

**DEVELOPMENT OF STRATEGIES TO ENHANCE QUALITY KANGAROO
MOTHER CARE AT SELECTED PUBLIC HOSPITALS,
LIMPOPO PROVINCE**

by

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DISSERTATION

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DECLARATION

I, **Shale Audrey Malatji**, declare that the research reported in this dissertation, **“Development of Strategies to Enhance Quality Kangaroo Mother Care at Selected Public Hospitals, Limpopo Province”** is my original work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references. The dissertation submitted to the University of Limpopo for the degree of Master of Nursing Sciences (MNurs) has not been submitted for a degree at any other university or institution, it is my own work in design and execution, and all materials contained here have been duly acknowledged.



MALATJI SA (MISS)

DATE

DEDICATION

- To my mother, Malatji Modjadji Florinah, who supported me throughout the study period, and praying for me, while taking care of my children and encouraging me to work hard, her endless love gave me strengths even in difficult times.
- My sons, Tshegofatso and Tshepiso, who missed me during my absence but then understood and still appreciated me as a good mother.
- My beloved and understanding husband, who never gave me a reason to quit but instead provided me with unconditional support throughout the period of study.
- My younger sister Tebogo in her memory may her Soul Rest in Peace.
- My younger sisters, Zandi and Kagiso, your support is highly appreciated.
- My family friends, Antoinette, Lucia and Olga, ladies friendship only was never enough from you but sisterhood, thank you.

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The Almighty, I will remember the works of the Lord; surely I will remember your wonders of old. I will also meditate on all your work and talk of your deeds.

(Psalm 77:11-12)

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ABSTRACT

BACKGROUND

The quality Kangaroo Mother Care (KMC) continues to be sub-standard as it is not managed properly, despite the maternal and neonatal services provided by the midwives during postpartum and neonatal period, as this can lead to increased neonatal mortality rate and maternal depression at selected hospitals of Limpopo Province, therefore the researcher is interested in developing strategies to enhance quality KMC at selected hospitals of Limpopo Province. KMC has been found to have physiological, behavioural, psychosocial and cognitive developmental benefits, and it enhances mother-infant bonding. The aim of the study was to develop strategies to enhance quality Kangaroo Mother Care in selected hospitals of Limpopo Province.

RESEARCH METHOD

A quantitative descriptive cross-sectional research method was used to collect numerical data with regard to the factors that hinders the quality Kangaroo Mother Care in selected hospitals of Limpopo Province. Population size was 77, Simple Random Probability Sampling was used in this study with the sample size of 65 midwives. Data were collected using self-administered questionnaires and analysed using Statistical Package for Social Sciences (SPSS) version 24. Quantitative analysis is the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomenon reflected on observations (Babbie & Roberts, 2018).

RESULTS

The study revealed that the factors that hinders quality of Kangaroo Mother Care are lack of education and training to midwives regarding Kangaroo Mother Care, and other sources suggested that all categories of nurses should also be trained. The midwives are knowledgeable with regard to

KMC, however, the problem remains the work overload when they have to monitor both the mother and neonate during feeding. It was further indicated that family members can also assist with regard to KMC. Strategies were developed, as optimal KMC environment, optimal KMC interventions, enhance optimal mother attitude to KMC create gender sensitive environment.

CONCLUSION

The study concluded that the quality of KMC should be enhanced through both the promotion of education and training to all midwives, and involvement of families to assist in KMC at selected hospitals of Limpopo Province.

Keywords: Development, Strategies, Enhance, Quality, Kangaroo Mother Care

DEFINITION OF CONCEPTS

Development

An event of constituting a new stage in a changing situation (Collins, 2017). In this study, 'development' refers to the process of gradually bringing some changes to enhance KMC units.

Strategies

A carefully developed plan to develop a plan or method for achieving a particular goal usually over a long period of time (Webster, 2017). In this study, 'strategies' refers to long-term plan in order to enhance the quality in KMC units.

Enhance

To intensify or improve the quality of something (Collins, 2017). In this study, 'enhance' refers to strengthen or upgrade the quality of KMC.

Quality

The degree of excellence of something (Collins, 2014). In this study, 'quality' refers to the extent to which interventions should be carried out in KMC in order to provide quality interventions through utilization of manuals and protocols.

Kangaroo Mother Care

According to Charpak, Tessier and Ruiz (2017), Kangaroo Mother Care (KMC) is a multifaceted intervention for preterm and low birth-weight infants and their parents. In this study, 'Kangaroo Mother Care' refers to the care that the mother provides by being physically close to the baby during new-born period.

LIST OF ABBREVIATIONS/ACRONYMS

AAPOR	American Association for Public Opinions Research
AJPHRD	African Journal for Physical, Health Education, Recreation and Dance
CEO	Chief Executive Officer
BFHI	Baby Friendly Hospital Initiative
DHIS	District Health Information Software
DoH	Department of Health
EBF	Exclusive Breastfeeding
EBFD	Early Breast Feeding
ENAP	Every Newborn Action Plan
IBM	International Business Machines
KMC	Kangaroo Mother Care
LBW	Low Birth Weight
LMIC	Low and Medium income Countries
LINC	Limpopo Initiative of Newborn Care
NICU	Neonatal Intensive Care Unit
PIIP	Perinatal Problem Identification Program
PMTCT	Prevention of Mother to Child Transmission
RCT	Randomized Controlled Trial
SANC	South African Nursing Council
SDG	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences
STS	Skin-to-Skin
TB	Tuberculosis
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
VLBW	Very Low Birth Weight
WHO	World Health Organization

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CHAPTER 1

OVERVIEW OF THE STUDY

1.1 Introduction and Background

Globally, several studies have documented the success of KMC (Bergh, Manu, Davy, Van Rooyen & Asare, 2013). Both mother and baby derive great benefits from this intervention. For the infant, KMC has proven beneficial in mortality reduction effects for babies weighing less than 2kg. It is a successful project put in place to reach all premature babies and was projected to have the capacity to have saved 19,000 lives in 2015 (Aboda & Williams, 2011). It reduces maternal stress and postpartum depression for the mother. The mother also serves as the main source of food and stimulation for the Low Birth Weight (LBW) infants until they are mature enough to face life outside the uterus in near to similar 6 conditions as the babies that are born full term (Shrivastava, Shrivastava, & Ramasamy, 2013). It is cost-effective and accessible because it does not require complicated facilities (Davanzo, Brovedani, Travan, Kennedy & Crocetta, Sanesi, Strajn & De Cunto, 2013). Chan, Labar, Wall and Atun, (2016) assert that, in the developed and some developing countries, KMC has been embraced as a method of neonatal care. However, in South Africa, the infant mortality rate in 2020 is still higher at 25,772% (United Nations, 2015).

The National Department of Health is currently working towards combining elements of District Health Information Software (DHIS) data with the elements of Perinatal Problem Identification Program (PPIP) data to streamline and strengthen the quality of data to be used to effectively plan perinatal care in South Africa. This becomes a problem and worrisome, especially in District Hospitals where there is lack of resources in KMC units. This study, therefore, aims to develop strategies to enhance quality KMC at selected public hospitals in Limpopo Province.

Globally, 44% of under-five deaths occurs during the neonatal period, and the proportion of under-five deaths due to neonatal causes continues to rise. Preterm birth before 37 weeks of gestation accounts for 35% of neonatal deaths, whereas low birth-weight

(defined as <2500g) is commonly used as a surrogate measure of preterm birth (Chan, Valsangkar, Kajeepeta, Boundy & Wall, 2016). They furthermore affirmed that, a significant proportion of deaths among preterm and low birth-weight infants is preventable. There is evidence that KMC, when compared to conventional neonatal care in resource limited settings, significantly reduces the risk of mortality in infants born in facilities who are clinically stable and weighing less than 2000g. Chan *et al.*, (2016) asserted that KMC also reduces the risk of hypothermia, severe illnesses, nosocomial infections and length of hospital stay, and improves growth, breastfeeding and maternal infant attachment. Despite strong evidence for mortality and morbidity reduction in low and middle-income settings and endorsement from WHO, country level adoption and implementation of KMC has been limited.

Ahmed, Mitra, Chowdhury, Camacho, Winikoff and Sloan (2011) indicated that the effect of KMC immediately after birth before stabilization is unclear due to inconclusive evidence, and additional effort to test the effect of KMC prior stabilization and to define stability is needed through further studies or by consulting experts at each level of care (primary, secondary, or tertiary care). KMC involves care in which the neonate is placed in the kangaroo position and includes the following elements: vertical position of the infant between the mothers' breasts, skin-to-skin contact (STS), exclusive breastfeeding (EBF), and any type of medical, emotional, psychological and physical support for the well-being of both mother and infant (Nyqvist, Anderson & Bergman, 2010). KMC has multiple benefits such as improving the mother-infant bonding and attachment; prolonged duration of breastfeeding; and decreasing neonatal mortality of preterm babies (birth weight <2000g) (Lawn, Mwansa-Kambafwile, Horta, Barros & Cousens, 2010).

In the study conducted by Samra, Taweel, and Cadwell (2011), intermittent KMC was found to be a safe, effective and feasible method of care of LBW infants admitted to the Neonatal intensive care unit (NICU). The effects of these interventions has been explored on various aspects of neonatal health problems such as jaundice (Samra, Taweel, & Cadwell, 2012), infant cognitive development (El Azim & Samra, 2011), infant vital parameters (Samra & Brimdyr, 2011), and weight gain. Weight gain problems represent

about 25% of cases in our NICU. However, Conde-Agudelo, Belizán and Diaz-Rossello (2011), in their most recent, extensive and critical updated systematic review of 15 randomized controlled trials comparing KMC and conventional neonatal care, found compelling evidence that KMC is associated with increases in weight gain among other important benefits.

In South Africa, the study conducted in Western Cape, 60% of the staff indicated that they did not receive KMC training. According to the study conducted by Solomons and Rosant (2012), in the eastern sub-district of Cape Town, it was estimated that approximately 13 million babies are born prematurely worldwide. Of these, 11 million are born in Asia and Africa, with 17.5% born in Southern Africa. Prematurity is considered to account for 72% of four million neonatal death annually. In low-income countries, the mortality rate of premature infants is six times higher than that of high-income countries. Therefore, KMC has been proven to be an acceptable and feasible method to decrease the mortality rate of premature neonates in low- and high-income countries.

In the study survey conducted at Malamulele Hospital, Vhembe District, Limpopo Province by the Limpopo Initiative for Newborn Care (LINC) which is a provincial newborn outreach project, supported by the Limpopo Provincial Department of Health, United Nation Children's Fund (UNICEF) and Save the Child, indicated that with support from the LINC team and LINC training, they started a dedicated Neonatal Unit and KMC unit in 2005. The LINC team provided strong initial support and some ongoing support, but other local factors also contributed to continuing improvement in newborn care and outcomes (Bonnici, Bramford, Crowley & Robertson-Suttan, 2011). Currently, there are no studies that have been conducted locally regarding Kangaroo Mother Care Units in Mopani District, Limpopo Province.

1.2 Research Problem

The researcher observed that KMC is not frequently monitored and women are not supervised appropriately during infants feeding, as such leading to sub-standard care. Twenty-four hours KMC monitoring is essential in order to detect any problems that might

occur to the neonate or even the mother. Therefore, it is of utmost importance that appropriate and standard management is provided and more detailed information on KMC should be provided to the mothers. Therefore, the researcher has interest in developing strategies to enhance quality KMC at selected public hospitals in Limpopo Province. The researcher observed that it is necessary to conduct this study regarding quality KMC at selected public hospitals of Mopani District, since mothers discontinue to attend the follow-up schedule of the baby for optimal growth monitoring and development after they had been discharged from the hospital.

The quality KMC continues to be sub-standard as it is not managed properly, despite the maternal and neonatal services provided by the midwives during the postpartum and neonatal period, and this can lead to increased neonatal mortality rate and maternal depression at selected hospitals of Limpopo Province. Despite the fact that both the Sustainable Development Goals (SDGs), introduced by the United Nations (2015), with each goal has specific target to be achieved over the next 15 years, specifically Goal 3 of Health, namely, to “ensure healthy lives and promote well-being for all at all ages,” which also proposes to end preventable death of newborns and children under five, and the Limpopo Initiative Newborn Care (LINC) in 2003, ensuring that we achieve improved and more equitable care for newborns in South Africa, however, quality KMC interventions remains a challenge in selected public hospitals of Limpopo Province South Africa.

This is evidenced by the absence of standardized practices regarding KMC. Quality KMC will be enhanced if midwives are empowered through education and training, which is possible by developing an educational strategy. Therefore, in the context of this study, the researcher is interested in identifying and describing the factors hindering enhancement of quality KMC at selected public hospitals Mopani District, Limpopo Province.

1.3 Theoretical Framework

1.3.1 Overview of the Theoretical Framework

Theoretical framework is described as:

[A]n explanation which is based on the formulated prepositions resulting from an existing theory which seeks to create a specific way at looking at a particular phenomenon. Theoretical framework is the structure that hold and support a theory of a research study by focusing on specific variables and defining the specific viewpoint of framework that the researcher will take in analysis and interpreting the data to be gathered.

(Ravitch & Matthew, 2017)

For the intent of this study Kefilwe Evidence -Based model was adapted and applied according to the ten components which are, namely: context, goal, existing environment (agent & recipients), dynamics, and sub-optimal practice environment, bridge the gap, protocols/ procedures and outcome/ terminus (Thopola & Lekhuleni,2016).

1.3.2 Adapted Figure of Kefilwe’s Evidence-Based Model (Thopola & Lekuleni, 2016)

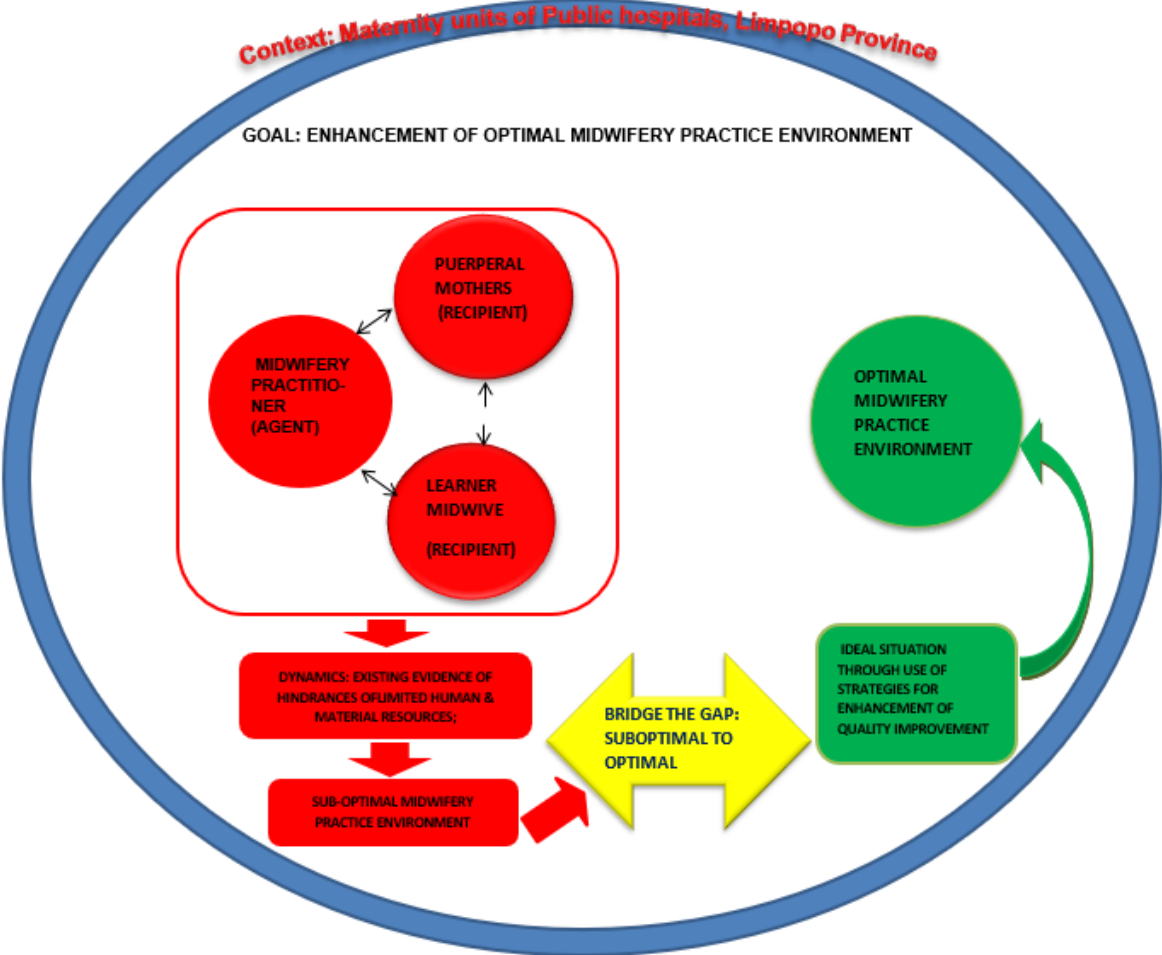


Figure 1.1 Kefilwe’ Evidence-Based Model (Thopola & Lekhuleni, 2016) adapted

Figure 1.1 above shows Kefilwe’ Evidence-Based Model to enhance optimal Midwifery practice Environment in Public Maternity hospital. The research study was guided by Kefilwe’s Evidence-Based Model and will be described in 10 components which are, namely: context, goal, existing environment (agent & recipients), dynamics, and sub-optimal practice environment, bridge the gap, protocols/ procedures and outcome/ terminus as shown in figure 1.

- **The context**

The context' on the evidence-based mode is Maternity Units of public hospitals, Limpopo Province (Thopola & Lekhuleni, 2016). In this study, 'context' is KMC units in selected public hospitals in Limpopo Province.

- **The goal**

In the model, 'goal' refers to Enhancement of Optimal Midwifery Practice Environment. In this study, 'goal' refers to the enhancement of quality KMC interventions focusing on the hindrances of quality interventions such as unconducive environment (Thopola & Lekhuleni, 2016) non-availability of material resources, privacy, maternal support and equipment and sub-standard care.

- **Existing environment**

In this study, the 'existing environment' relates to the midwives (agents) providing services to both mothers and neonates (recipients), with the limited human and material resources such as equipment, medical and negative attitude and practices of the midwives, thus leading to sub-standard care and consequently hindering quality interventions, which include midwives (agent), mothers and their neonates (recipients) and Kangaroo Mother Care units. As such, the researcher intends to develop strategies to enhance the quality KMC interventions in selected public hospitals Limpopo Province.

- **Dynamics**

'Dynamic' is defined as the way in which things or people behave, react and affect each other (Convetry & Nixon, 2010). In this study, relating to the model, the quality interventions of KMC by the midwives will be hindered due to limited human and material resources, and staff workloads. The mothers and neonates as the recipients of care will be compromised and resulting in sub-standard KMC interventions. In this regard, competent, dedicated midwife will be an advantage to the existing situation.

- **Sub-Optimal Midwifery Practice Environment**

In the model, the sub-optimal midwifery practice is due to the insufficient and limited human material resources (Thopola & Lekhuleni, 2016). The researcher observed that the KMC units in selected public hospitals of Limpopo Province, as the environment, are not conducive for patient care and hinder quality interventions. KMC mothers and neonate's health will be affected due the limited human, material and medical resources. According to the National Patients' Rights Charter (National Department of Health, 1999), every patient has a right to a healthy and safe environment that will ensure their physical and mental or well-being.

- **Arrows**

In this study, the down arrows indicate the existing evidence of factors hindering quality KMC interventions; the limited human and material resources; and the effects thereof on the existing environment.

- **Bridge the Gap from sub-optimal to optimal**

In the model, strategies were formulated in order to facilitate optimal midwifery practice environment, thus bridging the gap from sub-standard quality KMC interventions to standard quality KMC interventions. In this study, strategies are developed to enhance the quality interventions of KMC units in selected public hospitals. The strategies will assist in correcting the unacceptable existing situation, that is, needs intervention, by acting to prevent potential problems. And this will encourage the midwives to perform according to the set standards. This will hold and lead midwives who are responsible to provide quality KMC interventions.

- **Ideal situation through facilitation of strategies for quality improvement (Protocols/ Procedure)**

In this study, relating to the theory adopted from the model, an ideal situation can be achieved through the implementation of protocols. This will enhance the quality interventions of KMC units in selected public hospitals. The existing environment will be ideal in a manner that mothers and neonates will be comfortable; reduce neonatal mortality and morbidity; reduce maternal postpartum depression; return dates for

follow-up will be adhered to; and neonates will be monitored according to stipulated protocols or policies and grow well. The protocols must be implemented as designed to produce positive outcomes and mothers' satisfaction.

- **Optimal Practice Environment**

In the model, 'optimal practice environment' is the desired outcome, which will lead to implementation of optimal and safe patient care and acquiring competency, and midwifery skills in an optimal experiential learning environment. In this study, the KMC interventions should be enhanced through the provision of quality of care to both the mother and infant, thus will promote maternal and neonatal health. This will also encourage the mothers to continue with KMC even when discharged home.

- **Outcome/ Terminus**

'Outcome/Terminus' refers to a stop or station at the end (Convetry & Nixon, 2010). In this study, 'terminus' refers to the final point or the end products of the results, whereby the strategies to enhance quality KMC interventions at selected public hospitals Limpopo Province, will be developed.

1.4 Research Question

The research question that guided this study is, namely:

What strategies can enhance the quality of Kangaroo Mother Care?

1.5 Aim of the Study

The aim of the study is to develop strategies to enhance quality Kangaroo Mother Care at selected public hospitals of Limpopo Province.

1.6 Objectives of the Study

The objectives of the study are, namely, to:

- Identify the factors hindering quality of Kangaroo Mother Care at selected public hospitals of Limpopo Province;

- Describe the factors hindering quality Kangaroo Mother Care at selected public hospitals of Limpopo Province; and
- Develop strategies to enhance quality Kangaroo Mother Care at selected public hospitals of Limpopo Province.

1.7 Overview of the Research Methodology

A quantitative research method was used as an approach that emphasizes the collection of numerical data (Brink, van der Walt & van Rensburg, 2017). This chapter covers the study site, design and methodology that address the research question of the study. The researcher adopted a quantitative approach, using a cross-sectional Descriptive Design to describe the factors hindering quality Kangaroo Mother Care at the selected public hospitals. A questionnaire was developed to collect data. Simple Random Sampling was used and the sample consisted of midwives. The accuracy of the instrument was tested. Content validity was ensured by presenting the questionnaire to experts in the field of study for evaluation. Reliability was ensured by conducting a pilot study. The Statistical Package for Social Sciences (SPSS) Version 24 for Windows was used to analyse numerical data. Descriptive statistics was used to obtain frequency tables, percentages, pie charts and bar graphs. In this study, the researcher is interested in developing strategies to enhance Kangaroo Mother Care at selected public hospitals in Limpopo Province.

1.8. Significance of the Study

The study might assist midwives in providing quality KMC to prevent neonatal mortality and maternal depression. It may also shed light on in-depth understanding of the importance of KMC and management of LBW neonates. KMC appears to be an effective assist in reduction of infant mortality on less than 2kg due to complications of prematurity. Saving a mother and neonate through correct and competent quality care can increase the confidence of midwives.

Nursing operational managers may also acquire knowledge from the research on how to pre plan in-service training by means of drills, workshops and seminars. The most

significant benefit might be the improved quality in management of KMC in selected public hospitals, this may also improve confidence of the patient and reputation of the midwives. The study may also serve as a basis for Department of Health in policymaking to instil standard management practices in KMC settings, with respect to improvement of interventions that will be provided to mothers and neonates during postpartum and neonatal period.

This study will benefit the Department of Health in formulating further protocols and policies; staff training and education; as well as mothers and their neonates. It will also assist operational managers of Maternity Wards to organize seminars and workshops to increase the knowledge of midwives regarding quality KMC. Bergh, Graft-Johnson, Khadka, Om'Iniabohs, Udani, Pratomo and Leon-Mendoza, (2014) indicated that a Nurse Manager could play a role in providing support and opportunities for ongoing education.

1.9 Outline of Chapters

CHAPTER 1: This chapter provides an overview of the study by describing the context of the study, stating the problem studied, specifying the research aim, question and objectives. The chapter outlined the theoretical framework that guided the study and significance of the study.

CHAPTER 2: This chapter provides a review of the research literature based on the knowledge and ideas of what is already known about the studied topic. It is undertaken to establish an understanding of the studied phenomena.

CHAPTER 3: This chapter describes the research methodology and the Research Design which include the data collection, population and sampling, data analysis, ethical considerations and significance of the study.

CHAPTER 4: The chapter summarizes the research findings, in the context of the aims and objectives of the study.

CHAPTER 5: In this chapter, the researcher draws a conclusion, indicates the limitations of the study and makes recommendations based on the findings.

1.10 Conclusion

This chapter presented introduction and background of the study; research problem and theoretical framework adopted were described; and aims of the study, research question, research objectives, research methodology and significance of the study were outlined. The research method and design were summarised. Chapter 2 reviews the literature relevant to the study.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction and Background

Literature review refers to a summary of theoretical and empirical sources to generate a picture of what is known and not known about a particular problem (Burns & Grove, 2016). Literature review surveys books, scholarly articles and other sources relevant to a particular issue, area of research or theory. And by so doing, provides a description, summary and critical evaluation of these works in relation to the problem being investigated. Furthermore, it is affirmed that literature review is designed to provide an overview of the sources the researcher explored while researching a particular topic and to demonstrate to readers how the research fits within a larger field of the study (Fink, 2014).

2.2 The Purpose of the Literature

The purpose of literature review is to “determine the extent to which the topic under study is covered in the existing body of knowledge” (Babbie & Mouton, 2014). The purpose of literature review is to provide appraisal of current research that relate to the study, and to discuss and provide a supportive theoretical framework. In this study, the researcher reviews articles, theses, books and abstracts of full texts from PubMed, Science-direct SABINET and some scholar articles from Google Scholar that describe the literature in relation to Kangaroo Mother Care. The research study utilizes the findings from the literature to control and support the observed results.

The literature review creates a foundation based on existing related knowledge (De Vos, Strydom, Fouchè & Delpont, 2014). Literature review aimed at contributing to a clearer understanding of the nature and meaning of the problem that has been identified (De Vos *et al.*, 2014). The purpose of literature review in this study was to develop strategies to enhance Kangaroo Mother Care.

In essence, KMC should be practiced on low birth weight infants for as long as their condition is stable and discharged from NICU. Infants can gain weight rapidly when they are in KMC in hospital environment or even at home, also it can be practiced on infants of birth weight from 1-1800g in order to maintain growth and development of the neonate. Mothers should also be supported by midwives to relieve stress and depression while they care for their infants. The process of KMC can also promote breastfeeding while in care of the midwives. Conde-Agudelo *et al.*, (2011) indicates that KMC resulted in improved weight, length, head circumference, breastfeeding mother infant bonding and maternal satisfaction with the method of care. Midwives play an important role in terms of the facilitation on KMC, they give information, constant reassurance as well as provision of comfortable environment and privacy to the parents of preterm infants (Bergh *et al.*, 2012)

KEY SEARCH TERMS:

- *Kangaroo Mother Care*

Kangaroo Mother Care (KMC), often defined as skin-skin contact between a mother and her new born, frequent or exclusive breastfeeding and early discharge from the hospital has been effective in reducing the risk of mortality among preterm and low birth weight infants (Chan, Valsangkar, Kajeepeta, ,Boundy, & Wall, 2016).

- *Midwives*

In terms of the Nursing Act No: 33 of 2005 (SANC, 2005) the clinical practice of a midwife in terms of Section 31 (3) is to provide care and management as an independent practitioner, of all aspects that influence the course of pregnancy, labour and the puerperium, and the newborn baby in terms of Section 31 (3)

- *Exclusive Breastfeeding*

Exclusive breastfeeding can be defined as practice whereby the infants receive only breast milk without mixing it with water, other liquid, and tea, herbal preparations of food in the first six months of life with the exceptions of vitamins, mineral supplements or medicines. (Nkala& Msuya, 2011).

- *Low birth weight*

Low birth weight is defined as the birth weight of less than 2500g (up to and including 2499), irrespective of the gestational age (UNICEF & WHO, 2004)

- *Preterm*

According to (WHO, 2012) preterm is defined as babies born alive before 37 weeks of pregnancy are completed.

2.2.1. Promotion of Exclusive Breastfeeding

According to Vesel, de Graft and Kerber (2015), Kangaroo Mother Care is an evidenced-based approach to reducing mortality and morbidity in preterm infants which was first developed in Bogota Columbia. According to WHO's definition of 2003, KMC consists of skin-to-skin contact between mother and infant, exclusive breastfeeding whenever possible, early discharge with adequate follow-up and support, and initiation of the practice in the facility and continuation at home. WHO (2003) furthermore affirmed that KMC emerged as a key intervention package for a number of new-born health initiatives, and this is epitomized by Every Newborn Action Plan.

The core component of KMC is skin-to-skin, but the component that seems to be applied more successfully is exclusive breastfeeding. A Cochrane review, and several local and national reports, show that KMC results in a higher rate and a longer duration of exclusive breastfeeding when compared with conventional care of preterm infants (Conde-Agudelo & Diaz-Rossello, 2016). The total duration of any breastfeeding is also higher when KMC is practised. This seems to be due to several factors as follows:

- the STS contact, even if not as early, continuous and prolonged as recommended, is certainly the most important factor;
- the closeness of mother and baby results in increased maternal awareness of her infant's needs;
- the easier access to the breast by the preterm baby, as opposed to the difficulty of moving the infant in and out of an incubator or other warming device; and

- the increasing confidence of the mother in handling her baby, as compared to the dependence on the ward staff in conventional care.

In addition, the hospitals that implement KMC are often baby-friendly hospitals, where the influence of marketing for a greater use of breastmilk substitutes is restricted, and preterm infants do not represent a significant market opportunity for the infant formula industry, due to the small size of this subgroup of infants (Conde-Agudelo & Diaz-Rosello, 2016).

The practice was originally intended to modify the care of low birth-weight infants (<2.5kg) (Bergh & Pattison, 2003; and Nyqvist *et al.*, 2010) since it improved infant development significantly, particularly that of premature infants (Nyqvist *et al.*, 2010). KMC proved the following: it improves and extends mother – infant bonding; it reduces maternal postpartum depression; it improves parental response to infant signals, it enhances physiological stability and ameliorates pain in the infant, it prolongs breastfeeding (Nyqvist *et al.*, 2010); it significantly decrease the neonatal mortality of preterm babies birth weight (<2000g); and it effectively reduces severe infant morbidity, predominantly from infection (Bergh, Kerber, Abwao, de Graft Johnson, Aliganyira, Davy, Gamache, Kante, Ligowe, Luhanga, Mukarigwiro, Ngabo, Rawlins, Sinzoga, Sengendo, Sylla, Taylor, van Rooyen & Zougrana, 2014 and Lawn *et al.*, 2010).

Charpak, Tessier and Ruiz (2017) stated that Kangaroo Mother Care (KMC) is a multifaceted intervention for preterm and low birth-weight infants and their parents. Short- and mid-term benefits of KMC on survival, neurodevelopment, breastfeeding, and the quality of mother–infant bonding were documented in a randomized controlled trial (RCT) conducted in Colombia from 1993 to 1996. Again, in 2012-2014, it was decided to evaluate the persistence of these results in young adulthood.

2.2.2. Midwives Knowledge and Attitude

The nurses' responses to questions regarding their knowledge of KMC as assessed using a 5-point Likert scale. Overall, all the nurses (n = 15) agreed that KMC promoted mother-infant bonding, enhanced the mother's confidence about how to handle her LBW infant,

and resulted in effective breastfeeding. More than 50% (n = 9) of the nursing staff disagreed with the statement that KMC should be practised on infants weighing 1-1.8 kg. Twenty per cent (n = 3) of the nurses were unsure of how soon after birth KMC should be initiated. Approximately 33% (n = 5) of the nurses agreed that both parents should be involved in KMC practice, and 66.7% (n = 10) of the nurses agreed that nurses should always facilitate KMC (Solomons & Rosant, 2012). Leadership in a form of a champion who has an interest in maternal and new-born care and KMC in particular could enhance implementation of the educational strategy by using mentorship and reinforcement of information and skills (Bergh *et al.*, 2011); and Gagliardi, Webster & Straus, 2015). This mentor or facilitator should be knowledgeable and skilful (regarding KMC) and motivated to implement educational strategy (Centre for Creative Leadership, 2016).

2.2.3. Unconducive Working Environment

Stone, Hughes and Dailey (2010) stated that it is important to improve work environment since it will enhance the quality and safety of patient through development of KMC quality care. Issues with facility environment emerged as the top barrier to practice for mothers and this factor includes an array of different issues, this issue includes crowdedness and noise, lack of privacy, lack of food and supplies and comfortable beds. Although a lack of resources in the community, such as comfortable beds and readily available food, may be equally common barrier. However, because facility and community practice of KMC represent a continuum, with infants moving back and forth between the two, there is still opportunity to study facility initiated KMC program (Seidman, Unnikrishanan, Kenny, Myslinski, Cairns-Smith, Muligan & Engmann, 2015).

Charpak *et al.*, (2017) furthermore indicated that a total of 494 (69%) of the 716 participants of the original RCT known to be alive were identified; 441 (62% of the participants in the original RCT) were re-enrolled, and results for the 264 participants weighing ≤ 1800 g at birth were analysed. The study indicated that KMC had significant, long-lasting social and behavioural protective effects 20 years after the intervention. Coverage with this efficient and scientifically based health-care intervention should be extended to the 18 million infants born each year who are candidates for the method.

Kangaroo Mother Care has been highlighted as an effective intervention package to address high neonatal mortality pertaining to preterm births and low birth-weight. However, KMC uptake and service coverage have not progressed well in many countries (Bergh *et al.*, 2014). Bergh *et al.*, (2014) furthermore affirmed that the main aim of this case study was to understand the institutionalization processes of facility-based KMC services in three Asian countries (namely, India, Indonesia and the Philippines) and the reasons for the slow uptake of KMC in these countries and this dissertation illustrates the complexities of implementing a new healthcare intervention (Bergh *et al.*, 2014). According to Vesel *et al.*, (2015), most of neonatal deaths are happening in the low and middle-income countries, mainly in sub-Saharan Africa and South Asia. Kangaroo Mother Care, which involves a continuous skin-to-skin contact, breastfeeding support and early hospital discharge with follow-up support, is a low-cost, effective intervention to prevent mortality in preterm neonates. However, uptake of this simple intervention at country level is slow (Vesel *et al.*, 2015).

2.2.4. Educators, Trainers and Facilitators

Kangaroo Mother Care appears to be a simplistic method, it is far more intricate than it appears at first and may require a mind-set change for which planning, training and follow-through are needed. Apart from having the same frame of reference, educators and trainers should have hands-on experience in KMC and be able to relate to facility- and community-based KMC issue. According to one community KMC manual, inexperienced or unqualified trainers should never be used. Trainers should be “doctors, nurses or midwives who have spent many years teaching KMC to mothers’ and formally educated, experienced trainers who have been taught KMC by such experts and who correctly and completely understand the method” (Bergh *et al.*, 2012).

Bergh *et al.*, (2012) stated that, although there are universal aspects of KMC, and countries and institutions could learn from one another with regard to the way’s education and training in KMC are conducted, pedagogy and materials should be locally applicable and appropriate. Education and training should be based on the evidence produced by

research and conducted according to current best practice in education. In the past, the focus was on clinical care and hospital organization, and a need has been identified for the development of “companion tools on education and planning, such as those developed and used in South Africa”. Nyqvist *et al.*, (2010) indicated that evidence from the South African trials suggests that the implementation of a new healthcare intervention can be scaled up by using a carefully designed educational package, combined with face-to-face facilitation by respected resource persons, on site or at a Centre of Excellence (Bergh *et al.*, 2012).

2.2.5. Kangaroo versus Incubator Care

Over the past 3-4 decades, many studies have been carried out on Kangaroo Mother Care and in 2011 a Cochrane review concluded that Kangaroo Mother Care is an acceptable alternative to conventional neonatal care in low birth-weight infants (Conde-Agudelo, *et al.*, 2011). They furthermore indicated that, Kangaroo Mother Care has been shown to reduce mortality, infection, increase growth, breastfeeding rates, improve thermostasis and improve maternal infant bonding. Findings of the study conducted by Chisenga, Chalanda and Ngwale, (2015) stated that mothers had knowledge about the significant of Kangaroo Mother Care, but 84% was not aware of the services prior to the hospitalization, whereas 18.6% was not counselled prior to KMC practice. Mothers preferred KMC to incubator care. These factors affecting compliance and continuation of KMC, which were lack of support, culture, lack of assistance with skin-to-skin contact, multiple roles of the mother and stigma therefore the researcher has interest in describing the factors affecting compliance and continuation of KMC (Chisenga *et al.*, 2015).

The study published by Bergh *et al.*, (2012) indicates that, despite the positive results of most of the studies, implementation was patchy in many countries and KMC did not expand beyond the teaching hospital where the initial study had been done. They furthermore, stated that all over the world interest groups also started promoting KMC, by means ranging from informal communications to formal education and training programmes. These programmes are presented in diverse formats, supported by wide variety of educational materials and training opportunities. However, despite these

efforts, some countries are finding it difficult to increase their coverage of KMC institutionalized in sustainable way (Bergh *et al.*, 2012).

2.2.6. Positive Impact of Kangaroo Mother Care (Hardy, 2011).

2.2.6.1 *Thermoregulation*

Thermoregulation or control of body temperature has been studied as physiological parameter defining health and disease for centuries (Ring, 2007; Ring, McEvoy, Jung, Zuber & Machin 2010). More research is needed to combine evidence-based interventions into thermoregulation bundles and to assess morbidity and mortality when such bundles are implemented. It is essential to continue focus on thermal stability and eliminate hypothermia in the very low birth weight population (Knobel-Dail, 2014).

When held skin-to-skin during kangaroo care, the mothers' body temperature helps to regulate the infant's temperature. Kangaroo care has been shown to decrease hypothermia in LBW infants. It is important to monitor the infant's temperature before, during and after kangaroo care to ensure that the infant remains stable. The infant should be undressed and only have a diaper on before placed on the mother or father's bare chest. A warm blanket can be used to cover the baby, a hat can be used, or a heat source can be placed over the mother to ensure that the very low-birth-weight (VLBW) infant does not experience hypothermia (Hardy, 2011).

2.2.6.2 *Physiologic stability*

The heart rate, respiratory rate and oxygen level remain more stable in infants during kangaroo care. There is also a decrease in apnoeic episodes. Nurses can support parents to see the importance of their role in helping the infant maintain physiologic stability through non-pharmacologic interventions. To do this, nurses and parents must understand infants' behaviours and cues (Hardy, 2011). KMC has proven beneficial in mortality reduction effects for babies weighing less than 2kg. it is a successful project put in place to reach all premature babies and was projected to have the capacity to have saved 19,000 lives in 2015 (Aboda & Williams, 2011). Furthermore indicated that, it

enhances physiologic stability and reduces its pain as evidenced by reduced cry and restless movement of the body.

2.2.6.3 Breastfeeding

Infants who routinely have the opportunity to kangaroo care with their mothers have increased success with breastfeeding and are more likely to be exclusively breastfed. Mothers of infants who are not yet able to take oral feedings are often able to express larger quantities of breast milk for gavage feedings after kangaroo care, and when kangaroo care is provided routinely, they are better able to produce a continuous supply of expressed breast milk (Hardy, 2011). Exclusive breastfeeding has many health benefits such as nutritional, psychological, neurological, social, environmental, immunological benefits for the infant, mother and community (Wiener & Wiener, 2011). Exclusive breastfeeding has been shown to decrease incidence or severity of bacterial meningitis, bacteremia, diarrhoea, urinary tract infections, and late onset of sepsis in preterm babies, lymphoma, leukemia, Hodgkin's disease, and asthma (Kramer & Kakuma, 2012). Evidence also shows that breastfed babies have improved cognitive development and increased bonding with the mother (Rempel & Moore, 2012)

2.2.6.4 Growth

Kangaroo care results in improved weight gain. Studies have shown that infants who have routine skin-to-skin care continue to grow better in length and head circumference as well. These two (2) categories of growth relate to the infants' overall nutrition and health. According to Victoria and Rubens (2010), there are barriers to KMC implementation that still need to be addressed. These include the misconception that KMC is only for the poor; that it increases the hospital staff workload; cultural opposition to it, exposure of the mother's body to medical staff; and resistance. Reasons for resistance to KMC implementation by nursing staff in developing countries included their perception that KMC is sub-standard, and that it represents extra work for staff. Solomons and Rosant (2012) argued that all nursing staff should receive training on KMC, even if they are not directly involved in its implementation. In this way, all nursing staff will be equipped to assist and advise expectant mothers on KMC.

2.3 Conclusion

This chapter dealt with a review of literature for the study. The literature review covers the main concepts responsible for the development of strategies to enhance quality Kangaroo Mother Care. The most common and important concepts studied are, namely: promotion of exclusive breastfeeding; midwives knowledge and attitude; uncondusive working environment; educators, trainers and facilitators; kangaroo versus incubator care; and advantages of Kangaroo Mother Care. All these factors contributed significantly to the quality of Kangaroo Mother Care in the studies reviewed from different countries.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the research method, study site, design and methodology that address the research question of the study. The researcher adopted a quantitative approach, using a cross-sectional Descriptive Design to describe the factors hindering quality Kangaroo Mother Care. A questionnaire was developed to collect data. Simple Random Sampling was used and the sample consisted of midwives. The accuracy of the instrument was tested by means of validity and reliability, and a pilot study pre-tested the questionnaire.

3.2 Research Method

The quantitative approach was used to conduct this study. Brink *et al.* (2017), explain that quantitative research method is an approach that emphasizes the collection of numerical data and the statistical analysis of hypothesis proposed by the researcher. Quantitative research focuses on a small number of concepts and strives to generalize research results to a larger context (Botma, Greef, Mulaudzi & Wright, 2017). This approach was used to identify and describe the factors hindering quality of Kangaroo Mother Care at selected public hospitals of Limpopo Province. In this study, computer software version 24 Statistical Package for Social Sciences (SPSS) was used to analyse data and represented into a numerical data in frequency tables and percentages, bar graphs and pie charts.

3.3 Study Setting

Limpopo Province is the fifth largest in the country in terms of population size of which by 2011 was 5.4 million to 5.8 million in 2016, and consists of five districts, namely: Mopani, Capricorn, Sekhukhune, Waterberg and Vhembe. The study was conducted at the Greater Tzaneen Municipality in Mopani District consisting of 3 hospitals, which are, namely: Dr C.N. Phatudi, Van Velden, and Letaba Hospitals.

- Hospital 1 is level 1 District Hospital classified as rural hospital providing comprehensive health-care services to population from nearest villages and feeder clinics including Health Care Centre, (DHIS, 2016/2017) services rendered includes HIV and TB treatment, care and support systems, the hospital consists of 4 wards, namely: Male ward (medical and surgical), Female (medical and surgical), Paediatric ward, and Maternity ward (Antenatal, Labour, Post-natal, KMC, & Nursery). The hospital consists of 110 usable beds. In hospital 1 a total number of 8 babies are admitted in KMC as indicated in the hospital daily statistics and DHIS (2016/2017).
- Hospital 2 is a Level 1 District Hospital classified as an urban hospital providing comprehensive health-care services to the population from nearest villages and feeder clinics and has a bed capacity of 86 with 74 usable beds. Hospital 2 provides services which includes HIV and TB treatment care and support systems. Hospital 2 consists of 4 wards, namely: Male (medical and surgical); Female (medical and surgical); Paediatric; and Maternity (Antenatal, Labour, Postnatal, Nursery and KMC). In Hospital 2 a total number of 5 babies are admitted in KMC as indicated by the monthly hospital statistics and DHIS (2016/2017)
- Hospital 3 is a Level 2 regional and the only referral hospital in Mopani District. It provides comprehensive health-care and specialist services which include Paediatrics, Obstetrics and Gynaecology, Orthopaedics, General Surgery and Psychiatric services (DHIS, 2016/2017). Hospital 3 is classified as a rural hospital, comprises 13 wards and has a bed capacity of 400 with 317 usable beds, namely: Male and Female (medical, surgical and orthopaedics) Wards; Maternity (Antenatal, Labour, Postnatal ward; KMC; Neonatal ICU; Paediatric and Gynaecology; TB; and Psychiatric wards. In hospital 3, a total number of 12 babies are admitted in in KMC as indicated by the hospital statistics and DHIS (2016/2017)

The study was conducted in KMC units of selected hospitals in Greater Tzaneen Municipality, Mopani District. A study conducted by Bonicci *et al.*, (2011) indicated that in four districts the rates have decreased significantly, while in one district (Mopani) there is a worrying upward trend. Furthermore, indicated that the early neonatal mortality rates in Mopani District remains the highest at 28% in Limpopo Province as compared to other districts, Waterberg District at 21% Sehukhune District at 20%, Capricorn District at 13% and Vhembe District at 6% (Bonicci *et al.*, 2011).

In Limpopo Province the study was only conducted at Malamulele Hospital, Vhembe District, and no research study was conducted in the three selected hospitals under Mopani District, therefore the researcher chose Mopani District due to the highest rate at 28% of early neonatal deaths. The researcher had an interest in conducting the study to identify and describe factors hindering quality KMC in order to develop strategies to enhance quality KMC units at selected hospitals of Limpopo Province.

- Hospital 1 is situated in Maake Village, Shiluvane Local Area, Lydenburg Road is the (R36), 7km to the North and 29km South to Tzaneen Town, 127km East of Polokwane. DR CN Phatudi is a level 1 hospital.
- Hospital 2 is situated on Third Avenue, Tzaneen. The nearest main road is R36 to the North-West and North-East of the hospital (R36 bends to the North of the hospital). Other nearby main roads are the R71 North-West and R528 to the South-west, 21km South of Modjadjiskloof and 100km East of Polokwane.
- Hospital 3 is situated in Nkowankowa Local Area, Tzaneen Lydenburg Road (R36), located 12.3km South-East of Tzaneen and 105km West of Phalaborwa along R71 and R36.



Figure 3.1: Geographical map showing site of the three study sites, namely: Letaba Regional Hospital, Van Velden Hospital and DR CN Phatudi Hospital (Mopani District Municipality Integrated Development Plan, 2017/2018)

3.4 Research Design

LoBiondo-Wood and Haber (2018) defined Research Design as a blueprint for conducting a study. According to Burns and Groove (2016), a research design is a blueprint for undertaking a study, which ensures the validity of the findings by minimizing the effect of intervening factors. The research design directs the planning and the implementation of the study so that the study reaches its objectives with a high probability of accuracy (Grove, Burns & Gray, 2015). According to Babbie and Roberts (2018); and de Vos *et al.*, (2014), research design refers to all the decisions we make in planning the study, decision not only about what overall type or design to use, but also about sampling, sources and procedures for collecting data, measurement issues and data analysis plans. In this study, a Descriptive Cross-Sectional Design was used as a quantitative approach. Simple Random Sampling technique was used to include respondents during data collection through questionnaires and data were analysed using SPSS Version 24.

3.4.1 Descriptive Research Design

Descriptive design was used to help the researcher give an accurate portrayal of the characteristics of target groups (Polit & Beck, 2018). According to LoBiondo-Wood and Haber (2018), descriptive design collects detailed descriptions of the existing variables and use the data to justify and assess the current condition and practices to make plans for improving health-care practices. In this study, descriptive design is used to describe the factors hindering the enhancement of KMC quality Kangaroo Mother Care at selected public hospitals of Limpopo Province. In this study, the questionnaire was used to describe the factors hindering enhancement of Kangaroo Mother Care units in selected hospitals of the Greater Tzaneen Municipality in Limpopo Province.

3.4.2 Cross-sectional Research Design

Cross-sectional designs were used to collect data at one point in time (Polit & Beck, 2018). Thus implying that data are gathered once from a specific sample (Brink *et al.*, 2017; and Burns & Grove, 2017). The cross-sectional research design was used to identify and describe factors hindering enhancement of quality Kangaroo Mother Care at one point in time. In this study, cross-sectional research design was used to collect data from registered midwives who are responsible for quality KMC, at the selected public hospitals in Limpopo Province.

3.5. Population and Sampling

3.5.1. Population

The population is a group of people or objects that have some common characteristics that the researcher is interested in (Brink, van der Walt & van Rensburg, 2017). Polit and Beck (2018) define population as the total of all subjects that conform to a set of specifications. De Vos *et al.*, (2014) regard 'population' as the total set of persons with whom the research question is concerned. Individuals for the study are selected from the population. In this study, 'population' refers to the total number of midwives working in Maternity Wards KMC units of Hospital 1, Hospital 2 and Hospital 3, which is 77 midwives.

3.5.2 Sampling

According to LoBiondo-Wood and Haber (2018), sampling is a process of selecting representative units of a population for a study. Simple Random Probability Sampling was used in this study to ensure that all registered midwives have an equal chance of being included in the study. Subjects were drawn randomly from the sampling list.

The Simple Random samples were drawn using the Container/Fishbowl Technique (Brink *et al.*, 2017). The researcher wrote on a separate piece of paper. All the pieces of paper were folded and placed in a bowl, and then each number code was out, one by one. The number code chosen was written down and replaced in the bowl before choosing the next one, so that each respondent had an equal chance of being included in the sample, this was done depending on the number of midwives available in each hospital (Brink *et al.*, 2017). The procedure continued until the desired sample of the study was reached, which is 65.

3.5.3 Sample Size

The sample size of midwives was 65, as shown according to the Slovin's formula (Stephine, 2013) below.

- Slovin's formula: $n = N / 1 + N \times (e)^2$

N = Population size = 77

n = Sample size =

e = confidence level = standard confidence level is 95% for a better accuracy, which will give a margin error of 0.05

- *Computation for the Confidence Level*

$e = 100\% - 95\%$

$e = 5\% = 0.05$

- *Sample Size*

$n = 77 / 1 + 77 \times (0.05) (0.05)$

$n = 77 / 1.192$

n= 64.6

n= 65 respondents

➤ *Inclusion criteria*

The inclusion criteria specify the criteria that define who is included in the population to be studied (Polit & Beck, 2018; and Grove *et al.*, 2015). The population in this study included registered and advanced midwives who had one year or more experience, routinely working in Maternity Ward, KMC at selected hospitals in Limpopo Province.

➤ *Exclusion criteria*

This refers to characteristics that result in a person or element being excluded from the target population to be studied (Grove *et al.*, 2015). All midwives who were working in general wards and community service nurses with less than one year experience were not included in the study as they did not have good understanding of the study because Kangaroo Mother Care is a special unit in Maternity Ward with special needs and could interfere with the success of the study or increase the unfavourable outcome. Therefore, it was of utmost important to conduct the study only with the midwives who have more knowledge about the unit.

3.5.4 Pilot Study

Brink *et al.*, (2017) describe a 'pilot study' as "a small-scale study carried out before the major study". 'Pilot study' refers to a trial run of research (Nieswiadomy & Bailey, 2016). Study was carried out with a small population that possessed homogeneous characteristics to the research population to test the questionnaire prior being used in the main study to prevent bias. The purpose of conducting the pilot study was to ensure that the respondents understood what was required of them and the researcher to make necessary amendments on the questionnaire.

The pilot study was conducted at a different setting in Greater Maruleng Municipality, Mopani District of Limpopo Province. A pilot study was conducted with a sample of 08 midwives. Internal validity of the questionnaire was tested by asking the respondents

about the factors hindering quality Kangaroo Mother Care in order to give direct feedback on the readability, difficult questions and time taken to complete the questionnaire for completion.

The results from the pilot study helped the researcher to correct spelling and typing errors, and the time frame to complete the questionnaire was 25-30 minutes but then, the respondents took 30-35 minutes to complete the questionnaire whereby the duration was adjusted. The pilot study results also made the data collection instrument to be more reliable. The results obtained from the pilot were not included in the results from the main study. There was no question left unanswered as almost all the questions asked were clear and easy, and the respondents were able to complete the questionnaire without leaving empty spaces. Feedback on readability was good.

3.6 Data Collection

A self-designed questionnaire was used for quantitative data collection in order to obtain information that is valid and could not be generalized to the study population. Data were collected from registered midwives at selected hospitals using self-developed questionnaire. The questionnaire consisted of same questions to all respondents and the information included the development of strategies to enhance quality Kangaroo Mother Care. Statistician was consulted for assistance regarding assessment of the questionnaire to ensure that the questions respond well to the research questions and also for analysis of data (Appendix 9: Page 98).

Questionnaire (Appendix 1 on Page 88) was designed using Likert scale and was in English. The respondents completed the questionnaires on their own, in private counselling rooms of their institutions which are, namely: Hospital 1, Hospital 2 and Hospital 3, in the presence of the contact person and the researcher was also available in a separate place in order to clarify other questions asked. The duration to complete the questionnaire was 30-35 minutes.

3.6.1 Format of the Questionnaire

The questionnaire was divided into four sections had a total number of 30 questions.

- Section A: Demographic data: age, gender, qualifications, profession, years of experience, Education and training (6 questions)
- Section B: Knowledge and attitude of midwives regarding KMC (10 questions)
- Section C: Advantages of KMC (10 questions).
- Section D: Methodology on development of strategies (4 questions)

3.6.2 Preparation for Data Collection

Prior to actual data collection the researcher received a clearance certificate from Turfloop Research Ethics Committee (TREC) Appendix 3 Page No 92:, permission to conduct study was obtained from Limpopo Department of Health (DoH) Appendix 4 Page No 93:, then the researcher requested permission to conduct study from the CEO's and Nurse Managers of the three selected public hospitals while presenting the approval letters from TREC and DoH. During the meeting, objectives of the study were discussed together with the entire aspect of the study and how it might benefit the institutions. Furthermore, the researcher was advised to ensure that data collection does not interfere with planned patient care programmes and other important daily activities. The matter was then taken and communicated to all hospitals stakeholders then the researcher was given probable dates and time suitable for data collection.

The researcher visited the three selected public hospital Maternity Wards on different dates in order to complete the questionnaires. The researcher explained the objectives and ethical considerations, particularly anonymity and confidentiality, thus enhancing anonymity. The instructions on how the questionnaires were supposed to be completed were also explained. The respondents were also informed about their right to withdraw (Polit & Beck, 2008) from the study at any time without being victimized, and they were also made aware that the data that they give would only be used for this study and further be published by submitting the research findings in an article to an accredited academic journal. The findings will also be made known through workshops and seminars so that other researchers can use the findings to research on further topics.

The midwives were willing to participate and gave informed consent; they then completed the questionnaires that had codes. Completion of the questionnaires took 30-35 minutes and at the end of the 6th day a total 65 questionnaires were completed based on the sample size of the midwives and according to inclusion criteria. All completed questionnaires were handed over to the researcher with a 100% response rate. The response-rate formula was calculated according to the American Association for Public Opinions Research (2011).

Response rate = number of people who completed the questionnaire x 100

The number of people in the sample 65/65x100=100%

3.7 Data Analysis

In this study, data are analysed by using the International Business Machines (IBM), Statistical Package for Social Sciences (SPSS) version 24 computer program with the assistance of the statistician. This is the statistical method that enables the researcher to reduce, summarise, organise, manipulate, evaluate, interpret and communicate quantitative data in a form of graphs. According to Babbie and Roberts (2018), quantitative analysis is the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomenon that those observations reflect.

Descriptive statistics are computed to reveal characteristics of the sample and to describe study variables (Grove et al., 2015). Descriptive statistics included measures of central tendency. The mean is the average, that is all scores are added up and divided by the number of subjects, median represents the exact middle score or value in a distribution of scores, mode is the value that occurs most frequently in a distribution of scores (Polit & Hungler, 2013; and Burns & Grove, 2016). Data are summarised in a form of frequencies, and percentage. Descriptive frequencies and percentages were applied in the analysis of data obtained in this study, and the data are presented in narrative form and by means of frequency tables, bar and pie charts.

3.8 Data Management

All the completed questionnaires were kept under lock-and-key in a safe cupboard. Only the researcher has access to the data collected. All the respondents were assured that the questionnaires will only be accessed by the researcher and the supervisor.

3.9 Validity and Reliability

According to Polit and Hungler (2013), validity and reliability of the instrument are usually determined in the pilot study. LoBiondo-Wood and Haber, (2018) refer to validity as the measure of the truth or accuracy of a claim, meaning how sensitive and specific the test is to measure the variable is interested in. In order to assess and evaluate the accuracy of the instrument, such was tested for validity and reliability. Pilot study was done in a different setting at Hospital in Greater Maruleng Municipality, using 8 respondents who were not participating in the main study to prevent bias. Pilot study refers to a trial run of research (Nieswadomy, 2016). The results from pre-testing helped the researcher to make corrections on the designed questionnaire with regard to questions construction. The pre-testing results also made the upcoming study tool to be reliable.

3.9.1 Validity

‘Validity’ refers to the ability of an instrument to measure the variable it is intended to measure (Brink *et al.*, 2017). In the study, ‘validity’ was ensured by doing thorough literature review to get the variables regarding strategies to enhance the quality of care in Kangaroo Mother Care, to ensure validity of the study, the questionnaires content, face and external validity were also tested.

Content validity

‘Content validity’ refers to the degree to which an instrument covers the scope and range of information that is sought (Brink *et al.*, 2017). Furthermore, De Vos *et al.*, (2014), say ‘content validity’ is concerned with the representatives or sampling adequacy of the content of an instrument. In this study, the researcher gave the questionnaire to the supervisor of the research project to evaluate for content validity. Content was based on the literature review and researcher’s experience, which was validated by experts in the field of Nursing Education and Methodology, which are the lecturers in the Department of

Nursing, and School of Health Care Sciences. The content was rectified according to the results of the pilot study to ensure that there was no ambiguity, questions were accurate and to determine feasibility of the study.

The questionnaires were submitted to the supervisor, co-supervisor and the statistician that are experts in quantitative research methodology and were facilitating modules on quantitative research. Furthermore, these academics have published articles in accredited journals and supervised postgraduate students who followed quantitative research methodology. Content validity was achieved by having data collection instrument reviewed by these experts in the field of Quantitative Research Methodology who commented about the appropriateness, completeness, clarity, comprehensiveness, readability, variables and wording of the items, the items agreed upon were used, and those that were not relevant were deleted.

Face validity

In this study, the questionnaire was considered to meet the requirements of face validity because all questions in the instrument were focusing on the strategies to enhance quality Kangaroo Mother Care at selected Public Hospitals, Limpopo Province. This was achieved by giving experts to assess the items in the questionnaire and agreed that the questionnaire is a valid instrument of the characteristic of interest.

External validity

'External validity' refers to the degree to which the study results can be generalised to other people and research settings (Brink *et al.*, 2017). In this study, the present researcher provided a detailed database for other researchers to determine whether the findings of the study are applicable in other settings.

3.9.2 Reliability

'Reliability' refers to consistency, stability and repeatability of the informant' accounts, as well as the researcher's ability to collect and record information accurately (Creswell, 2014). In this study, 'reliability' was ensured by ensuring consistency of questionnaire by

other researcher describing the strategies to enhance quality interventions of Kangaroo Mother Care units in selected public hospitals. Leon, Davis and Kraemer (2011), mentioned that the purpose of conducting a pilot study is to examine the feasibility of an approach that is intended to be used in a larger scale study.

3.10 Ethical Considerations

3.10.1 Ethical Clearance Certificate

The proposal was submitted to the Turfloop Research Ethics Committee for ethical approach, and Ethical Clearance Certificate was obtained from (TREC) Appendix 3 Page No 92:

3.10.2 Permission

Permission was obtained from Limpopo Department of Health Ethics Committee (Appendix 4: Permission Letter from Limpopo Province Department of Health Page No: 93), to the Greater Tzaneen Municipality's hospital CEOs and operational Managers to grant permission to request midwives' permission to conduct the study (Appendix 5: Permission letter from Letaba Regional Hospital Page No. 94:, Appendix 6: Permission letter from Van Velede Hospital Page No. 95:, Appendix 7: Permission letter from DR CN Phatudi Hospital Page No. 96). Once the Limpopo Province Department of Health gives permission the institutions endorse the directive from the province, there is a document to be signed by the institution.

3.10.3 Informed Consent

A respondent voluntarily agrees to participate in a research study in which he or she has full understanding of the study before the study begins (Brink *et al.*, 2017). The researcher ensured informed consent (Appendix 2 Page No: 90:) by explaining to the respondents the aim and objectives of the study; how the study will benefit them together with the patients; the expected duration of the respondents' involvement; the procedures that were followed during the investigation; and the possible advantages, disadvantages and dangers to which respondents may be exposed (Brink *et al.*, 2017; and De Vos *et al.*,

2014). The goal of informed consent is to allow participants to make an informed decision about whether to participate in a research study or not (Burns & Grove, 2016).

The researcher informed the respondents that the information shared will not be divulged to unauthorized personnel. The respondents who agree to participate in the study were requested to sign a Consent Form which included the name of the researcher, the research supervisor, the purpose, objective and brief description of the study (Appendix 2 Page No 86). The respondents were also informed that they had the right to terminate or withdraw from the study without the researcher's consent at any time. The researcher ensured the respondents that the signed Consent Forms were treated with utmost discretion and stored away in a correct manner so that a form can easily be found if the need arises (De Vos *et al.*, 2014).

3.10.4 Privacy

The respondents have the right to determine the extent to which and the general circumstances under which their private information was shared with or withheld from others, privacy was ensured by collecting data in their own institution, private rooms without interruptions. Information gathered was not disclosed or made available to any unauthorised person (Brink *et al.*, 2017). No disturbances, discussions or interruptions were allowed and there was no media coverage allowed such as cameras or video tapes in order to ensure privacy

3.10.5 Anonymity

Anonymity was ensured by putting name indicators, numbers or code names on the questionnaire. Literally means the identity of the research participants was unknown, even to the study investigator (Brink *et al.*, 2017). Anonymity means that no one, including the researcher, should be able to identify any respondents afterwards (De Vos *et al.*, 2014). The respondents were informed not to write their names nor hospital names on the questionnaires. A contact person was available during data collection, so that the respondents could remain anonymous to the researcher.

3.10.6 Confidentiality

'Confidentiality' refers to how the researcher manages personal information to ensure that only the researcher directly involved in the study has the access to information (Botma, *et al.*, 2017). The respondents had the right to refuse to answer any questions asked and to have the confidentiality of their data protected (Brink et al., 2017; and LoBiondo-Wood & Haber, 2018). In this study, 'confidentiality' was maintained whereby information provided by the respondents was kept confidential. The researcher ensured confidentiality by informing the respondents that both all the information gathered and signed Consent Forms will not be divulged to unauthorized personnel and that such will be locked away in a secured storage.

3.11 Bias

'Bias' refers to a quality of a data collection instrument that may result in the misinterpretation of what is being measured (Babbie & Roberts, 2018). According to Brink *et al.*, (2017), bias is an influence that produces distortion, which can affect the quality of evidence in the research study. In this study, the researcher avoided asking leading questions to respondents and did not react to any answers that the respondents provided.

The participation was determined randomly, using the random number generator to ensure that there is no systemic bias in either group. All respondents were given the same questionnaire to answer and the researcher ensured that all respondents understood all questions and clarified questions that were not clear. Pre-testing was done in a different setting in the Greater Maruleng, using 8 respondents who were not participating in the main study.

3.12 Conclusion

This chapter dealt with the methodology adopted to complete the study. A quantitative cross-sectional descriptive research design was chosen and a self-designed questionnaire was used for collecting data base on literature. The instrument was tested for validity and reliability, ethical considerations were followed, and bias avoided ensuring quality of the study. The respondents were midwives at Hospital 1, Hospital 2 and

Hospital 3. The respondents' rights were respected throughout the study. Findings of this study will be forwarded to the Limpopo Department of Health to improve the Kangaroo Mother Care units.

CHAPTER 4

PRESENTATION AND DISCUSSION OF THE RESEARCH FINDINGS AND THE ADAPTATION STRATEGIES

4.1 Introduction

Chapter 3 outlined the research methodology used in the study. This chapter interprets and presents research findings based on the data analysis. The information obtained is presented in the form of frequency tables, pie charts and bar graphs. This chapter uses descriptive statistics and inferential statistics to explain the findings. Examples of descriptive statistics are frequencies (f) and percentages (%). Correlations were also done among variables to give a better picture of research findings and to draw conclusions from the data.

Chapter four presents research findings based on a self-designed questionnaire administered by the researcher to midwives who working in KMC units at the three selected hospitals in the Greater Tzaneen Municipality, Limpopo Province. Data for this study were analysed using Statistical Package for Social Science (SPSS) version 24 for Windows. All (28) variables were entered numerically on SPSS spread sheet. The findings are presented according to the sections of the questionnaire used by the researcher to collect data, starting with the demographic variables of research respondents. This chapter uses descriptive statistics to explain the findings. Examples of descriptive statistics are frequencies (f) and percentages (%). Not all demographic factors had a significant difference for KMC.

4.2. Presentation of Research the Findings

In the present research, the demographic data of the respondents, knowledge of kangaroo mother care units, positive impact of kangaroo mother care units and development of kangaroo mother care strategies will be presented in relation to the KMC units at the selected hospitals.

4.2.1 Section A: Demographic Data

The demographic data included age, gender, type of profession, years of experience and education and training.

Table 4.1: Shows the Demographic Data of the Respondents

Demographic Data	Frequency	Percentage
Age (Years)		
22-25 years	12	18.5%
26-30 years	14	21.5%
35-40 years	16	24.6%
45-50 years	13	20%
>50 years	10	15.4%
Gender		
Male	23	35.4%
Female	42	64.6%
Qualifications		
Diploma	26	40%
Degree	21	32.3%
Advanced Midwifery	12	18.5%
Mcur Advanced Midwifery and Neonatology	06	9.2%
Type of Profession		
Registered Midwife	47	72.3%
Advanced Midwife	12	18.5%
Advanced Midwife and Neonatologist	06	9.2%
Years of Experience		
0-4 years	17	26.2%
5-9 years	16	24.6%
10-14 years	15	23.1%
15-20 years	09	13.8%
>20 years	08	12.3%
Education and Training		
Education and training is essential in KMC	15	23.1%
Educators should have knowledge of KMC	23	35.4%
Face-to-face facilitation is important in KMC training	08	12.3%
Education and training should be provided at all categories	05	7.7%
Relatives should be educated about KMC	14	21.5%

Age of the Midwives

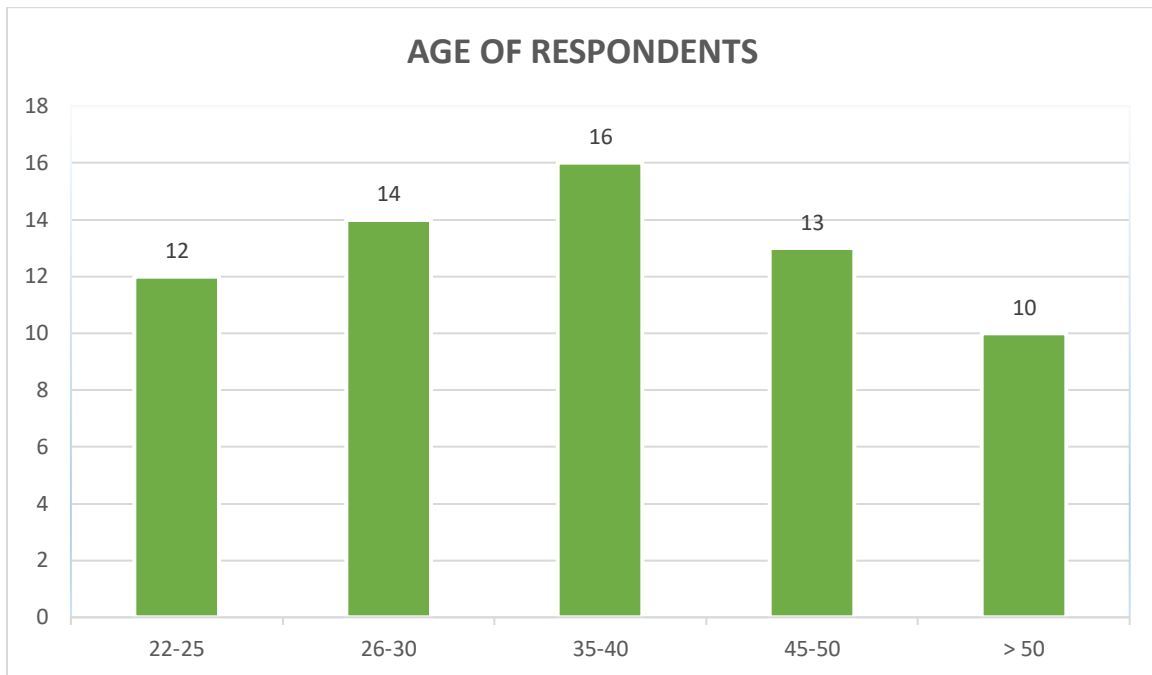


Figure 4.1: Shows the Age of Respondents

The majority of the study respondents was the age group 35-40 year olds, which is 24.6% (n=16), followed by middle aged 26-30 year olds, who represents (n=14), which resulted into 21.5% of the study sample. The age group of the respondents, ranging from 40-50 years, contributed to 20% (n=13). The following group was these aged 22-25 years, which is 18.5% (n=12). The lowest but not least were those respondents who were in the age group >50 who represented about 15.4% resulting to (n=10). According to the results, it clearly indicates that most group of the respondents who are involved in KMC are the age group ranging between 35-40 years and the least are aged group above 50 and due for pension within following years.

Gender of Respondents

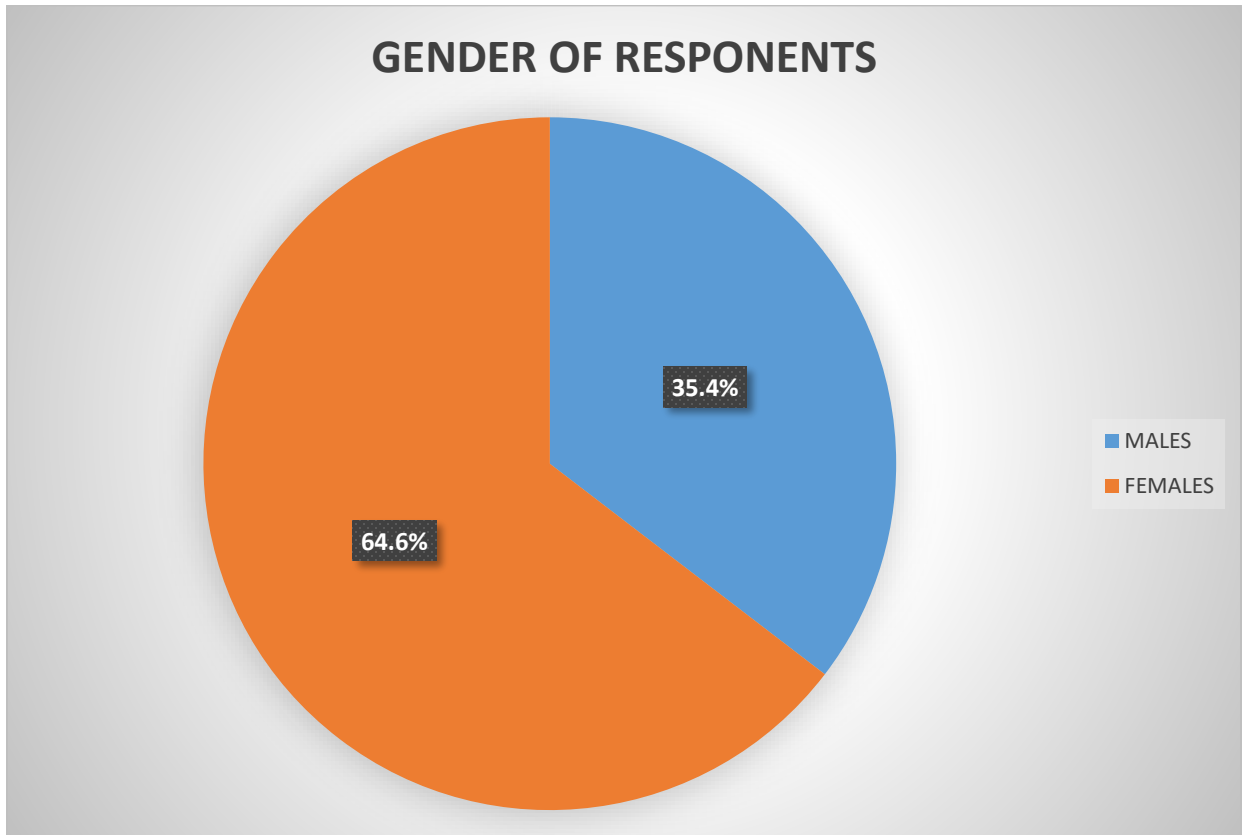


Figure 4.2: Shows Gender of Respondents

Since nursing was first registered as a profession, women have dominated in this field (American Nurses Association, 2010). It is clear from the above table that the majority of females, which comprises 64.6% (n=42), is responsible for monitoring Kangaroo Mother Care units and minority are males represented by 35.4% (n=23) of the study population. The study shows that more females register for nursing since they are dominating.

Qualifications of Respondents

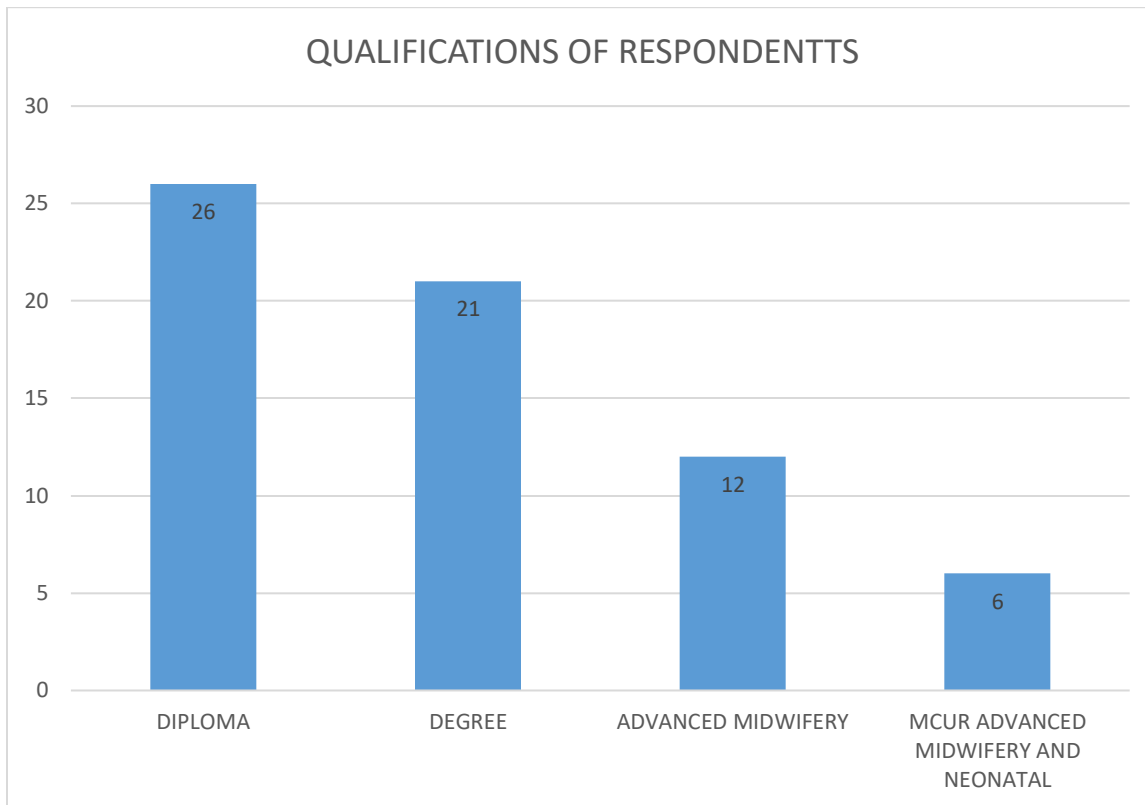


Figure 4.3: Shows Qualifications of the Respondents

The majority of the respondents qualified with diploma represented by 40% (n=26) of the sample, followed by the number of those having degree at 32.3% (n=21)). The other group that followed are those who studied advanced midwifery, rated at 18.5% (n=12) and the last group has MCur in Advanced Midwifery and Neonatology (9.2% (n=6). This affirms that the majority of study respondents who monitor KMC only have basic diploma and degree acquired while still in training institutions with regard to KMC, whereas those that advanced are in the minority. Therefore, this explains more on why the researcher is interested in developing strategies to enhance KMC as a special unit to monitor the wellbeing of infants.

Type of Profession of Respondents

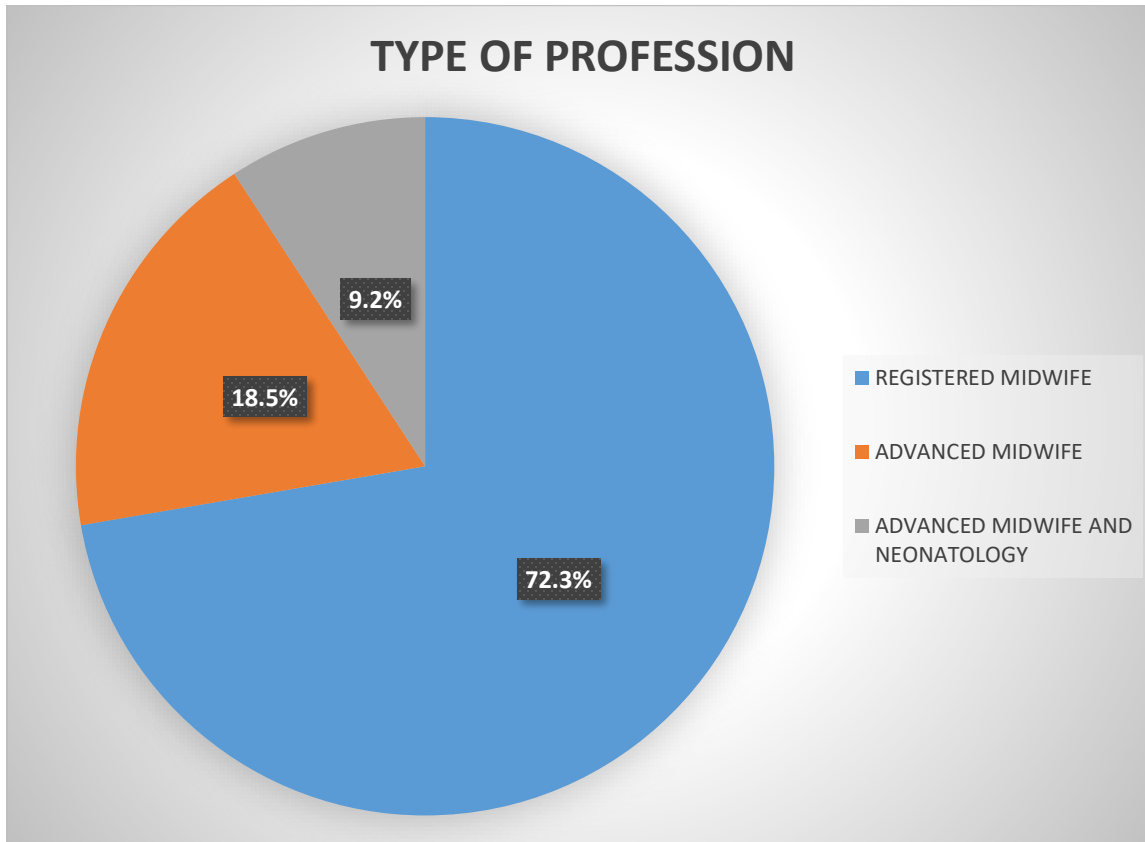


Figure 4.4: Shows the Type of Profession of Respondents

The study findings shows that the majority of midwives was still registered (72.3%) (n=47) and a minority are advanced midwives at 18.5% (n=12) and those having MCur in Advanced Midwifery and Neonatology are represented by 9.2% (n=6). Therefore, the type of profession also explains more why the researcher is interested in developing the strategies to enhance KMC at the three selected hospitals in Limpopo Province, so that more of the registered midwives can be trained to be able to care for the KMC units. The registered midwives also are responsible for monitoring KMC, as they were previously trained in undergraduate course, therefore more training in advanced field of neonatology will add value to KMC and prevent hindrances. This leads to a stage where more midwives should be trained regarding the management of KMC in order to reduce neonatal mortality and morbidities.

Years of Experience

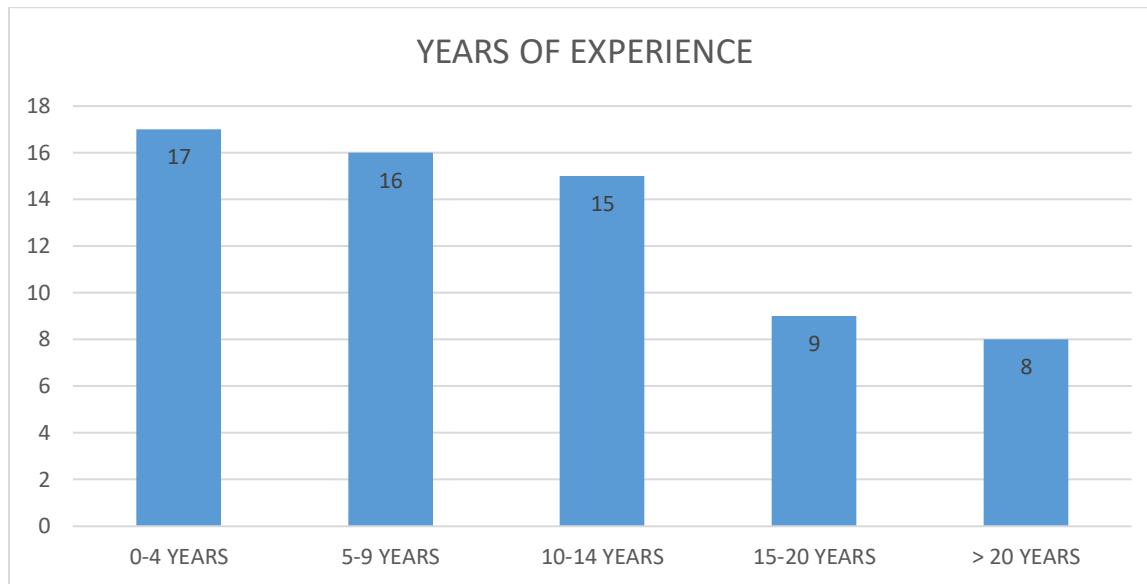


Figure 4.5: Shows Years of Experience of Respondents

The analysis on the years of experience shows that majority of study respondents were having experience as basic midwives between 0-4 years who represents 26.2% (n=17) of the sample, followed by those having experience range 5-9 years 24.6% (n=16). Years of experience of 10-14 years represents 23.1% (n=15), then those having 15-20 years were represented by 13.8% (n=09). The least were occupied by those having above 20 years 12.3% (n=08). The results clearly indicate that the less-experienced midwives are dominating the Advanced Midwives and Neonatology and also further factors hindering KMC at the three selected hospitals in Limpopo Province. The minority midwives will be retiring soon then the KMC will be compromised, therefore it is imperative that most midwives be trained to promote that there will be continuity of care to both mothers and their neonates in and also prevention of sub-standard interventions in the KMC of the selected hospitals.

The findings of the study sample indicates that majority of midwives still requires education and training 23.1% (n=15), then the higher percentage 35.4% (n=23) clearly shows that educators should have knowledge of KMC and be able to impart knowledge to learners and other fellow midwives. Twelve point three percent (12.3%) (n=08) also

indicated that face-to-face facilitation could also benefit the midwives. Only a few 7.7% (05) responded that all categories should be provided with education and training. The minority of the respondents indicates that relatives should be educated about KMC 21.5% (n=14). The analysis of this study sample indicates clearly that education and training regarding KMC is of utmost importance; it is a specialized unit that requires skills.

4.2.2 Section: B Knowledge of Kangaroo Mother Care Units

Table 4.2: Represents Knowledge of Midwives Regarding Kangaroo Mother Care Units

Statement	AGREE % (n)	DISAGREE % (n)
Kangaroo Mother Care promote mother infant bonding	63.1 (41)	36.9 (24)
Kangaroo Mother Care enhance mother' s confidence on how to handle the infant	56.9 (37)	43.1 (28)
Kangaroo Mother Care improves maternal response to infants	27.7 (18)	72.3 (47)
Kangaroo Mother Care should be practised on all infants less than 2000g	70.8 (46)	29.2 (19)
KMC should be practised on infants of birth weight 1-1.8kg	67.7 (44)	32.3 (21)
KMC should begin within few hours after birth	20 (13)	80 (52)
KMC should begin immediately after birth	36.9 (24)	63.1 (41)
Both parents should be involved in KMC	61.5 (40)	38.5 (25)
Skin-to skin contact is essential in KMC	84.6(55)	15.4 (10)
KMC reduces nosocomial infections	33.8 (22)	66.2(43)

According to the respondents study results, the majority of about 63.1% (n=41) shows that they are knowledgeable with regard to promotion of mother to child bonding whereas 36.9%, which represents (n=24), do not agree. Most of the midwives disagree with the fact that KMC improves maternal response to infants as shown on the table by 72.3% (n=47) and only 27.7% (n=18) agree with the given statement. Respondents strongly agreed that KMC should be practised on all infants of less than 2000g and a minimum of (n=19) represented by 29.2%, and this clearly shows that it is important to keep infants on KMC.

The following percentage of the respondents, which is 67.7% (n=44), fully supports the above statement as also agreed that KMC should be practised on infants of birth weight

1-1.8kg and a few of 32.3% (n=21) disagree with the statement. This indicates that KMC might assist with the reduction of neonatal mortality and morbidity, and midwives are also aware. Eighty percent (80%) of the respondents, which represented by (n=52), disagrees that KMC should be commenced hours after birth; while 20% (n=13) agrees and this statement shows that the majority of the respondents are knowledgeable and this will preserve and prevent neonatal mortality and morbidity at three selected hospitals in Limpopo Province.

Education and training efforts have been explored and employed by some countries China, South Africa, Ghana including Nigeria (Aboda & Williams, 2012). And minority will need to be trained and be knowledgeable on the management of neonates before they can be transferred to KMC. The majority of the respondents, at 63.1% (n=41), disagreed with the statement that KMC should begin immediately after birth as it is of importance to first assess the condition of the neonate as supported by the above statement. The minority agreed as represented by 36.9% (24) that education and training is imperative. Some countries are reportedly having difficulties in increasing their coverage and implementation of KMC beyond the initial programme set up by organised bodies like the WHO, UNICEF and Save the Children initiative (Aboda & Williams, 2012; Bergh, Manu, Davy, Van Rooyen, Quasah Asare, Awoonor-Williams, Dedzo, Twumasi & Nang-Beifubah, 2013; NAS, 2009).

Midwives play an important role in terms of the facilitation of KMC, they give information, constant reassurance as well as provision of comfortable environment and privacy to the parents of preterm infants (Bergh, Manu, Davy, Van Rooyen Asare, & Williams *et al.*, 2012; *et al.*, Nyavist *et al.*, 2010) . According to the respondents as midwives, 61.5% (n=40) agrees that both parents should be involved in KMC, as this can assist both parents to bond with the infant and also reduce the postpartum depression from the mother as mostly mothers are involved in KMC .This will also reduce the work overload of the midwives in the specialized KMC units (Nyavist *et al.*, 2010).Twenty-five (25), represented by 38.5%, disagree with the statement.

The majority of the respondents are knowledgeable and aware that skin-to-skin contact is essential in KMC as represented by 84.6% (n=55) and as a result it will promote optimal growth and development of the neonate and also thermoregulation whereas a minority of the respondents (n=10) disagrees with the statement 15.4% and this indicates that some of the midwives in the KMC units still needs to be trained and educated regarding the importance of KMC. Lastly, the majority of the respondents disagree that nosocomial infections can be reduced when practicing KMC represented by 66.2% (n=43) and other respondents ((n=22) 33.8%) agree that KMC can make a difference regarding reduction of nosocomial infections.

4.2.3 Section: C Positive Impact of Kangaroo Mother Care Units

Table 4.3: Represents the positive impact of Kangaroo Mother Care units

Statement	Agree % (n)	Disagree % (n)
Kangaroo Mother Care helps regulating baby temperature	89.2 (58)	10.8 (7)
Maintains physiological stability	83.0 (54)	17 (11)
There is no pharmacological intervention in KMC	64.6 (42)	35.4 (23)
There is increase in success in exclusive breastfeeding	69.2 (45)	30.8 (20)
Decrease use of incubators	73.8 (48)	26.2 (17)
Decrease workload of midwives	27.7 (18)	72.3 (47)
Increase development and optimal growth	67.7 (44)	32.3 (21)
Promotion of bonding	90.8 (59)	9.2 (6)
KMC reduces pain	56.9 (37)	43.1 (28)
KMC increase neurodevelopmental outcome	66.2 (43)	33.8 (22)

It is clearly indicated that KMC is a lot about temperature regulation of the baby by almost all respondents (n=58), represented by 89.2%, agree with the statement only 7 (10.8%) disagree with the above statement. Hypothermia can be mediated by nursing the preterm in an incubator to provide the needed temperature for survival where available. Many infants have died because incubators were not readily available (Friberg, Kinney, Lawn, Kerber, Odubanjo, Bergh, & Black, 2010). This literature clearly explains that, since KMC is readily available, neonates will survive the hypothermia, which is in support of the findings of the results. Most of the respondents at 64.6% (n=42)) agree that when infants are in KMC, pharmacological intervention might not be necessary, whereas 35.4% (n=23)

disagree with the statement. The findings from the respondents results (n=45) 69.2% shows that when infants are in KMC there is greater success in exclusive breastfeeding while few disagree as indicated by the rate of 30.8% (n=20).

The findings indicate that when infants are in KMC the use of incubators is reduced (n=48) 73.8% and only (n=17) 26.2% disagree with the given statement. Respondents disagree that workload is reduced when infants are in KMC as they are also supposed to monitor the care and growth of the infants including the well-being of the mothers. This is shown by the results above ((n=47) 72.3%) of which it becomes a burden to midwives and leads to chronically overworked and this is why the researcher was interested in investigating the factors hindering KMC at the three selected hospitals in Limpopo Province, whereas 27.7% (n=18) agrees that workload is reduced. It seems the respondents' results show that KMC promotes development and optimal growth as an advantage (Bergh *et al.*, 2013) represented by 67.7% (n=44) and 32.3% (n=32.3) does not agree with the statement.

The majority of the respondents clearly indicated and agreed that KMC promotes bonding between the mother and neonate and it is rated at 90.8% (n=59) but a few respondents disagreed (n=6) 9.2%. It is clearly shown on the above table that respondents agreed that when infants are in KMC pain is reduced (n=37) 56.8% and 43.1%, which is (n=28), disagrees with the statement. It is a successful project put in place to reach all premature babies and was projected to have the capacity to have saved 19,000 lives in 2015 (Aboda & Williams, 2011). It enhances infant physiologic stability and reduces its pains as evidenced by reduced cry and restless movement of the body. Furthermore, there is increase in parental sensitivity to infant cues due to the bonding effects created by KMC (Nyqvist *et al.*, 2010). For the mother, it reduces maternal stress and postpartum depression. It is cost-effective and accessible because it does not require complicated facilities (Davanzo, *et al.*, 2013). Chan, Labar, Wall and Atun (2016) remarked that in the developed and some developing countries, KMC have been embraced as a method of neonatal care. The respondents agreed that KMC can definitely increase neurodevelopmental outcome (Prathiba, Doddabasappa, Mahantshetti, Mahesh Kamate

& Adarsh, 2018) of the infant, which was indicated by 66.2% (n=43). But still (n=22) 33.8% disagree with the given statement.

4.2.4 Section D: Development of Kangaroo Mother Care

Table 4.4: Represents the Development of Kangaroo Mother Care Strategies

Statement	Agree % (n)	Disagree % (n)
Reduction of global infant mortality and perinatal morbidities	75.4 (49)	24.6 (16)
Raising awareness of KMC value in health system	73.8 (48)	26.2 (17)
KMC low cost safe, and effective way of infant care	50.8 (33)	49.2 (32)
Total health-care strategy within supportive environment	78.5 (51)	21.5 (14)

According to the respondents' results, 75.4% (n=49) agrees that development of strategies can assist to reduce the global infant mortality and perinatal morbidities, other respondents disagree with the statement 24.6% (n=16). The majority of the respondents, at 48 (73.8%), agreed that raising an awareness of KMC value in the health system helps reduce the mortality and perinatal mortality, and only a few at 26.2% (n=17) disagreed. This gives a clear indication of the importance of developing the strategies to enhance KMC. Respondents who agreed that KMC is low cost, and effective way of infant care were (n=33) 50.8%, whereas those who also disagreed are ranging at 49.2% (n=32). Therefore, it needs a thorough investigation on whether the statement can be effective in KMC. The majority of the respondents agreed that strategies should indeed be developed in order to find a health-care strategy within the supportive environment of KMC as represented by 78.5% (n=51) and only (n=14) 21.5% disagreed.

4.3 DISCUSSION OF THE RESEARCH FINDINGS

Section A: Demographic Data

This section discusses the research findings based on the demographic data of the respondents. It includes age (years), gender, qualifications, type of profession, years of experience and, education and training.

- **Age and gender of respondents**

The current study findings indicated that more females dominating nursing profession than males. The finding as this study was also supported in research done by Lehasa (2008), support the current study findings, as it indicate that gender distribution confirmed the general profile as more females enter the nursing profession. Since nursing was first registered as a profession, women have dominated in this field (American Nurses Association, 2010). Ngidi (2007) also emphasizes that this is a female-dominated profession. Tzeng, Chen, Tu and Tsai (2009) stated that the nursing and midwifery professions are predominantly women's practice and male nurses remain minority in these professions. According to the results, it clearly indicates that most group of the respondents who are involved in KMC are the age group ranging between 35-40 years and the least are aged group 50 years and above. According to Kantrowitz-Gordon, Ellis and Mcfarlane (2014), male midwives are required to recognize themselves as being in the minority because of their being few in midwifery practice that is a female-dominated profession.

Qualifications, type of profession, years of experience and education and Training of respondents

The findings of the study sample indicates that majority of midwives still requires education and training .The lack of education and training of healthcare practitioners on KMC was confirmed in other studies done in Malawi, Rwanda and Uganda (Bergh *et al.*, 2012). In study findings it clearly shows that educators should have knowledge of KMC and be able to impart knowledge to learners and other fellow midwives. Western Cape of South Africa 60 per cent of the staff indicated that they did not receive KMC training (Solomons & Rosant, 2012). The study also shows that, an educational strategy for healthcare practitioners to reinforce and implement KMC practices could be helpful to improve the midwives' overall knowledge, attitudes and practices of KMC (Bergh *et al.*, 2011). However when it comes to KMC education, there is no "one-size fits-all" education model (Bergh *et al.*, 2012). Having a policy about intervention enhances teaching and reinforces knowledge regarding that intervention (Henard & Roseveare, 2012). It also

promotes the educational strategy to be prioritized in the organizational budget. The policy could outline what information about training should be provided by whom (Henard & Roseveare, 2012). Leadership in a form of a champion who has an interest in maternal and newborn care and KMC in particular could enhance the implementation of the educational strategy by using mentorship and reinforcement of information and skills (Bergh, de Graft-Johnson., khadka, Om'Iniabohs, Udani, Pratomo & de Leon- Mendoza, 2016; Gagliardi *Et al.*, 2015). Many education and training efforts have been explored and employed by some countries, including Nigeria (Aboda & Williams, 2011).

The implementation of new healthcare interventions can be challenging as it demands intensive training or retraining of health workers at any level; be it at global, national or regional levels (Boundy, Dasjtjeri, Spiegelman & Wafaie, 2016). According to Thopola and Lekhuleni, (2016), the 'goal' refers to enhancement of quality KMC intervention focusing on the hindrances of quality such uncondusive environment, non-availability of material resources, privacy maternal support and equipment and sub-standard care. The task is particularly herculean for low resource countries (WHO, 2012a). In recent years, many ministries of health have collaborated with development partners 49 and health professionals to systematically introduce, strengthen, or promote the scale up of facility-based KMC (Joshi & Morade, 2013; Findley, Uwemedimo, Doctor, Green, Adamu, & Afenyadu, (2013). Bergh, *ET al.*, (2014), reported that in some countries, implementation starts in individual healthcare facility that also serves as education and training centres. The analysis of this study sample indicates clearly that education and training regarding KMC is of utmost importance; it is a specialized unit that requires skills.

SECTION B: Knowledge of kangaroo Mother Care Units

This section discusses the knowledge of kangaroo mother care units, which includes KMC promotes mother infant bonding, enhance mother's confidence on how to handle the infant, improves maternal response to infants, it should be practiced on all infants less than 2000g and on birth weight 1-1.8kg, should begin within few hours after birth, begin immediately after birth, both parents should be involved, skin-to-skin contact is essential

and it reduces nosocomial infections. The respondents, fully supports and also agree that KMC should be practised on infants of birth weight 1-1.8kg and a few of as these infants are qualifying to be nursed and monitored in KMC. This indicates that KMC might assist with the reduction of neonatal mortality and morbidity, and midwives are also aware. Some countries are reportedly having difficulties in increasing their coverage and implementation of KMC beyond the initial programme set up by organised bodies like the WHO, UNICEF and Save the Children initiative (Aboda & Williams, 2012; NAS, 2009; Bergh, Charpak, Ezeonodo, Udani, & van Rooyen, 2012).According to the respondents study results, the majority of midwives shows that they are knowledgeable with regard to promotion of mother to child bonding in KMC.

- **Kangaroo mother care promote infant bonding and enhance mother's confidence on how to handle the infant.**

Respondents in this study indicated that KMC does promote mother infant bonding and enhance mother's confidence in handling the infant. Preterm admission to NICU results in separation of mother and the infant who have had the opportunity to provide KMC for their infants describe of being needed, increased confidence in knowing their infants and a sense of their role as a mother (Johnson, 2007). Feldman (2002) also support the study finding as he indicated in his study that near the time of discharge home, mothers were observed to look at and touch their infant more frequently , show more positive affect and be more adaptive to their infant's signals than did mothers who had not provided KMC. Infant and maternal bonding and attachment occur due to early breastfeeding (Victoria et al., 2016). It has positive effects on infant development and infant /parent interaction (Conde-Agudelo & Díaz-Rossello, 2014).

- **Kangaroo Mother Care improves maternal response to infants**

According to the respondents as midwives agree that both parents should be involved in KMC, this can assist both parents to bond with the infant and also reduce the postpartum depression from the mother as mostly mothers are involved in KMC. Owing to its benefits, the implementation of KMC can play a role in enhancing neonatal and maternal care by offering medical, emotional, psychological and physical support for both mother and infant

(USAID, 2012). For the mother, it reduces maternal stress and postpartum depression. It is cost-effective and accessible because it does not require complicated facilities (Davanzo, *et al.*, 2013).

- **KMC should be practiced on infants of birth weight 1-1.8kg or less than 2000g.**

Respondents strongly agreed that KMC should be practiced on all infants of less than 2000g and this clearly shows that it is important to keep infants on KMC. The respondents fully supports the fact that infants must be monitored in KMC from birth weight of 1-1800g. (WHO, 2012) stated that a baby's birth weight was an important factor for determining his or her survival. However, when the overriding gains of KMC are considered, the recommendations of experts in this aspect of neonatal care is that as —soon as the general condition of these babies (preterm & LBW) improves, and no longer 4requires intensive medical care, KMC be introduced (Blomqvist, Frolund, Rubertsson & Nyavist *et al.*, 2013).

- **KMC should begin immediately after birth or should begin within few hours after birth.**

The study findings indicate that it is not necessary to begin KMC immediately after birth or within few hours after birth until midwives are sure of the wellbeing of the neonate. These results contradict with the recommendations by (UNICEF, 2011; WHO, 2012) as it recommended that KMC should be provided immediately after birth and for at least one hour for all women. Or until after the first breastfeed, however, the study also supports the study findings by mentioning that it is also recommended to be implemented anytime thereafter, and can be provided for any length of time (UNICEF, 2011). In the study the respondents disagree that KMC should be commenced hours after births and this indicates that the majority of respondents are knowledgeable and this will preserve and prevent neonatal mortality and morbidity at three selected hospitals of Limpopo province. However the Baby Friendly Hospital Initiative developed by WHO (2012) and UNICEF(2009), also recommends that all babies should have access to immediate KMC following vaginal birth, and as soon as the mother is alert and responsive after caesarean section (WHO (2012) & UNICEF, 2011). They further indicated that KMC to be facilitated

immediately after birth, as this is the time when the new-born is most likely to follow his/her natural instinct to find and attach to the breast and then breastfeed. This is practiced at a health care facility which offers maternity and newborn services. It is initiated after the on-site birth of a baby or after admission of a baby born elsewhere Ludington-hoe (2013):

- **Both parents should be involved in KMC**

Based on the current study findings, respondents agrees that both parents should be involved in the caring of the infant under KMC, it is of utmost importance to the growth and development of the neonate, as it has benefits for both of them. KMC is beneficial because it promotes attachment and bonding in both parents, improves parental confidence, and help to promote increased milk production and breastfeeding success (Conde-Agudelo & Diaz-Rossello, 2016).

The study conducted in 2017 on impact of kangaroo care on parental anxiety level and parenting skills for preterm infants in the neonatal intensive care unit, found that the psychological benefits of KMC for parents of preterm infants are fairly extensive. The research shows that the use of KMC is linked to lower parent anxiety levels, decrease anxiety scores in both parents unrelated to parents' marital status. The research further indicated that KMC also lead to great confidence in parenting skills and displayed higher confidence in their ability to care for their child (Sweeney, Rothstein, Visiintainer, Robert & Singh, 2016).

- **Skin-to skin contact is essential in KMC**

The study findings indicated that many of the respondents agree that skin-to-skin contact is essential in KMC. Sampiano, Bousqual and Barros (2016) concurs with the study findings as they have indicated that skin-to-skin contact between mother and the infant is a safe and inexpensive procedure that has proven benefits for mother and the children as compared to incubator caring method. Ethalik and El-Atawi (2016) further supported that skin-to-skin contact plays a significant role in infant survival, neurodevelopment, and the quality of mother-infant bonding. They also indicated that KMC complements good

quality care and allows providers to ration use of expensive resources such as warmers and incubators.

In preterm and low birth weight infants, skin-to-skin contact between the mother and her infant decreases maternal post-partum depressive symptoms and improves self-efficacy and mother child bonding (Badiee, Faramarzi & Mirizadeh, 2014).

- **KMC reduces nosocomial infections**

According to the current study findings, the majority of the respondents disagree with the statement that KMC reduces nosocomial infections. According to study done by Conde-Agudelo, Belizan, and Diaz -Rosello (2011), on KMC to reduce morbidity and mortality in low-birth weight infants, disagree with the current study findings as they indicated that the practice of KMC decreases the incidence of nosocomial infections particularly in developed countries. They further indicated that early KMC is likely to increase the chance of the infant being colonized with maternal flora rather than the flora in the nursery, which may include antibiotic resistant organism and coagulase-negative staphylococcus.

Section: C Positive Impact of Kangaroo Mother Care Units

This section discusses the positive impact of KMC care units. It includes Kangaroo Mother Care that helps regulating baby temperature, maintains physiological stability, there is no pharmacological intervention in KMC, there is increase in success in exclusive breastfeeding, decrease use of incubators, decrease workload of midwives, increase development and optimal growth, promotion of bonding, KMC reduces pain, and increase neurodevelopmental outcome.

- **Kangaroo Mother Care helps regulating baby temperature and maintains physiological stability.**

The findings of this study has indicated that KMC can be much helpful in regulating body temperature to prevent hypothermia, maintain physiologic stability where there will be no need for pharmacological intervention. The respondents also affirmed that KMC can

clearly increase success in exclusive breastfeeding and decrease the use of incubators however they disagreed with the issue of decreasing workload. Hypothermia can be mediated by nursing the preterm in an incubator to provide the needed temperature for survival where available. Many infants have died because incubators were not readily available (Friberg, *et al.*, 2010; Amadi, Azubuikwe, Etawo, Offiong, Ezeaka, Olateju & Makoula, 2010). It enhances infant physiologic stability and reduces its pains as evidenced by reduced cry and restless movement of the body. Furthermore, there is increase in parental sensitivity to infant cues due to the bonding effects created by KMC (Nyqvist *et.al.* 2010). One of the major complications of prematurity is hypothermia which arises due principally to the large body surface and lack of subcutaneous fat under the skin of the infant (Kinney, Kerber, Black, Cohen, Nkrumah, & Coovadia, (2010). The goal of KMC is to reduce the risks of mortality and morbidity due to hypothermia, hypoglycemia and infection by employing cheap, available and accessible methods (Bergh, *et al.*, 2013; FMOH, 2011).

- **There is no pharmacological intervention in KMC.**

A decline in neonatal mortality rate can be achieved without the use of high technology which can be reached without the introduction of high technology medicine if countries have the political will to do so (Saugstad, 2011). According to the respondents it is indicated that no pharmacological intervention can be helpful but then KMC highly recommended in this regard.

- **There is increase in success in exclusive breastfeeding**

The study findings shows that during KMC exclusive breastfeeding can be increased and be beneficial to the infants. A study by Heidarzadeh, Hosseini, Ershamanesh, Gholamitabar Tabai and Khazae, (2013) shows that KMC is more effective, and increases exclusive breastfeeding successfully. It can be a good substitution for conventional method of care. It is a safe, effective and feasible method of care for low birth weight infants in the NICU settings (Heidarzadeh,et al., 2013). Early breastfeeding ensures the infant's intake of colostrum is maximized, as well as to promote the establishment of lactation through the stimulation of prolactin production (Victora, Bahl, Barros, França, Horton & Rollins., 2016). Hence an early initiation of breastfeeding in the

first hour of life is promoted by UNICEF and WHO because it improves neonatal outcomes (Barros, Bhutta, Batra, Hansen, Victora, & Rubens, 2010). For preterm newborns, most of whom are unable to suckle until 34 weeks of gestational age or later, EBF entails using a cup and spoon to administer expressed milk and is also regarded as total breastfeeding (Victora *et al.*, 2016). A review of breastfeeding benefits of KMC in Sweden reported that very preterm infants who were breastfed between one to six months spent more time on the mother's breast and thus feed longer irrespective of the amount of time or duration of KMC per day (Flackin, Ewald, & Wallin, 2011). However, the proportion of exclusively breastfed babies (EBFD) at 6 months post birth was significantly higher with earlier KMC than later KMC (Nagai, Yonemoto, Rabesandratana, Andrianarimanana, Nakayama, & Mori, 2011).

- **Decrease use of incubators**

The respondents indicated that the KMC can reduce the use of incubators and preserve the lives of the infants. In the study conducted by (Friberg, Kinney, Lawn, Kerber, Odubanjo, Bergh, & Black, 2010; Amadi, *et al.*, 2010) hypothermia can be mediated by nursing the preterm in an incubator to provide the needed temperature for survival where available. Many infants have died because incubators were not readily available. KMC is a form of thermal care recommended as part of neonatal and infant care practices based on its reported success in developed and some developing countries (WHO, 2013; Boundy, Dastjerdi, Spiegelman, & Wafaie, 2016). Incubators are used to provide thermal care in high resource countries, but the Low and Medium Income Countries (LMIC) still have financial challenges to provide incubators for every neonate that requires it, thus leading to an unabated increase in neonatal morbidity (Renfrew *et al.*, 2014; Akinyemi, Bamgboye & Ayeni, 2015). Various studies have reported on KMC as an alternative to incubators to prevent neonatal mortality especially in infants weighing less than 2kg (Bergh, *et al.*, 2011).

- **Decrease workload of midwives**

According to the respondents as midwives agree that both parents should be involved in KMC, as this can assist both parents to bond with the infant and also reduce the postpartum depression from the mother as mostly mothers are involved in KMC, this will

also reduce the work overload of the midwives in the specialized KMC units. However, the supervision of KC between mother and baby requires professional skills for both nurses and medical NICU staff based on the stability of the healthcare facility to take into cognizance some specific guidelines based on peculiar context or environment (Davanzo *et al.*, 2013; In Australia, efforts aimed at short, medium, and long-term outcomes that could be improved by care within the scope of midwifery was adduced to reduce maternal and neonatal mortality and morbidity, reduced stillbirth and preterm birth, and improved psychosocial and public health outcomes (Renfrew *et al.*, 2014). The study by Thopola and Lekhuleni, (2016) shows that existing evidence of factors hindering quality KMC interventions; the limited human and material resources; and the effects thereof on the existing environment. For Kangaroo nutrition, staff perceives the supervision of breastfeeding mothers as an extra workload. They assert that training and supporting mothers in breastfeeding a premature infant is demanding in terms of skill, time and effort. It is perhaps the most important barrier perceived by healthcare professionals (Blomqvist, Frölund, Rubertsson, & Nyqvist, 2013). This finding is in agreement with a study in Egypt that reported staff resistance towards KMC (Nyqvist *et al.*, 2010)

- **Increase development and optimal growth**

The 2011 review also revealed that KMC resulted in improved weight and length, head circumference, breastfeeding, mother-infant bonding and maternal satisfaction with the method of care, as compared with conventional methods (Conde-Agedulo, *et al.*, 2011). This study is supported by the respondents who indicated that KMC increase development and optimal growth of infants thereby increasing maternal bonding.

- **Promotion of bonding, KMC reduces pain and increases neurodevelopmental outcome**

The respondents agreed that KMC can definitely increase neurodevelopmental outcome of the infant, compared with incubator care, KMC has also been found to reduce infection (including sepsis, hypothermia, severe illness, lower respiratory tract diseases) and length of hospital stay (Conde-Agudelo *et al.*, 2011). The psychosocial effects of KMC includes reduced stress, enhancement of mother-infant bonding and positive effects of

the family environment and the infants; cognitive development. The knowledge and facilitation provided by the health workers in the neonatal environment, enable the parents especially the mothers to develop bonding relationships with their infants (Bergh *et al.*, 2012).

Section D: Development of Kangaroo Mother Care

This section discusses the development of KMC. It includes reduction of global infant mortality and perinatal morbidities, raising awareness of KMC value in health system, KMC low cost safe and effective way of infant care and total health-care strategy within supportive environment.

- **Reduction of global infant mortality and perinatal morbidities and low cost safe and effective way of infant care.**

Majority of respondents agree that the KMC is crucial to the reduction of global infant mortality and perinatal morbidities. To contribute significantly to the reduction of new-born death in developing countries, KMC should be considered as technically simple and cost effective option of care where feasible (WHO,2012). In the model, strategies were formulated in order to facilitate optimal midwifery practice environment, thus bringing the gap from sub-standard quality KMC interventions to standard quality KMC interventions (Thopola & Lekhuleni (2016) .Preterm birth is the leading cause of the 3 million neonatal death that occur each year and the second leading cause of all death in children under five (UNICEF, 2011). Preterm birth is also the dominant risk factor for neonatal mortality, particularly for death due to infection (WHO, 2012). One of the main reasons that preterm babies are in greater risk of illness and death is that they lack the ability to control their body temperature i.e they get cold or hypothermic very quickly.

Study conducted by Lawn *et al.*, (2010) suggest that in low-income settings a 51% reduction in mortality for newborns weighing less than 2000g compared with incubator care. It is one of the most common causes of neonatal mortality globally; it accounts for 4 million out of 15 million neonatal mortality during the neonatal period (Blencowe, Cousens, Oestergaard, Chou, Moller & Narwal *et al.*, (2012). KMC has proven beneficial in mortality reduction effects for babies weighing less than 2kg. It is a successful project put in place to reach all premature babies and was projected to have the capacity to have

saved 19,000 lives in 2015 (Aboda & Williams, 2011). A lot remains to be done to accelerate the pace of infant mortality reduction to meet the new target of goal 3 in the SDG 2030 (UN, 2015).

Raising awareness of KMC value in health system and total health-care strategy within supportive environment.

Midwives play an important role in terms of the facilitation of KMC, they give information, constant reassurance as well as provision of comfortable environment and privacy to the parents of preterm infants (Bergh, *et al.*, 2012; Nyqvist *et al.*, 2010). According to the midwives responds, its clearly gave an indication that strategies should indeed be developed in order to find a health care strategy within the supportive environment of KMC for the continuity of infants care. This fact equally aligns with Uwaezuoke, (2017) who reported lack of use of KMC because of the availability and accessibility of infrastructures especially in high resource countries. Thopola and Lekhuleni, (2016) indicated that sub-optimal midwifery practice environment is due to insufficient and limited human and material resources.

4.4 Strategies to Enhance Quality Kangaroo Mother Care at Selected Public Hospitals of Limpopo Province.

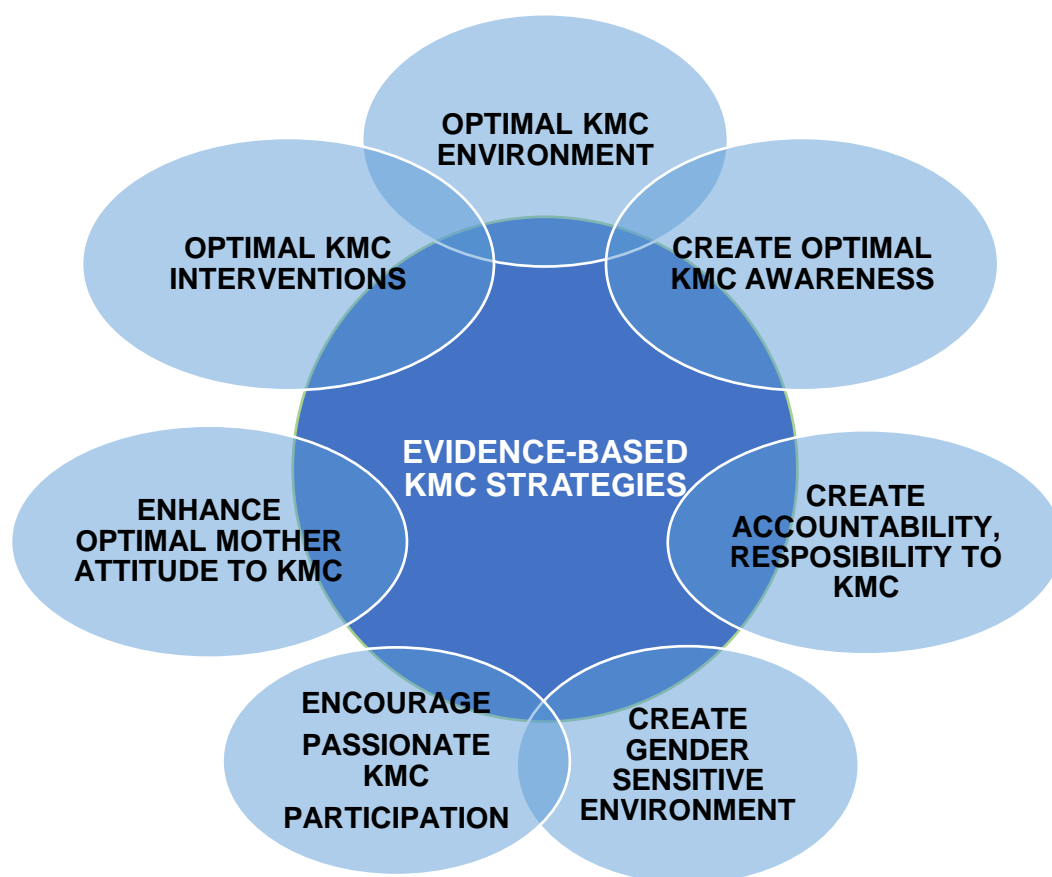


Figure: 4.6 Evidence-Based KMC Strategies

This objective was achieved as follows:

Figure 4.6 indicates Evidence-based Kangaroo Mother Care strategies to enhance quality Kangaroo Mother Care at selected hospitals of Limpopo Province in relation to the factors that hinder quality KMC. The researcher adapted and applied Kefilwe's Evidence-Based Model in the study to develop the strategies (Thopola & Lekhuleni, 2016).

The strategies were achieved as follows:

4.4.1 Optimal KMC Environment

- The objective of optimal KMC environment is to ensure that the mother together with the infant are well taken care of in a conducive environment. The main aim is

to serve the purpose of infant growth and monitoring together with the mother not having feeling of uncertainty. The environment should make the mother to feel at home and accepted and this will also place her mind at ease and will not be able to recognize the issue of prolonged stay and early discharge. Establish a conducive working environment that focuses on the needs of the mothers together with their neonates and health-care workers. The study as supported by Thopola and Lekhuleni (2016) in the model asserted that, the practice environment is affected by the existing issues of weakness and strengths. Therefore, if evidence gave the picture of a weak setting, such as sub-optimal nature will affect the environment negatively (Thopola & Lekhuleni, (2016).

4.4.2 Create Optimal KMC Awareness

- The objective of creating optimal awareness on the value of Kangaroo Mother Care in all public hospitals of Limpopo Province is to ensure that every midwife or caregiver delegated in KMC is aware of the importance of care and support the mother together with the infant requires. I followed the study by Thopola and Lekhuleni, (2016) as indicated in the model that every task that the learner midwives perform during experiential learning should be during the presence of the midwifery practitioner who assess and confirm before the puerperal mothers are involved as evidence of optimal practice. In this regard optimal KMC awareness is important and KMC will continue to raise global awareness, which can lead to neonatal survival; and growth and development of the low birth-weights infants of less than 2000g. This also will help infants to gain weight rapidly and to maintain a desired temperature whereby hyperthermia is prevented through skin-to-skin contact with the mother; and create awareness and reduce misconceptions of KMC in the communities

4.4.3 Create Accountability and Responsibility to KMC

- Creating accountability and responsibility for both the parents and health-care workers will assist in the optimal growth and development of the infant because

both are responsible for the well-being of the infant. In the model by Thopola and Lekhuleni, (2016) it is indicated that, the midwifery care provided to these participants seemed to be inadequate, ineffective and compromised based on the limited resources, negative attitudes of midwifery practitioners. This proves that KMC requires the joint responsibilities between both parties. This will establish a good working relationship between the mother and health-care workers. If the mother is aware of her accountability and responsibility, it will also reduce the work overload of midwives and create a well-established relationship. This objective can be maintained if mothers are well advised and taught of what is expected of them. Learner midwives correlate theory to practice, and during their exposure they develop, grow professionally and become accountable (Thopola & Lekhuleni, 2016)

4.4.4 Create Gender Sensitive Environment

- Kangaroo Mother Care environment should be welcoming to both parents as this can help allay anxiety to the mother and also assist the mother in the care of the infant. Gender sensitivity is one the objectives needed in KMC because this can also assist in the growth and development of an infant. Finding of the study conducted by Blomqvist *et al.*, (2012) indicated that interventions for enhancing parents opportunities for performing KMC should address both hospital and staff attitudes and practices and the NICU environment. Majority of both mothers and fathers continued providing their infant with KMC to some extent after discharge (Blomqvist *et a.*, 2012). This objective could also create a positive impact for both parents in raising the infant. If both parents are allowed in the care of their infant, this could even build a better bonding between parents and reduce the period of stay in hospital. The presence of a father during the neonatal period in KMC could also maintain the mental status of the mother and calm all the worries.

4.4.5 Encourage Passionate KMC Participation

- This objective will be obtained by preparing the mother's physical and psychological expectations before commencement of KMC. Mothers should know their objectives with regard to care of the infant as it is an unusual situation. Participation from both the mother and midwife is of utmost importance for maintaining growth and development of the low birth-weight infants. Mothers need support from the midwives in the care of their infants. It is indicated in the model that the, the midwifery practitioner is a professional who is skilful, knowledgeable and competent with midwifery services, function independently, dependently and interdependently, mentors and supervise learner midwives (Thopola & Lekhuleni, 2016). In the study these competent midwives should educate and encourage mothers to participate in the care of their newborn infants as they well skilful.

4.4.6 Enhance Optimal Mother Attitude

- A mother's attitude towards KMC is very crucial, and this can be done by midwives giving health education regarding the importance of KMC, and explaining on the procedures before commencement of the KMC. With increasing survival rate of premature infants, there will be a greater number of parents experiencing the difficulties adjusting to parenthood in the Neonatal Care Unit (Evans, Whittingham & Boyd, 2012). The puerperal mother were the centre of the focus, as the consumers of the midwifery care (Thopola & Lekhuleni, 2016). It is the duty of a midwife to ensure that a mother understands that kangaroo units is a place where infants of low birth-weight are taken care and mostly explain well all four components of KMC, which are kangaroo position, kangaroo nutrition, kangaroo support and kangaroo discharge. For a successful implementation of KMC, the midwives need to be more knowledgeable in all aspects in order for the mother to have an optimal positive attitude.

4.4.7 Optimal KMC Intervention

- Infants born with low birthweight requires more intervention. Therefore, this objective is achieved by allowing the mothers to also take part in the care of their infants. This objective can be maintained by implementing and practising the Sustainable Development Goal 3, particularly in the prevention of neonatal deaths. Intervention from both the mother and midwives is very crucial to the life of the infant as it will promote optimal growth and development, promote bonding and reduce the patient's hospital stay. Without support to both mothers and midwives, it will not be an easy intervention.

4.5 Conclusion

The chapter represented and discussed data collected from the respondents as midwives who are working in the KMC units of the three selected hospitals, strategies developed to enhance quality KMC. The representation was done using tables and graphs. The results were discussed in agreement and disagreement with the reviewed literature. The results on the demographic data clearly indicated that the majority of the respondents age ranges between 35-40 years and females are dominating as are middle aged though still registered basic midwives. In terms of qualifications, only a minority is advanced, with Masters in nursing. Most of the respondents have 0-4 years of experience and are not advanced in the field, whereas the unit requires specialized management. This statement proves without reasonable doubt that education and training is important.

Study findings indicated the Advanced Midwives and Neonatologists are few. On the findings on knowledge and advantages of KMC, it has indicated that midwives are aware that infants less than 2000g should be nursed in KMC, but then it can cause work overload for midwives as they have to monitor both infants and mothers. The other advantage noted and supported by the respondents was that KMC can assist in regulating body temperature and also promote bonding.

The majority were registered midwives as such KMC requires someone with knowledge and skills regarding management of neonates. The results also indicated that education

and training is needed in order for the midwives to be able to manage KMC, whereby all midwives who are working with neonates should be knowledgeable about KMC, and supported by the statement that indicated “implementation starts in individual healthcare facility that also serves as education and training centres”. The analysis of this study sample indicates clearly that education and training regarding KMC is of utmost importance; it is a specialized unit that requires skills.

The study discussed the fact that KMC increases mother and infant bonding and exclusive breastfeeding is promoted which is supported by literature. Majority of respondents indicated that KMC also reduces nosocomial infections and decrease the use of incubators and it can also be initiated from birth weight of 1800g-2000g which is an acceptable weight. However the study findings did not agree with the fact that KMC reduces workload of midwives as they indicated that since they have to monitor and supervise the mothers during the course of the day, it is one the factors that hinders KMC monitoring by midwives. The majority of respondents also disagreed with the literature indicated that KMC should be commenced immediately after birth as there are some factors that needs to be taken into consideration such as the condition and wellbeing of the infant post-delivery including the maternal factors during antenatal period. Therefore, the awareness and intervention is important and also developing strategies to enhance KMC at the selected public hospitals of Limpopo Province as there are many factors that needs to be attended to.

The study findings indicated that both parents should be available in KMC to support one another psychologically and skin–skin contact is an important factor to regulate the infant’s body temperature and prevent hypothermia, because hypothermia is one of the leading causes of infant mortality and perinatal morbidities as supported by literature. Respondents indicated that KMC reduces pain in infants as the mother will be there to support in KMC position and also promote neurodevelopmental growth while gaining optimal weight on daily basis. KMC is a low-cost effective way of infant care and requires strategies to be indeed developed within a supportive environment. KMC can only be

effective if mothers are prepared initially and be reassured and also midwives be more knowledgeable about the care and monitoring of the infants including family whereby providing optimal support to the mother in order to prevent postpartum stress and maintain infant's well-being.

The development of strategies according to respondents is highly recommended as it shows that they can assist in the reduction of global infant mortality and morbidity, and also raising awareness of KMC in the health system. This can provide a total health-care strategy within supportive environment. According to the overall results of the research study from responses, it shows that most midwives still need to be educated and trained on the enhancement of KMC.

CHAPTER 5

SUMMARY, LIMITATIONS, RECOMMENDATIONS AND CONCLUSIONS

5.1 Introduction

Chapter 4 presented the discussion of the study findings. This chapter incorporates the summary, limitations, recommendations and conclusion of the research study. It also indicates the extent to which the objectives of the study have been met and makes recommendations reflecting from the findings of the study in Chapter 4. Limitations of the study show the identified gaps during the execution of the research project. Strategies were developed based on the factors identified by the respondents that might enhance Kangaroo Mother Care units, and conclusions were drawn from the findings of the study.

5.2 Summary of the Study

5.2.1 The Aim of the Study

The current study aimed to develop strategies to enhance quality Kangaroo Mother Care at selected public hospitals of Limpopo Province.

5.2.2 Objectives of the Study

The objectives of the study were evaluated as follows:

Identify the factors hindering quality Kangaroo Mother Care at selected public hospitals of Limpopo Province

- The findings of the study indicate that the majority of midwives still requires education and training and also the educators should be knowledgeable on KMC so that they can be able to impart the knowledge to learners and midwives. The results also showed that relatives should be educated about the importance of KMC. Therefore, education and training was identified as one of the factors that hinder quality Kangaroo Mother Care at selected public hospitals of Limpopo Province.

- The findings indicated that respondents disagree with the fact that KMC reduces work overload as they are also supposed to monitor the care and growth of the

infants, including the well-being of the mothers and they end up being chronically overworked and unable to perform some other duties delegated to them in KMC. This is the factor that hinders quality Kangaroo Mother Care at selected public hospitals.

- The respondents indicated that development of strategies on how to run KMC could assist in reduction of infant mortality and perinatal morbidities, raising the awareness of KMC value in health system can also have a positive impact the quality KMC. This is one of the factors that could hinder quality KMC. If there are no strategies to be followed, then KMC will definitely serve no purpose, which is supposed to be the growth and development of an infant.

Describe the factors hindering quality Kangaroo Mother Care at selected public hospitals of Limpopo Province.

- Education and training plays an important role in KMC because the midwives need to have experience and be knowledgeable so that they could be able to provide teaching to mothers including their relatives regarding the importance of KMC. This will also assist them by intervening where necessary and be able to monitor the mothers together with their infants.
- The issue of workload disables midwives to perform some of the duties fully as they are supposed to monitor both the mother and the infant and ensure that they are well. This enables the rapid growth and development of infant as they do not have enough time. As a result, it promotes long hospital stay and midwives become chronically overworked.
- When strategies are developed on how to run Kangaroo Mother Care could have a positive impact on KMC and assist in the reduction infant mortality and perinatal morbidities. Strategies need to be followed in the monitoring of KMC in order to preserve the lives of infants, thereby promoting optimal growth and development.

Kefilwe's Evidence-Based Model (Thopola & Lekhuleni, 2016) was adapted and applied throughout the study in order to develop strategies to enhance quality Kangaroo Mother Care at selected hospitals of Limpopo Province.

- The objective of optimal KMC environment is to ensure that the mother together with the infant are well taken care of in a conducive environment. The practice environment is affected by the existing issues of weaknesses and strengths (Thopola & Lekhuleni, 2016). Furthermore indicated that if evidence gave the picture of a weak setting, such as sub-optimal nature will affect the environment (Thopola & Lekhuleni, 2016). The main aim is to serve the purpose of infant growth and monitoring, together with the mother not having feelings of uncertainty.

- KMC will continue to raise global awareness which can lead neonatal survival, growth and development of the low birth-weights infants of less than 2000g. This also will help infants to gain weight rapidly and to maintain a desired temperature whereby hypothermia is prevented through skin-to-skin contact with the mother. The presence of the father during neonatal period in KMC could also maintain the mental status of the mother and calm all the worries. Finding of the study by Thopola and Lekhuleni, (2016) attested that evidence from the recipients and agents showed limited human and material resources that led to provision of sub-optimal midwifery care to puerperal mothers. The model assisted the researcher to develop strategies to enhance quality Kangaroo Mother Care at the three selected Hospitals of Limpopo Province.

5.3 Limitations of the Study

When this study was developed by the researcher, she had planned to include also the Primary Health Care workers. Initial investigation was done to assess the state of neonatal care at PHC level, but then only hospitals have KMC units. A study conducted by Esewe (2017) indicated that “questioning persons on a programme they have limited information is tantamount to putting the cart before the horse”. Therefore, the researcher conducted the study at the three selected hospitals of Limpopo Province. Then, the

findings of this study limit the researcher to generalize to other hospitals that also have KMC units. However, the research method could be also be used to gain more knowledge.

5.4 Recommendations

Based on the findings of this study, the researcher wishes to make the following recommendations in order to enhance KMC:

5.4.1 Midwifery Training

The findings of the study indicated that there is lack of education and training with regard to Kangaroo Mother Care units, and that results in a negative impact in the monitoring of KMC. Therefore, the researcher recommends that:

- KMC should be provided as one of the post-basic specialized course in order to assist midwives to be able to provide specific care with regard to the care of infants and the mothers in KMC;
- Kangaroo Mother Care units should have midwives that are delegated on daily basis only to perform duties that will, at the end of the day, benefit both the mother and the infant; and
- Midwives should work together as a multidisciplinary team as it benefits infants being nursed in KMC.

5.4.2 Experiential Learning and Clinical Practice

- Kangaroo Mother Care should always be recommended as essential in the clinical practice of learners an optimal part of midwifery.
- Learner midwives should be delegated in KMC to monitor the growth and development of infants.
- Clinical practice should be accommodating to learners be educated on the importance of KMC.

5.4.3 Further Research

The researcher recommends that further studies should be conducted nationwide on the strategies to enhance Kangaroo Mother Care as this could be most helpful and bring upon more ideas on how to improve the KMC in all hospitals and also around the world.

Other factors that could enhance KMC are as follows:

- Impact of extended families on KMC;
- Knowledge and attitude of midwives regarding KMC;
- Strategies to allay anxiety of mothers with regard to commencement of KMC;
and
- Factors contributing to prolonged stay in KMC

5.5 Conclusion

The focus on this chapter was on the summary of the study results, limitations and recommendations of the study. The study has identified and described the factors hindering quality Kangaroo Mother Care at selected hospitals of Limpopo Province. Strategies were developed that might be used to enhance quality Kangaroo Mother Care at selected hospitals.

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APPENDICES

Appendix 1: Questionnaire

QUESTIONNAIRES TO MIDWIVES

- Please indicate with an X on the appropriate box.
- Do not mention your name, personal information or name of the institution on the questionnaire.

SECTION A: DEMOGRAPHIC DATA

1. Age

22-25 years	1
26-30 years	2
35-40 years	3
45-50 years	4
50> years	5

2. Gender

Male	1
Female	2

3. Qualifications

Diploma: in midwifery General Nursing, Community, Psychiatry	1
Degree: B.Cur (Degree in General Nursing, Community, Psychiatry)	2
Advance Midwifery and Neonatology Nursing science	3
M.Cur Advanced Midwifery and Neonatology Nursing Science	4

4. Type of profession

Registered Midwife	1
Advanced Midwife	2
Advance Midwife and Neonatology	3

5. Years of experience

0-4 years	1
5-9 years	2
10-14 years	3
15-20 years	4
>20 years	5

6. Education and training

Education and training is essential in KMC	1
Educators should have knowledge of KMC	2
Face-to-face facilitation is important in KMC training	3
Education and training should be provided to all categories	4
Relatives should be educated about KMC	5

SECTION B: KNOWLEDGE OF KANGAROO MOTHER CARE UNITS**A=Agree, B=Strongly Disagree, D=Disagree, SD=Strongly Disagree**

	A	SA	D	SD
7. Kangaroo Mother Care promotes mother infant bonding				
8. Kangaroo Mother Care enhances mother' confidence on how to handle the infant	1	2	3	4
9. Kangaroo Mother Care improves maternal response to infants	1	2	3	4
10. Kangaroo Mother Care should be practised on all infants less than 2000g	1	2	3	4
11. KMC should be practised on infants of birth weight 1-1.8kg	1	2	3	4
12. KMC should begin within few hours after birth	1	2	3	4
13. KMC should begin immediately after birth	1	2	3	4
14. Both parents should be involved in KMC	1	2	3	4
15. Skin-to-skin contact is essential in KMC	1	2	3	4
16. KMC reduces nosocomial infections	1	2	3	4

SECTION C: ADVANTAGES OF KANGAROO MOTHER CARE UNITS

18. Kangaroo Mother Care helps regulating baby temperature	1	2	3	4
19. Maintains physiological stability	1	2	3	4
20. There is no pharmacological interventions in KMC	1	2	3	4
21. There is increased success in exclusive breastfeeding	1	2	3	4
22. Decrease use of incubators	1	2	3	4
23. Decrease workload of midwives	1	2	3	4
24. Increase development and optimal growth	1	2	3	4
25. Promotion of bonding	1	2	3	4
26. KMC reduces pain	1	2	3	4
27. KMC increase neurodevelopmental outcome	1	2	3	4

SECTION D: DEVELOPMENT OF KANGAROO MOTHER CARE STRATEGIES

28. Reduction of global infant mortality and perinatal morbidities	1	2	3	4
29. Raising awareness of KMC value in health system	1	2	3	4
30. KMC low cost safe, and effective way of infant care	1	2	3	4
31. Total health-care strategy within supportive environment	1	2	3	4

Appendix 2: Consent Form

CONSENT FORM FOR RESPONDENTS

DEPARTMENT OF NURSING SCIENCE ENGLISH CONSENT FORM

Statement concerning participation in a Clinical Research Project*.

Name of Project/Study: Development of strategies to enhance the quality Kangaroo Mother Care at Selected Public Hospitals of Limpopo Province.

I have read the information and heard the aims and objectives of the proposed study and was provided the opportunity to ask questions and given adequate time to rethink the issue. The aim and objectives of the study are sufficiently clear to me. I have not been pressurized to participate in any way.

I know that sound recordings will be taken of me. I am aware that this material may be used in scientific publications which will be electronically available throughout the world. I consent to this provided that my name and hospital number are not revealed.

I understand that participation in this Study/Project is completely voluntary and that I may withdraw from it at any time and without supplying reasons. This will have no influence on the regular treatment that holds for my condition neither will it influence the care that I receive from my regular doctor.

I know that this Study/Project has been approved by the Turfloop Research Ethics Committee (TREC). I am fully aware that the results of this Study/Project will be used for scientific purposes and may be published. I agree to this, provided my privacy is guaranteed.

The Study/Project envisaged may hold some risk for me that cannot be foreseen at this stage.

Access to the records that pertain to my participation in the study will be restricted to persons directly involved in the research.

Any questions that I may have regarding the research, or related matters, will be answered by the researcher/s.

If any medical problem is identified at any stage during the research, or when I am vetted for participation, such condition will be discussed with me in confidence by a qualified person and/or I will be referred to my doctor.

I indemnify the University of Limpopo and all persons involved with the above project from any liability that may arise from my participation in the above project or that may be related to it, for whatever reasons, including negligence on the part of the mentioned persons.

I hereby give consent to participate in this Study/Project.

Signature of researched person.....

Signature of researcher.....

Signed at.....this.....day of.....20

Contact No:.....

Appendix 3: Ethics Clearance Certificate



University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 3935, Fax: (015) 268 2306, Email: anastasia.ngobe@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE
ETHICS CLEARANCE CERTIFICATE

MEETING: 4 July 2019

PROJECT NUMBER: TREC/178/2019: PG

PROJECT:

Title: Development of Strategies to Enhance Quality Kangaroo Mother Care at Selected Public Hospitals, Limpopo Province.
Researcher: SA Malatji
Supervisor: Prof MK Thopola
Co-Supervisor/s: Mrs MG Mathebula
School: Health Care Sciences
Degree: Master of Nursing


PROF P MASOKO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: REC-0310111-031

Note:

- i) This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.
- ii) Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.
- iii) PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

Finding solutions for Africa

Appendix 4: Permission Letter from Limpopo Department of Health



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

Ref : LP_201908_002
Enquires : Ms PF Mahlokwane
Tel : 015-293 6028
Email : Phoebe.Mahlokwane@dhsd.limpopo.gov.za

Shale Malatji

PERMISSION TO CONDUCT RESEARCH IN DEPARTMENTAL FACILITIES


Your Study Topic as indicated below;

Development of Strategies to Enhance Quality Kangaroo Mother Care at selected Public Hospitals, Limpopo Province.

1. Permission to conduct research study as per your research proposal is hereby Granted.
2. Kindly note the following:
 - a. Present this letter of permission to the institution supervisor/s a week before the study is conducted.
 - b. In the course of your study, there should be no action that disrupts the routine services, or incur any cost on the Department.
 - c. After completion of study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
 - d. The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
 - e. The approval is only valid for a 1-year period.
 - f. If the proposal has been amended, a new approval should be sought from the Department of Health
 - g. Kindly note that, the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated


Head of Department


Date

Private Bag X9302 Polokwane
Fidel Castro Ruz House, 18 College Street, Polokwane 0700. Tel: 015 293 6000/12. Fax: 015 293 6211.
Website: <http://www.limpopo.gov.za>

Appendix 5: Permission Letter from Letaba Regional Hospital



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

Letaba Regional Hospital
Private Bag X 1430
Letaba
0870

Ref: S5/4/2/3
Enq: Malatji E.M
Date: 22/01/2020

ATT: Ms Malatji SA

RE: OFFER TO CONDUCT RESEARCH DEVELOPMENT OF STRATEGIES TO ENHANCE QUALITY KANGAROO MOTHER CARE AT SELECTED PUBLIC HOSPITAL. LIMPOPO PROVINCE: MS MALATJI SA.

1. The above matter refers

2. It is a great pleasure to inform you that the Chief Executive Officer has approved your application to conduct on development of strategies to enhance quality kangaroo mother care at selected public hospital in Limpopo Province for a period of a year.

Starting Time : 7h30
Lunch Time : 13hour
Knock off Time: 16h30

3. You will be expected to work from Mondays to Fridays.

4. Hoping that you will enjoy your stay in the hospital.


ACTING CHIEF EXECUTIVE OFFICER

2020-01-24
DATE

Private Bag X 1430, LETABA, 0870
Cnr. Tarentaal and Lydenburg Road, Tel: (015) 303 8200, Fax no: 015 303 8421

The heartland of Southern Africa – development is about people!

Appendix 6: Permission from Van Velden Hospital



Confidential
LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH
VAN VELDEN HOSPITAL

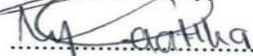
Ref: 8/1/1
Date: 08.01.2020
From: Head of Institution
To: SA Malatji

Cc: HRD Officer
Deputy Manager Nursing Services

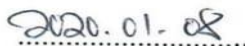
RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

- ❖ Apologies for the delayed response to your request dated 26.11.2019
- ❖ The Research Committee approval letter with ref LP_201908_002 for your research entitled "**Development of Strategies to Enhance Quality Kangaroo Mother Care at selected Public hospitals, Limpopo Province**" is noted.
- ❖ Permission to conduct the aforementioned research at Van Velden is hereby granted.
- ❖ During the course of your studies there should be no actions that disrupts services or administration of the ward.
- ❖ Please also note there might be limitation to your research as a result of low patient/subject load in the hospital.

Yours Sincerely,



Dr. J.M. Selattha
015 3078834
082 042 7757


Date

Corner 3rd Ave & Claude Wheatley, Medipark, Private Bag X4041, Tzaneen 0850
Tel: 015 307 8800, Fax: (015) 307 3512, Website: <http://www.limpopo.gov.za>

The heartland of Southern Africa – *development is about people*

Appendix 7: Permission Letter from DR CN Phatudi Hospital



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DR CN PHATHUDI HOSPITAL

MOPANI DISTRICT

P/BAG X4056

TZANEEN

0826

08/11/2019

POSTNET SUITE 170

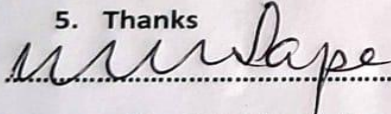
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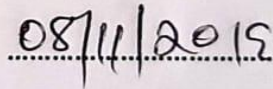
REQUEST FOR PERMISSION TO CONDUCT RESEARCH: Malatji Shale Audrey student no: 200907788

1. The above bears reference:
2. Permission is hereby granted to conduct research on Development of Strategies to Enhance Quality Kangaroo Mother Care
3. Kindly observe all ethical principles during the research
4. Hope you find it to be in order
5. Thanks


.....

Approved by Chief Executive Officer

SAPE WM


.....

Date

Appendix 8: Editor's Letter

Mr MM Mohlake
University of Limpopo
Turfloop Campus
Private Bag x 1106
Sovenga
0727

21 December 2020

To Whom It May Concern

EDITING CONFIRMATION: Mr SA MALATJI's DISSERTATION

This letter is meant to acknowledge that I, MM Mohlake, as a professional editor, have meticulously edited the dissertation of Ms Malatji Shale Audrey (Student Number 200907788 entitled "Development of Strategies to Enhance Quality Kangaroo Mother Care at Selected Public Hospitals, Limpopo Province").

Thus I confirm that the readability of the work in question is of a high standard.

For any enquiries please contact me.

Regards



Mosimaneotsile M Mohlake

Freelance Professional Editor

(015) 268 2464

072 1944 452

<mosimaneotsile.mohlake@ul.ac.za>

Disclaimer: Subsequent alterations remain the responsibility of the author.

