.

7.5.4 Contributions of this research to nursing and midwifery practice

The results of this research suggest a possible need to examine the nature of evidence-based practice and how it is applied by nurses and midwives in the clinical setting. This study showed that nurses and midwives lacked consistency in translating evidence into practice, which calls on curriculum designers and evaluators to evaluate how much evidence translation is contained in the current curriculum. Health facility administrators need to re-evaluate their implementation initiatives and general practices to ensure they adopt those that are backed by scientific evidence.

The findings of this study also make a major contribution to the literature that could facilitate effective and relevant development strategies that support nursing and midwifery practice while caring for preterm babies in future.

7.6 OVERALL STUDY CONCLUSIONS

This chapter discussed conclusions drawn from the main findings as well as the recommendations and limitations of the study. The results provided rich information from several data sources highlighting a need to improve the implementation of four evidence-based practices that will enhance health outcomes for preterm babies.

Interventions through clinical guidelines are supposed to close the gap between research and clinical practice, thereby reducing inappropriate variability in practice. Despite common recognition of their key function, guidelines are not always adhered to, as shown in this study. Inadequate use of guidelines reflects the omission of beneficial treatments, possible avoidable harms, suboptimal patient care and can be a waste of resources. Emphasis needs to be placed on reducing variations in the care of preterm babies among nurses and midwives, advocating for best care practices by implementation of evidence-based practice and adherence to clinical practice guidelines to improve health outcomes. The barriers identified in this study that prevented implementation of clinical guidelines need to be systematically addressed by a variety of effective strategies.

Current guideline dissemination and implementation strategies need to be employed, as this can lead to improvements in care. Decision-makers need to use considerable judgment about how best to use the limited resources available for quality improvement activities. This has potential to improve the care received by preterm babies by promoting interventions of proven benefit and discouraging ineffective interventions.

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ANNEXURES

ANNEXURE A

APPROVAL FROM THE UNIVERSITY OF SOUTH AFRICA RESEARCH



**RESEARCH ETHICS COMMITTEE: DEPARTMENT OF HEALTH STUDIES
REC-012714-039 (NHERC)**

15 February 2017

Dear MS JW Kabo

Decision: Ethics Approval

HSHDC/619/2017

MS JW Kabo

Student: 5856-359-8

Supervisor: Dr J Mathibe-Neke

Qualification: PhD

Joint Supervisor: -

Name: MS JW Kabo

Proposal: High Impact low cost interventions to enhance the quality of care given to preterm babies in Kilifi County Kenya.

Qualification: DPCHS04

Thank you for the application for research ethics approval from the Research Ethics Committee: Department of Health Studies, for the above mentioned research. Final approval is granted for the duration of the research period as indicated in your application.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the Research Ethics Committee: Department of Health Studies on 15 February 2017.

The proposed research may now commence with the proviso that:

- 1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
- 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Research Ethics Review Committee, Department of Health Studies. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*



University of South Africa
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3) The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

4) [Stipulate any reporting requirements if applicable].

Note:

The reference numbers [top middle and right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the Research Ethics Committee: Department of Health Studies.

Kind regards,


Prof L. Roets
CHAIRPERSON
roetsl@unisa.ac.za


Prof MM Moleki
ACADEMIC CHAIRPERSON
molekmm@unisa.ac.za

ANNEXURE B

APPROVAL BY THE AGAKHAN UNIVERSITY RESEARCH ETHICS COMMITTEE



THE AGAKHAN UNIVERSITY

Faculty of Health Sciences
Medical College

Ref: 2017/REC-50 (v2)
09th May 2017

Ms. Jane Kabo
Principal Investigator and Faculty member
Aga Khan University, Kenya

Dear Ms. Kabo,

Re: HIGH IMPACT LOW COST INTERVENTIONS TO ENHANCE THE QUALITY OF CARE GIVEN TO PRETERM BABIES IN KILIFI COUNTY-KENYA

The Aga Khan University, Nairobi Research Ethics Committee (REC) is in receipt of your revised proposal and responses submitted to the Research Office on 25th April 2017. With reference to our communication Ref: 2017/REC-50 (v1) dated 21st April 2017, the committee records that most of the concerns earlier raised have been adequately addressed. However, there is suggestion to consider reviewing your study title to align with your research questions and objectives.

The committee has granted conditional approval (as per attached official stamped protocol) for this project based on core ethical standards, which have been fully instituted in the protocol. Prior to commencing the study, you will be expected to obtain a research licence from the National Commission for Science, Technology and Innovation (NACOSTI) and site approvals from the five health facilities. A copy of these approvals should be submitted to the Research Office for record purpose. Subsequently, you are authorized to conduct this study from 10th May 2017. This approval is valid until 09th May 2018.

The study should be conducted in full accordance with all the applicable sections of the REC guidelines and you should notify the REC immediately of any changes that may affect your research project. You must immediately report any unanticipated problems involving risks to the participants to the REC. All consent forms must be filed in the study binder. You must provide an interim report before expiration of the validity of this approval and request extension if additional time is required for study completion. As the principal investigator you must advise the REC when this study is finished or discontinued and a final report submitted to the Research Office.

If you have any questions and/or require assistance to obtain research permit from NACOSTI, please contact Research Office research.support@aku.edu or 020-366 2148/1136

With best wishes,

Dr. Aynn Lakhani, Chairman
Research Ethics Committee, AKU (Nairobi)

ANNEXURE C

APPROVAL BY THE NATIONAL COUNCIL FOR SCIENCE, INNOVATION AND TECHNOLOGY

ORIGINAL

OFFICIAL RECEIPT 15174

Station: Nairobi **Date:** 24/1/21

RECEIVED FROM: Jane Hamuyu Kabu

Shillings: Two thousand only

Item: Research permit fee

Mode: K3

Head:

Method of Payment: Direct deposit

Cash:

Cheque No.:

USD	
KShs	2000/-
AC	
No.	

Signature of Officer receiving remittance

ANNEXURE D

LETTER SEEKING CONSENT FROM THE COUNTY GOVERNMENT OF KILIFI

Date: 12/12/17

To:
Dr. Evaline Lang'at
The County Research Co-ordination Office,
Department of Health,
Kilifi County Government, Kenya
+254-721-627-306

Re: Permission to Conduct Graduate Study Research in Selected Health Facilities in Kilifi

I am a Faculty Member at the School of Nursing and Midwifery of the Aga Khan University, Nairobi. Presently, I am also a doctoral student undertaking PhD in Nursing at the University of South Africa (UNISA). This study program requires all students to complete an original research in partial fulfilment to the graduate program requirements.

Thus I have formulated a research which will focus on "High Impact Low Cost Interventions to Enhance the Quality of Care Given to Preterm Babies-Midwives' Role in Kilifi County-Kenya". This research is motivated by a baseline findings of an ongoing project that is being implemented in Kilifi by the Aga Khan University, from 2016 -2020. The project title is "Access to Quality Care through Extending and Strengthening Health Systems" (AQCESS).

The primary aim of my proposed doctoral research is:

To explore and describe the implementation of the National policies and guidelines regarding low cost high impact interventions to improve the health outcomes of preterm babies among County health professionals and design instructional strategies to enhance implementation of these policies and guidelines in Kilifi County, Kenya.

Specific objectives include the following:

1. To determine the extent to which the current policies and guidelines regarding interventions to improve health outcomes of preterm babies are being implemented.
2. To identify the factors associated with the implementation of the policies and guidelines in the health facilities in Kilifi County.
3. To assess the role, knowledge, understanding and the use of the policies and guidelines for improving health outcomes of preterm babies among the nurses and midwives in Kilifi county health facilities.
4. To explore the barriers and enablers for health care workers in the implementation of these polices and guidelines in the health facilities.
5. To develop instructional strategies to enhance the compliance of the national guidelines and policies to improve the health outcomes of preterm babies.

The research seeks to purposefully sample 10 Health facilities in Kilifi County which have the highest number of deliveries, preterm births and health care workers.

The facilities will then be randomized using quota system depending on their levels in the following sub counties: Rabai, Kaloleni, Kilifi South, Magarini, Ganze, Kilifi North and Malindi.

The purpose of this application is therefore to seek your permission to allow me to successfully carry out the research, as well as to provide any necessary support that I may need, such as introducing me to the respective study respondents and research assistants.

Should you have any questions regarding the research, kindly don't hesitate to contact me on the following address: Email: jane.kabo@aku.edu. Telephone: (0722591518).

I look forward to your positive consideration and support during the process.

Thanks in Advance

Yours Faithfully

Jane Kabo

Bachelor of Science in Midwifery Coordinator,

School of Nursing and Midwifery,

Aga Khan University,

P O Box 39340 – 00623

Nairobi

ANNEXURE E

APPROVAL LETTER FROM COUNTY GOVERNMENT OF KILIFI



**KILIFI COUNTY GOVERNMENT
DEPARTMENT OF HEALTH SERVICES
OFFICE OF THE COUNTY DIRECTOR**

When Replying quote
Email: chmtkilifi@gmail.com
REF: HP/KCHS/VOL.VIX/6

P. O. Box 9-80108
Kilifi
Date 20 December 2017

Jane Kabo
Principal Investigator
Aga Khan University,
School of Nursing and Midwifery,
P O Box 39340 – 00623,
Nairobi Kenya.

RE: DEPARTMENTAL AUTHORIZATION TO CARRY OUT RESEARCH IN KILIFI COUNTY

The Kilifi County Department of Health Services is in receipt of your request to conduct a study titled, " **High Impact Low Cost Interventions to Enhance the Quality of Care Given to Preterm Babies-Midwives' Role in Kilifi County-Kenya,**" that has received ethical approval from AKU Nairobi ERC. Ref: **2017/REC-50** and NACOSTI Ref: **NACOSTI/P/17/32115/17346.**

The Department is glad to grant you authorization to conduct your study in **10 health facilities within Malindi, Kaloleni, Rabai, Kilifi North, Kilifi South, and Magarini Sub Counties** in line with the approved study protocol. It is required that you engage the administration within the Sub Counties and facilities where you will be working prior to commencing data collection.

Upon completion of the study, you are required to share your study findings, conclusion and recommendations with the Department of Health Services, Kilifi County.

Sincerely,

Dr. Bilali Mazoya
Ag. Director of Health
Kilifi County



Cc: CEC Department of Health
COH Department of Health

ANNEXURE F

PARTICIPANT INFORMATION SHEET

Title: High impact low cost Interventions implemented to enhance the quality of care given to preterm babies in Kilifi County-Kenya

Dear Prospective Participant

My name is Jane W. Kabo and I am doing research with Dr. Mathibe-Neke Johanna, a professor, in the Department of health studies towards a Doctor of Philosophy in Nursing at the University of South Africa. We are inviting you to participate in a study entitled: “High impact low cost Interventions implemented to enhance the quality of care given to preterm babies in Kilifi County-Kenya”.

WHAT IS THE PURPOSE OF THE STUDY?

I am conducting this research to explore and describe the implementation of the National policies and guidelines regarding low cost high impact interventions to improve the health outcomes of preterm babies among County health professionals and design instructional strategies to enhance implementation of these policies and guidelines in Kilifi County, Kenya.

WHY AM I BEING INVITED TO PARTICIPATE?

We obtained your contact details from the Health Facility in charge. You have been chosen to be a participant in this research because you are a nurse/midwife working in the health facility where the research is being conducted. All the nurses and midwives will participate in the study.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The study involves semi-structured interviews. Questions will be asked regarding your availability of the guidelines, knowledge and understanding on the implementation of policies and guidelines to improve preterm babies’ health outcomes. It will take about 45-60 minutes to complete one semi-structured questionnaire.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Participating in this study is voluntary and you are under no obligation to consent to participation. There is no penalty or loss of benefit for non-participation. If you decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. You are free to withdraw at any time and without giving a reason. It may not be possible to withdraw once the questionnaire has been filled in and submitted.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

There is no direct benefit to you as a participant, however, data obtained will be used to gain a needs assessment perspective of the current situation in the region and to identify the gaps in implementation of policies and guidelines, help design instructional strategies to address the gaps and contribute to improving the health outcomes of preterm babies.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

There is no anticipated risk to for participating in this research however there is a possibility that some questions may make you uncomfortable. If so you may opt not to answer the question if you do not want to.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

You have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research. Your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Your answers may be reviewed by people responsible for making sure that research is done properly, including external coder, and members of the Research Ethics Review

Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for a minimum period of five years in a locked cupboard/filing cabinet for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. After this period hard copies will be shredded and/or electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

There is no payment or reward offered, financial or otherwise, in order to participate in the study.

HAS THE STUDY RECEIVED ETHICS APPROVAL

This study has received written approval from the Research Ethics Review Committee of the Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Jane Wamuyu Kabo on +254 722 591 518 or jane.kabo@aku.edu. The findings are accessible for five years.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact Jane Wamuyu Kabo on +254 722 591 518 or jane.kabo@aku.edu

Should you have concerns about the way in which the research has been conducted, you may contact Dr. Mathibe-Neke Johanna, through mathijm@unisa.ac.za. Contact the research ethics chairperson of the higher degree ethics committee of UNISA, if you have any ethical concerns.

Thank you for taking time to read this information sheet and for participating in this study.

Thankyou.

Jane Wamuyu Kabo

CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the semi-structured questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name and Surname..... (Please print)

Participant Signature.....Date.....

Researcher's Name and Surname..... (Please print)

Researcher's signature.....Date.....

ANNEXURE G
CONFIDENTIALITY BINDING FORM

Dear Participant

You are kindly being invited to participate in the research study stated below. It is guaranteed that any information the participant provides, will be kept private and confidential. Participant's personal information will be protected. By signing this document, you will be authorising the researcher to involve you as a participant for a research study, ensuring confidentiality of data collected.

Title of research

“HIGH IMPACT LOW COST INTERVENTIONS IMPLEMENTED TO ENHANCE THE QUALITY OF CARE GIVEN TO PRETERM BABIES IN KILIFI COUNTY-KENYA”

The purpose of the research

To explore and describe the implementation of the National policies and guidelines regarding low cost high impact interventions to improve the health outcomes of preterm babies among County health professionals and design instructional strategies to enhance implementation of these policies and guidelines in Kilifi County, Kenya

Thankyou.

Participant's name and surname.....

Participant's signature.....

Researcher's name

Researcher's signature.....

Date.....

ANNEXYRE H
HEALTH FACILITY CHECK LIST

DATE OF ASSESSMENT:		INTERVIEWER NAME:	
FACILITY NAME:		TYPE OF FACILITY:	
FACILITY NUMBER:		SUB-COUNTY:	
<p>My name is Jane W. Kabo and I am doing research with Dr. Mathibe-Neke Johanna, a professor, in the department of health studies towards a Doctor of philosophy in Nursing at the University of South Africa</p> <p>YOUR FACILITY WAS SELECTED TO PARTICIPATE IN THIS STUDY. WE WILL BE ASKING YOU QUESTIONS ABOUT VARIOUS POLICIES AND GUIDELINES THAT ARE IMPLEMENTED TO IMPROVE THE OUTCOMES OF PRETERM BABIES. WE MAY ALSO ASK TO SEE THE DOCUMENTS. NO NAMES FROM THE FACILITIES WILL BE RECORDED OR SHARED. THE INFORMATION MAY BE USED BY THE MINISTRY OF HEALTH AND ORGANIZATIONS SUPPORTING HEALTH SERVICES FOR PLANNING SERVICE IMPROVEMENT FOR PRETERM BABIES OR FURTHER STUDIES OF HEALTH SERVICES. THE DATA COLLECTED MAY ALSO BE PROVIDED TO RESEARCHERS FOR ANALYSES; HOWEVER, NEITHER YOUR NAME NOR THE NAME OF THIS HEALTH FACILITY WILL BE PROVIDED, AND ANY REPORTS THAT USE THIS FACILITY'S DATA WILL ONLY PRESENT INFORMATION IN AGGREGATE SO THAT THE FACILITY CANNOT BE IDENTIFIED. YOUR NAME AND ALL INFORMATION THAT YOU GIVE US WILL BE KEPT STRICTLY CONFIDENTIAL.</p> <p>YOU MAY REFUSE TO ANSWER ANY QUESTION OR CHOOSE TO STOP THE INTERVIEW AT ANY TIME. DO YOU HAVE ANY QUESTIONS ABOUT THE SURVEY? DO I HAVE YOUR AGREEMENT TO PROCEED?</p> <p>(Tick) Yes No</p>			
POLICIES/GUIDELINES AVAILABILITY			
Q1: DO YOU ROUTINELY RECEIVE UPDATED POLICIES/GUIDELINES REGARDING CARE OF PRETERM BABIES?	YES	NO	DON'T KNOW
Q2: ARE THE GUIDELINES AVAILABLE TO THE NURSES AND MIDWIVES?	YES	NO	DON'T KNOW
Q3: PLEASE SHOW US THE FOLLOWING POLICIES/GUIDELINES REGARDING CARE OF PRETERM BABIES :(TICK AS APPROPRIATE)			
POLICY/GUIDELINE	AVAILABLE	NOT AVAILABLE	DON'T KNOW
A) RESUSCITATION OF A PRETERM BABY			
I. ADMINISTRATION OF OXYGEN			
II. USE OF BAG AND MASK			
III. CHEST COMPRESSIONS			
IV. CUTTING THE CORD			
B)PROVISION OF WARMTH			
I. IMMEDIATE DRYING OF PRETERM BABY AFTER BIRTH			
II. WRAPPING OF THE BABY TO INCLUDE THE HEAD			

III. KANGAROO MOTHER CARE			
C)FEEDING			
I. FEEDING WITHIN ONE HOUR OF BIRTH WHERE APPLICABLE			
II. EXCLUSIVE BREASTFEEDING			
D)INFECTION PREVENTION			
I. USE OF CHLORHEXIDINE FOR CORD CARE			
II. ANY OTHER METHOD OF CORD CARE(SPECIFY)			
<p>ANY OTHER COMMENTS REGARDING THE ABOVE POLICIES/ GUIDELINES</p>			

Interviewer's signature:

Date:

	Enrolled midwife-----		
Q4) WHAT IS THE HIGHEST LEVEL OF PROFESSIONAL EDUCATION ATTAINED?	Certificate..... Diploma Advanced diploma..... Degree Post-graduate diploma..... Master's..... PhD.....		
Q5) WHICH YEAR DID YOU GRADUATE WITH THE CURRENT QUALIFICATION?		
Q6) HOW MANY YEARS HAVE YOU WORKED AS A NURSE/MIDWIFE?		
Q7) HAVE YOU RECEIVED ANY IN-SERVICE TRAINING ON ANY COURSE RELATED TO CARE OF NEWBORN? (IF YES, INDICATE THE YEAR AND COURSE)	YES	NO	
PROTOCOLS/GUIDELINES IMPLEMENTATION			
Q8. WHICH PROTOCOLS/GUIDELINES REGARDING CARE OF PRETERM BABIES ARE AVAILABLE AND IMPLEMENTED IN YOUR FACILITY (TICK AS APPROPRIATE)			
POLICY/GUIDELINE	AVAILABLE AND IMPLEMENTED	NOT AVAILABLE	DON'T KNOW
A) RESUSCITATION OF A PRETERM BABY			
I. ADMINISTRATION OF OXYGEN			
II. USE OF BAG AND MASK			
III. CHEST COMPRESSION			
IV. INTUBATION			
B) PROVISION OF WARMTH			

IV.	IMMEDIATE DRYING OF PRETERM BABY			
V.	WRAPPING OF THE BABY TO INCLUDE THE HEAD			
VI.	INCUBATOR/RADIANT HEATER/HEATED COT OTHERS-----			
VII.	KANGAROO MOTHER CARE			
VIII.	DELAYED BATH			
C) FEEDING				
III.	FEEDING WITHIN ONE HOUR OF BIRTH			
IV.	EXCLUSIVE BREASTFEEDING			
V.	ALTERNATIVE FEEDING IF BABY UNABLE TO BREASTFEED(SPECIFY)			
D) INFECTION PREVENTION				
III.	USE OF CHLORHEXIDINE FOR CORD CARE			
IV.	ANY OTHER METHOD OF CORD CARE(SPECIFY)			
EQUIPMENTS AND ESSENTIAL DRUGS				
Q9) ARE THE FOLLOWING EQUIPMENTS AVAILABLE IN THE FACILITY ?		AVAILABLE	NOT AVAILABLE	DON'T KNOW
I.	BAG AND MASK			
II.	OXYGEN SUPPLY			
III.	SUCTION MACHINE/NASAL ASPIRATOR			
IV.	BABY SCALE			
V.	INCUBATOR/RADIANT HEATER			
VI.	MEASURING CUP			
VII.	INTRAVENOUS FLUID AND INFUSION SET			
Q10) DO YOU HAVE THE FOLLOWING ESSENTIAL DRUGS NECESSARY FOR CARE OF PRETERM AVAILABLE		AVAILABLE	NOT AVAILABLE	DON'T KNOW
I.	VITAMIN K			

II.	CHLORHEXIDINE CREAM OR ALTERNATIVE			
III.	TETRACYCLINE EYE OINTMENT			
IV.	DEXAMETHASONE			
V.	GENTAMYCIN			
VI.	AMPICILLINE			
VII.	DIAZEPAM			

Q11) WHAT ARE THE MAJOR ISSUES OF IMPLEMENTATION?

SKILLS..... POOR

TIME..... LACK OF ENOUGH

GUIDELINES..... UNAVAILABLE

GUIDELINES..... LACK OF UNDERSTANDING OF

ATTITUDE..... POOR

(SPECIFY)..... OTHERS

WHAT IN YOUR UNDERSTANDING IS BEST WAY OF ENSURING POLICIES/GUIDELINES ARE IMPLEMENTED?

(LIST AS MANY AS POSSIBLE)

- 1.
- 2.
- 3.
- 4.
- 5.

Q12) WHAT ARRANGEMENTS DO YOU HAVE TO REFER OR ADMIT CASES OF PRETERM IN THE FACILITY?

GUIDELINES/PROTOCOLS/JOB AIDS

NONE

PRACTICE

Q13) A BABY IS DELIVERED AT 34 WEEKS GESTATION, BUT DOES NOT CRY AFTER DELIVERY. WHAT WOULD YOU DO FOR THIS BABY IMMEDIATELY?

- Dry quickly gently.....
- Examine and suction the mouth.....
- Ensure extra warmth for the baby.....
- Use a bag and mask to ventilate
- Put the baby's head upside down.....

Q14) SUPPOSE YOU ARE CARING FOR 36 WEEKS PRETERM BABY, AFTER DELIVERY, WHEN SHOULD YOU GIVE THE BABY THE FIRST BATH?

- Soon after birth.....
- After two hours.....
- Within 4 to 6 hours.....
- After 24 hours.....

Q15) A PRETERM BABY AT 28 WEEKS GESTATION IS UNABLE TO BREASTFEED.WHAT WOULD YOU DO?

- Wait for some hours then try again.....
- Insert an intravenous line and give fluids.....
- Give glucose via cup.....
- Insert an oral/nasogastric tube and give expressed breast milk.....
- Feed expressed milk with a cup.....

Q16) AFTER THE PRETERM BABY IS BORN AND IS STABLE. HOW SOON SHOULD YOU CLUMP THE CORD?

- Soon after delivery.....
- After 30 seconds.....
- After 50 seconds.....
- After 2-3 minutes.....

Q17) WHAT WOULD BE THE BEST PRACTICE TO PREVENT INFECTION FROM THE CORD IMMEDIATELY AFTER BIRTH AND THEREAFTER?

- Leave It alone to dry.....
- Apply spirit on it.....
- Wash with soap and water.....
- Apply antiseptic cream/ointment.....

ANY OTHER IMPORTANT INFORMATION

ANNEXURE J

FOCUS GROUP DISCUSSION INTERVIEW GUIDE

My name is Jane W. Kabo and I am doing research with Dr. Mathibe-Neke Johanna, a professor, in the Department of health studies towards a Doctor of Philosophy in Nursing at the University of South Africa. We are inviting you to participate in a study entitled: “Exploration and description of high impact low cost Interventions implemented to enhance the quality of care given to preterm babies in Kilifi County-Kenya”

Consent

“I would like you to take a few minutes to read the information on the consent form before you make the decision whether you would like to voluntarily participate.”

Ground Rules

1. We want to learn from you – we’re not from this facility – we don’t know how some of the issues are handled in the facility – you are the experts.
2. There are no right or wrong answers to questions just ideas, experiences and opinions.
3. We want to hear from everyone – everyone’s comments are equally valuable.
4. You don’t need to wait for me to call on you. This is a discussion, so if you have something to say, just say it.
5. It is alright to disagree with something someone else says, but don’t be disagreeable – be polite.
6. Please turn off all cell phones and other electronic devices and minimize any movements in and out during the session.
7. We shall speak loudly and clearly, one person at a time so that your point can be captured.
8. Lastly, confidentiality is important amongst you as participants “what is shared in the room stays in the room.”
9. Any further rules from the group?
10. Any questions before we proceed? If none, please may I proceed.

GUIDING QUESTIONS

- I. Please tell us your experiences on how policies and guidelines regarding interventions to improve the care of preterm babies have been implemented in this facility.
- II. In your opinion what are some of the enablers to the implementation of these policies/guidelines?
- III. In your opinion what do you consider as challenges/barriers to the implementation of these policies /guidelines?
- IV. What in your opinion would help in improving the implementation process?
- V. Any other comments that you would like to share regarding the implementation of the policies /guidelines?

ANNEXURE K

IN-DEPTH INTERVIEWS WITH KEY INFORMANTS INTERVIEW GUIDE

My name is Jane W Kabo and I am doing research with Dr Mathibe-Neke Johanna, a professor, in the Department of health studies towards a Doctor of Philosophy in Nursing at the University of South Africa. We are inviting you to participate in a study entitled: “Exploration and description of high impact low cost Interventions implemented to enhance the quality of care given to preterm babies in Kilifi County-Kenya”.

Consent

“I would like you to take a few minutes to read the information on the consent form before you make the decision whether you would like to voluntarily participate.”

Ground Rules

11. We want to learn from you – we’re not from this facility – we don’t know how some of the issues are handled in the facility – you are the experts.
12. There are no right or wrong answers to questions just ideas, experiences and opinions.
13. Please let us turn off all cell phones and other electronic devices and minimize any movements in and out during this session.
14. Please speak loudly and clearly, so that your point can be captured well on recorder.
15. Any questions or special requests before we proceed? If none, please may I proceed?

GUIDING QUESTIONS

- VI. Please tell us how the guidelines (use of chlorhexidine, resuscitation, warmth provision and early feeding) to support care of preterm are disseminated to various health facilities?
- VII. What about the equipment and medications availability to support preterm babies’ care?

- VIII. In your opinion, how has these guidelines been implemented by the nurses and midwives in various health facilities?
- IX. In your opinion what are some of the enablers and barriers to the implementation of these policies/guidelines?
- X. What are some of your supportive roles to improve the implementation of these interventions?

Any other information you would like to add regarding this discussion?

Thank you very much for giving us this information.

Yours Sincerely

Jane Wamuyu Kabo