



**Identifying Nursing practices  
that facilitate the Mother-Premature Baby bond  
in the Neonatal Care Unit (NICU)**

Patience Ayisibea and Sarah Kwakyewaa-Bosompem

Degree Thesis  
Degree Programme in Nursing  
2020

DEGREE THESIS	
Arcada	
Degree Programme:	Nursing
Identification number:	20786 & 20809
Author:	Patience Ayisibea and Sarah Kwakyewaa-Bosompem
Title:	Identifying nursing practices that facilitate Mother-Premature Baby Bond in the Neonatal Intensive Care Unit (NICU)
Supervisor (Arcada):	Pamela Gray
Commissioned by:	
<p>The existence of a strong loving bond between a newly born infant and their mother is essential for the social, cognitive, and emotional development of the infant. Mothers who give birth to premature babies often have their babies separated from them as they receive specialized treatment at the NICU. This separation stops opportunities for mother-infant bonding and places mothers in psychological distress and uncertainty in which nurses play a vital role in the NICU and possess the ability to facilitate mother-infant bonding at the NICU. The aim of this study is to identify the nursing care practices and interventions that nurses can adopt to facilitate and support the bonding of mothers and their premature infants at the NICU and to help answer, what are the nursing care practices and interventions that nurses can adopt to facilitate the bonding of mothers and their premature infants at the Neonatal In-tensive Care Unit (NICU)?</p> <p>The Theory of Human Caring by Dr Jean Watson is used as the theoretical framework and the study is a descriptive literature review which utilised inductive thematic analysis.</p> <p>The findings revealed common themes that were found and summarized into two major themes and then divided into subthemes. The findings revealed that nurses can promote the mother-infant interaction and mother-nurse interaction to facilitate the bond between the mother-premature infant. The promotion of mother-infant interaction provides opportunities for physical contact, provides opportunities for remote monitoring, and opportunities for mothers' participation in routine care. The mother-nurse interaction shows nurses need to communicate consistently, offer assurance, empathetic treatment, and exhibit trustworthiness to the parents at the NICU. The study finally points that, the NICU nurse possesses the power to either promote or hinder the bonding process. Because there is evidence that early mother-infant bonding is essential for an infant's neurological development process, nurses should take the role of facilitating the attachment process from birth seriously.</p>	
Keywords:	Premature birth, NICU, Bonding, Nursing Care Practices, Mother-Infant
Number of pages:	54
Language:	English
Date of acceptance:	9.11.2020

# CONTENTS

<b>1</b>	<b>Introduction</b> .....	<b>7</b>
<b>2</b>	<b>Background</b> .....	<b>9</b>
2.1	Premature birth.....	9
2.2	Neonatal Intensive Care Unit (NICU).....	11
2.3	Bonding.....	11
<b>3</b>	<b>Theoretical framework</b> .....	<b>15</b>
3.1	Watsons Theory of Human Caring .....	15
3.2	Implication of the Watsons Theory of Human Caring to the Study.....	17
<b>4</b>	<b>Aims And Research Question</b> .....	<b>19</b>
<b>5</b>	<b>Methodology</b> .....	<b>20</b>
5.1	Data collection .....	20
5.2	Data Analysis.....	21
5.3	Ethical consideration.....	22
<b>6</b>	<b>Results</b> .....	<b>24</b>
6.1	Promotion of Mother-Infant Interaction .....	24
6.1.1	<i>Providing opportunities for physical contact</i> .....	24
6.1.2	<i>Providing opportunities for remote monitoring</i> .....	25
6.1.3	<i>Providing opportunities for the participation in routine care</i> .....	26
6.2	Mother-Nurse Interaction .....	27
6.2.1	<i>Communication</i> .....	27
6.2.2	<i>Assurance</i> .....	28
6.2.3	<i>Empathic treatment</i> .....	29
6.2.4	<i>Exhibition of trustworthiness</i> .....	29
<b>7</b>	<b>Discussion</b> .....	<b>30</b>
7.1	Discussion in relation to the literature.....	30
7.2	Discussion in relation to Watson Theory of Human Caring .....	33
<b>8</b>	<b>Conclusion</b> .....	<b>35</b>
8.1	Strengths and limitations.....	35
8.2	Recommendations for future studies .....	36
	<b>References</b> .....	<b>37</b>
	<b>Appendix 1 Characteristics of the articles reviewed</b> .....	<b>46</b>

## **Figures**

Figure 1. Watson's Carative Nursing Practices (Watson 2011b).....	17
---	----

## **Tables**

Table 1. Themes and Sub-themes of Nursing Interventions that Promote Maternal -Infant Bonding at the NICU. ....	22
---	----

## FOREWORD

We would like to take this opportunity to thank the Almighty God for his great protection and thank Arcada University of Applied Sciences for offering us the opportunity to study and accomplish our Degree Programme in Nursing.

We would like to also extend our sincere gratitude to Pamela Gray for her generous guidance during our thesis supervision, advice, patience, and support during our studies. Sincerely, it would not have been possible for us to complete this thesis without her effort.

Additionally, Patience Ayisibea would like to personally acknowledge some special people in her life. First, I thank my Auntie Mrs. Henrietta Awuah Addae and her family for their contribution in my life. Secondly, I like to thank Mr. Asafo-Adjei Agyenim Boateng, Rev. Dr, Seree Yeboah Mensah, and family, Pirjo Tuominen and her husband Raimo Tuominen for their great support and direction in diverse ways and my final gratitude goes to my family, especially my two lovely sons Jaden and Aiden and the Hayes family for their immense support. I am blessed and lucky to have you all in my life, for without them, I could not have done it.

Finally, Sarah Kwakyewaa-Bosompem would like to express her appreciation to her lovely husband Mr. George Dosu and our two lovely children Daniel and Dorinda who encouraged, supported, and accompanied me through hard times. Madam Elizabeth Frimpong and Manuela Frimpong for their special help rendered when needed. Mr & Mrs. Ernest Kenah-Amoah for their support and contribution during my studies. I would like to also thank my relatives especially Miss Agatha Hagan for her immense contribution into my life.

## ACRONYMS

NICU Neonatal Intensive Care Unit

KMC Kangaroo mother care

FCC Family-centred care

# 1 INTRODUCTION

There is usually a great dependence of human babies on their parents on birth. It is this characteristic of newly born babies that necessitates great care and bonding early in their lives. When there is existence of a strong attachment or a loving bond between a newly born infant and their primary caregiver, usually their parent, the newly born undergoes optimum social, cognitive, and emotional development (Winston and Chicot, 2016). Bonding between mother and child is therefore very crucial in the early development of the child and caregivers including nurses should try to ensure this bond and mother-child attachment is nurtured. When this is done right from infancy, babies are positioned to grow and become independent, happy, and resilient adults.

Some children are lucky to have incidence free early lives but some due to complications at birth, illness after birth or a combination of other factors must spend their early lives in the Neonatal Intensive Care Unit (NICU). According to World Health Organisation (2020) statistics, about 10% of all births worldwide are preterm. This occurrence endangers the chance that many mothers and their children must make strong early attachments. In the NICU, the child is separated from his/her mother. This prevents effective bonding as it necessitates that the mother and his/her new-born baby be close to each other so that a nurturing connection between them can be established (Flacking et al., 2012). The mother-infant separation at the NICU may interrupt the mother-infant bonding process due to the separation it causes. It may also be a significant cause of emotional distress to infants' mothers and families which may affect future bonding opportunities (Ionio et al., 2019).

Therefore, it is during this period of emotional, psychological, and physiological trauma upon mothers together with their premature babies in the Intensive Care Unit that nursing care becomes very much necessary and needed more than ever before. In recent years, especially, after the recognition of the importance of early bonding to a premature child's development; there has been an emphasis on ensuring that nursing care practices in the NICU promote mother-premature baby bonding. As NICU admission greatly reduces the mother-premature infant relationship and bonding, there is a need to identify nursing

practices that nurses can adopt at the NICU to facilitate greater bonding between a mother and her preterm infant.

The introduction chapter explains the general background of the study, the purpose, and the motivation behind this study. The background chapter deals with preterm birth and bonding between mothers and preterm infants at the NICU. The theoretical framework explains the chosen nursing theory used in this study. The aims and research question were used to investigate the study and the methodology chapter explore the method, data collection, data analysis used in this study. The results and the discussion chapters present findings from the analysed data of the literature reviews and discusses the findings in relation to the articles and the theoretical framework. The final chapter concludes and discusses the strengths and limitations of the study and suggests recommendations for future research.

## **2 BACKGROUND**

There has been great interest in the field of paediatrics medicine and nursing on how mother-premature baby bonding can be established and sustained at the Neonatal Intensive Care Unit (NICU). Often, the experiences of mothers whose infants are admitted to the Neonatal Intensive Care Unit is usually traumatic. Mothers have been found to experience significant psychological distress, loss of a chance to discharge their parental role and disruptions of mother infant bonding. Formation of enduring mother-premature infant bonding is an essential feature of any human experience. The bonding process between mother and infant begins before birth and continues even after the child is born (Wigert, Johansson, Berg and Hellstrom, 2006). Past research has indicated that bonding is a crucial developmental force in the life of any individual and its absence can lead the child to experience social incompetence and cognitive disability in later life (Winston and Chicot, 2016). It is for this reason that promoting mother-infant is a crucial aspect of care provision. Parents need the requisite support if they are to form enduring bonds with their premature infants. Mother-premature infant bonding is a crucial step in the cognitive and physical development of the child and begins during pregnancy and continues after childbirth (Wigert, Johansson, Berg and Hellstrom, 2006). The NICU environment can disrupt the all-important attachment process and affect the effective bonding between mother and their infant placing the child at a risk of the neurobiological complications later in life (Schmücker et al., 2005). With nurses playing an especially important role in the NICU, it is essential that they recognize the nursing care practices and interventions to facilitate the bond between mother and the premature infant.

### **2.1 Premature birth**

According to Quinn et al. (2016) premature birth can be described as the birth of baby more than three weeks before the due date. Premature birth, this author notes is a situation where babies are born before 37 weeks of pregnancy instead of a full-term pregnancy which is normally 40 weeks. As a result, babies born preterm weigh much less than full-term as babies spend minimal amount of time to develop in the womb. There are different categories of preterm babies characterized by how soon the baby is born. According to Quinn et al. (2016), there are several classes of preterm infants which include 1) late

preterm, when the baby is born between 34 and 36 weeks of pregnancy, 2) moderately preterm, when the infant is born between 32 and 34 weeks of pregnancy, 3) very preterm, when the baby is born at less than 32 weeks of pregnancy and 4) extremely pre-term, thus when the baby is born before 25 weeks of pregnancy.

A lot of complexity on the causes of preterm births exist and the pathophysiologic triggers that cause preterm births are largely unknown. Several underlying factors that pre-dispose mothers to experience pre-mature births have however been identified. Some physiological and mechanical factors that have been found to increase the risk of pre-term births include antepartum haemorrhage, cervical incompetence, uterine over-distention, hormonal changes as well as inflammation and bacterial infection (Simmons, Rubens, Darmstadt and Gravett, 2010; Villar et al., 2012). Others such as multiple births, being overweight or underweight pre-pregnancy, existence of physical and psychosocial stress as well as maternal age (over 35 years and under 17 years) have also been associated with increased risk of pre-term births (Simmons, Rubens, Darmstadt and Gravett, 2010).

Premature babies, especially those born earliest, in most cases are characterized by medical complications and are often admitted into the NICU for specialized treatment and care. While the NICU is a key hub for pre-term infants' care, it is often a complex, highly structured environment that has been reported to impede meaningful interactions between mother and child (Hopwood, 2010). Disruption of the all-important attachment process and effective bonding between mother and child have reportedly been caused by parent child separation, maternal anxiety as well as the neurobiological risk that the child experiences while in isolation in the NICU (Schmücker et al., 2005). The effects of child's care at the NICU as regards to mother infant bonding in the NICU is worrying. This is because about 10% of all births worldwide are preterm according to the World Health Organization (World Health Organisation, 2020). As NICU admission greatly reduces the mother-infant relationship and bonding, there is a need to identify ways that nurses at the NICU can facilitate greater bonding between a mother and her young infant.

## **2.2 Neonatal Intensive Care Unit (NICU)**

The Neonatal Intensive Care Unit (NICU) is usually a specialized treatment setting for premature infants who are deemed high-risk. It is a technological unit which plays an important role of keeping infants alive and giving them a chance at life. Its environment is however intimidating to parents whose infants need specialized care. First, mothers at the NICU suffer significant psychological distress. Their helplessness in protecting their baby from medical procedures, guilt from failing to birth a healthy child, exposure to near-death infant resuscitation events, and inability to interact and provide care to their children works to exacerbate this psychological distress. Ultimately, mothers become emotionally unavailable to bond with their children (Lindberg and Öhrling, 2008). Secondly, the mother-child separation that is necessary for infants to be provided with specialised care may result in delayed maternal attachment (Obeidat, Bond and Callister, 2009). This early separation strains infant-mother relationship as mothers need to hold, see, and touch their new-born if they are to facilitate this early attachment and bonding (Hall, 2005). Noting the significance of bonding and the challenges that mothers face in their attempt to initiate and establish this early attachment with their new-born babies, it is very important that strategies are developed to enhance mother infant bonding at the NICU.

## **2.3 Bonding**

Shroff (2016) defines bonding as the special attachment that forms between a mother and father and their new baby; and it is that bond which sends them into their new-born room in the middle of the night at the slightest grumble with urgency. It is also what makes parents want to instinctively care for and nurture their child (Hill and Flanagan, 2019). Also, bonding could occur for merely looking at the new-born, through touching of the skin, feeding, and caring. In addition, rocking the baby to sleep or stroking the back might establish the new relationship and make them feel more comfortable.

According to Vedova, Dabrassi and Imbasciati (2008), the significance of a parents' affection towards an unborn baby has been previously discussed as a continuous interactive conscious or unconsciousness field. The process of establishing maternal personality is

tangled with the developing an emotional attachment with the unborn child. Bowlby (1988) referred to this emotional tie as ‘prenatal attachment’. According to Bowlby (1988), attachment or bonding is the emotional tie that the baby forms between himself and those who care for it. This attachment according to Bowlby ensures the survival of the baby, which is therefore grounded on the activity of neural paths in the baby and in the adult’s mind. Consequently, the baby develops an internal representation of the self, of others and of relationships in general due to the initial attachment experiences. These early representations, ‘internal working models’, influence the formation of attachment relationships for the rest of the individual’s life. That baby enjoying nurturing and safe relationship with those who care for it enhances a secure personal basis and therefore a sense of trust in others. This bond is characterized by emotions such as affection and trust. And any two people who spend time together may form a bond (Barker, Daniels, O’Neal and Sell, 2017).

The study of mother-premature baby bonding has gained such prevalence not only because of its being very essential for the baby’s sense of security, self-esteem and cognitive development but also because in the case of the parents, it serves as a conduit for connecting them to their latest and important arrival. Normally, bonding starts even before the baby is born such as during the first little flutters in the belly occurs or when seeing the baby kick on the ultra-sound screen (Feldman et al., 1999). Early mother-infant contact also significantly promotes bonding and the affectionate behaviour that both mother and infant give to each other (Anisfeld and Lipper, 1983). Despite the importance of effective and smooth mother-child bonding, some situations that some mothers find themselves in makes it difficult for the establishment of a solid mother-child bond. For instance, some mothers develop postpartum depression after birth. This condition that appears six weeks after delivery in mothers is characterized by episodes of behavioural and mental disorders has been known to persist for up to a year (American Psychiatric Association, 2013). It has also been known to occur in 10-15% of all new mothers (Anokye et al., 2018). This condition negatively affects the mother’s social and occupational functioning as well as the child’s health (Corrigan, Kwasky and Groh, 2015). Ultimately this may prevent the mother and child from completely bonding.

Difficult pregnancies and child delivery may also contribute to insufficient bonding between mother and child. Child delivery is usually a very painful process that women experience and to some delivery is usually riddled by life threatening complications. Most difficult child deliveries necessitate painful procedures such as the c-section and are also characterized by exhaustion, pain, and premature birth at times (Feldman et al., 1999). These complications during childbirth may render the mother physically unavailable to their child. Due to this, mothers may fail to provide early nurturing and affectionate maternal bond that is crucial in the building of the child's psychological resilience (Røseth et al., 2018).

A mother's childhood and upbringing has also been identified as a key factor in the quality of mother-infant bonding. Mothers who have suffered some form of childhood maltreatment or emotional neglect during their childhood are more likely to experience an impaired mother-infant bonding (Lehnig et al., 2019). Other factors such as life pressures such as a difficult job, joblessness, or financial difficulties may also affect mother-infant bonding. Life pressures have been known to increase the propensity of after-birth depression (Goyal, Gay and Lee, 2010; Eastwood et al., 2012). Perceived lack of social support or difficulty in past pregnancies may also trigger the onset of postpartum depression (Corrigan, Kwasky and Groh, 2015). This unstable emotional state may translate to deferred affection and feelings of guilt or shame. This then may affect the immediacy of affection and lead to less than optimal mother-child bonding.

Sometimes difficult child births may result in complications that necessitate a child be admitted into the NICU. In the NICU, various restrictions that hinder mother-child contact hinder the creation of a bonding connection between mothers and their new-born babies (Kantrowitz-Gordon, 2013). Admission of a new-born into the NICU may also cause devastating and traumatic mental effects on the mother. From this occurrence, their confidence in child-caring is also shaken and ultimately this may affect how the mother and child bonds. Reduced interactions between mother and infant may also lead to inadequate bonding between the mother and their young one (Phuma-Ngaiyaye and Welcome Kalembo, 2016). With there being many barriers to the formation of strong mother-infant bonding and the wide recognition of the importance of this occurrence, there is a need to

identify nursing solutions that will bolster formation of strong mother-child bonds at the NICU.

### **3 THEORITICAL FRAMEWORK**

The act of caring is an essential component in nursing and healthcare (Joolae et al., 2010). According to Clinton (2014) and NANAP Position Statement (2009), paediatric nursing is a special type of nursing which focuses on caring for the children and their families in any health settings. The paediatric nurse also grieves with families as they deal with disturbing diagnoses, hereditary irregularities, and sudden trauma. Some of the principals that reinforce paediatric nursing include the adaptation of care with high respect for the goals and preferences of each child within the situation of his or her family; encouragement of each child/family to contribute in goal setting; provision of all-inclusive care that is considerate of the physical, spiritual, mental, emotional socio-cultural hereditary and developmental aspects of each child/family; and provision of care that is premised on family centred education, encouragement and active communication. In this chapter we will explore Jean Watson's, Theory of Human Caring and use it to develop our study's theoretical framework.

#### **3.1 Watsons Theory of Human Caring**

The Theory of Human Caring by Dr Jean Watson was developed between 1975 and 1979, while lecturing at the University of Colorado. The theory developed from her own opinions and experiences of nursing, combined, and informed by his doctoral studies in educational-clinical and social psychology. Originally, Watson attempted to bring meaning and focus to nursing as an evolving discipline and a separate health profession with its own unique values, knowledge, and practices, with its own ethic and mission to society (Gonzalo, 2019).

Through her evolving ideas borne from experiences, practices, nursing values and knowledge for human caring in her nursing career, she proposed the importance of approaching nursing like a caring science. Watson emphasized the need of approaching nursing with empathy and caring, ensuring that nurses make a deliberate effort to exercise an emotional and open approach to patient care, and that nurses engaged authentically with patients and their families both at a personal and spiritual level (Saviato and Leão, 2016) Application of Watson's theory is via what she referred to a carative factors which

form the structure of the science of nursing care. Carative factors she posited worked hand in hand with conventional medicine but stood in stark difference to curative factors (Nelson and Watson, 2011).

There are several assumptions that have been identified in Jean Watson's Theory of Human Caring. First, this theory emphasizes that caring has a personal nature and can only be effectively practiced from one person to another. This is what is described as transpersonal caring and can be described as the connection of spirits and soul through the process of trustworthiness in caring for someone of which identifies with a godly union. Nurses who identifies with this type practice transpersonal caring exhibit a genuine desire to be available and involved in the relations with patients. Transpersonal nurse focuses on the mindfulness and reasoning of caring, healing, and fullness, rather than the disease, the main goal is to help patient attain complete sense of harmony inside the mind, body and spirit through the process of caring and healing (Saviato and Leão, 2016).

This theory notes that acts that can be classified as caring are those that accept a person as they are presently as well as how they may be in future. Environments that foster caring on the other hand are those that offer opportunity for development while allowing people to chart their own paths that they feel are best for themselves. It is a theory that emphasizes the freedom that patients have during care and the role of nurses in respecting these choices (Watson, 2012).

The theory also notes that within caring are what Watson referred to as carative factors. It is these factors that result in the satisfaction of certain human needs in patients and which nurses need to practice in their association with patients. According to (McEwen and Willis (2011 p.182), ten carative factors have been identified both as stated by Jean or implicitly identified within her theory based on its assumptions. These are listed in the figure 1 below. These carative factors emphasize on the need to employ traditional care practices empathy and strong inter-personal relationships with patients. These carative factors as espoused by Jean Watson's theory encourages the utilization of a more emotional and open approach to patients care in healthcare practice. It emphasizes that strong and helpful interpersonal relationships between a nurse and patient that incorporate

emotional and spiritual aspects in nursing care go a long way in promoting general health and satisfaction.

Jean Watson's Theory identifies caring to involve: Helping trusting, and caring relationships; Expression of negative and positive feelings; Allowance for existential phenomenological spiritual forces; Teaching-learning; Assisting with basic human needs; Sensitivity to self and others; Instillation of faith and hope; Formation of humanistic -altruistic system of values; Supportive and protective all-around environment; and Creative problem solving.

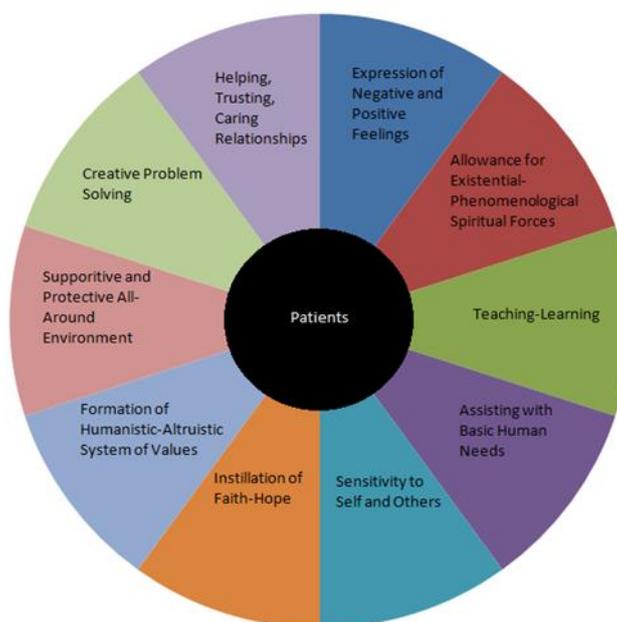


Figure 1. Watson's Carative Nursing Practices (Watson Theory: Theory of Human Caring, 2020).

### 3.2 Implication of the Watsons Theory of Human Caring to the Study.

Watson's theory of human caring emphasizes the importance of caring in nursing and identifies it as a foundation for the professional nursing practice. This theory asserts that in the healing process, individuals cannot be viewed as objects but rather a sum of their environment. For healing to take place, there must be a personal relationship characterized by respect, trustworthiness, and genuine desire to (Saviato and Leão, 2016). Healing

also needs that an environment which fosters caring and offers opportunity for people to be allowed to chart their own paths be present. Nursing has long been categorized as a humanitarian science, a profession characterized by personal, ethical, and scientific practice. Watson's theory of human caring seeks to guarantee harmony between a person's health and illness. It emphasizes the need to utilize a holistic approach when providing care to those who need it. At its core it identifies the mind-body-spirit sub-dimensions and their importance to a person's holistic health (Nelson and Watson, 2011).

There are several reasons that makes the Watson's Theory of Human Caring be a good fit to guide the direction of this study. First, the theory is people oriented and recognizes the unique human integrity dimensions without any compromises on a person's mind, body, and spirit (Fawcett, 2005 p. 51-59). Secondly, the theory identifies nursing as caring science characterized by interpersonal relationships, healing, caring and awareness of healing (Watson, 2012) and finally, the theory has a well delineated caritas process (figure 1) that provides articulate guide to its clinical implementation. Based on this, the study sought to identify nursing care practices and interventions that support mother-infant bonding using the Jean Watson's Theory of Human Caring as a framework.

## **4 AIMS AND RESEARCH QUESTION**

The aim of this study is to identify the nursing care practices and interventions that nurses can adopt to facilitate and support the bonding of mothers and their premature infants at the Neonatal Intensive Care Unit (NICU).

### **Research question**

1. What are the nursing care practices and interventions that nurses can adopt to facilitate the bonding of mothers and their premature infants at the Neonatal Intensive Care Unit (NICU)?

## **5 METHODOLOGY**

This study employed a descriptive literature review approach to ascertain the nursing interventions and practices that nurses can adopt to promote mother-infant bonding at the NICU. In this section, the approach that was used to provide answers to the study's research questions is laid out. The study's research design, literature search strategy employed, and the process used to select relevant studies and undertake full synthesis of literature is elaborated.

### **5.1 Data collection**

Data collection was undertaken in a sizeable number of peer reviewed scholarly articles identified from a host of search engines; including the Arcada FINNA, Academic Search Elite (EBSCO), Cinahl (EBSCO), Cochrane Library, PubMed, Sage, Science Direct, and Ebrary. Careful selection of keywords relevant to the study was also conducted before the study began. Keyword selection is central to the thoroughness and accuracy of a literature review study and any researcher should ensure that they get it right from the start (Grewal, Kataria and Dhawan, 2016). As such, search terms were selected and used in different combinations to undertake the search. The search keywords included nursing care, neonatal nursing, neonatal nursing intervention, Neonatal Intensive Care Unit (NICU), premature infant, maternal-infant bond.

To refine the search further it was necessary to apply several refinement filters. First, research papers were only included in the review if they had been published within the previous 20 years (2000-2019). Publications published earlier than 2000 were also considered if they were relevant to this study and were available as readable full texts in the English language.

In addition, the review was centred on using care practice in nursing, specifically with-in prematurity and mother-baby bonding context at the NICU; literature was therefore excluded if it fell within other health disciplines. Literature was included if the study was primarily set at the NICU, the study participants were either mothers of pre-term infants or NICU nurses, the study identified either negative or positive aspects of nursing care at the NICU, the study highlighted mothers' first-hand experiences at the NICU or the study

explored the issues at the NICU that either support or derail mother-infant bonding. After the initial database search was undertaken as described previously in the methodology section, 203 research publications were returned. On analysing these publications' content, 40 were found to be duplicates and were thus excluded. By following the established inclusion and exclusion criteria, a further 134 publications were removed. Skimming through the abstracts of all the publications left helped identify publications that were not relevant to the study and were subsequently removed which remained only 25 articles for analysis. In appendix 1 below are list of characteristics of the 25 articles reviewed.

## **5.2 Data Analysis**

The study's aim was to identify the nursing care practices that nurses can adopt in the Neonatal Intensive Care Unit (NICU) to enhance the formation of mother-infant bond. Thematic analysis was utilized here with an aim of identifying themes or patterns within the reviewed studies. The study researchers utilized an inductive content analysis approach that utilized abstraction to condense and group data into relevant categories that in turn enabled the researchers to provide answers to the study's research. The researchers employed the process outlined by Elo and Kyngäs (2008). This process involves open coding (inscribing notes, and headings when reading selected text), categorizing (utilization of manifest and latent content interpretation to create categories) and abstraction (crafting of a general description of the study topic). From the major themes observed, further refinement was conducted to identify specific sub-themes that possessed a connection with the questions this study sought to answer as guided by (Braun and Clarke, 2006). Two major themes were identified with one being the promotion of mother-infant interactions with the other being the improvement in how mothers and nurses interact at the NICU, see table 1 below.

Table 1. Themes and Sub-themes of Nursing Interventions that Promote Maternal -Infant Bonding at the NICU.

<b>Major Theme</b>	<b>Sub-Theme</b>	<b>Unit of analysis</b>
<b>Promotion of Mother-Infant Interaction</b>	Providing opportunities for physical contact	7, 10, 11, 19, 20, 21, 23, 25
	Providing opportunities for remote monitoring	13, 22
	Providing opportunities for mothers' participation in routine care	5, 9, 15, 21
<b>Mother-Nurse Interaction</b>	Communication	2, 4, 8, 11, 12, 16, 21
	Assurance	1, 14, 17, 24
	Empathic treatment	3, 15, 18
	Exhibiting trustworthiness	3, 6, 10, 21

### 5.3 Ethical consideration

Contributing to the health evidence base that is then used to guide clinical and policy decisions requires that study authors make a deliberate effort to ensure that studies are unbiased, are based on accepted scientific methods and are accurate (Sng, Yip and Han, 2016). One aspect that we sought to achieve was to find most if not all relevant studies to our research questions to review. Often, most literature databases both electronic and physical have indexing limitations. It is for this reason that we undertook our literature search in a variety of repositories to improve the number and quality of relevant research articles that we were able to identify and utilize in our study. This is because the researchers' ability to access and utilize appropriate research studies while undertaking a literature review, goes a long way in influencing the quality of their research (Thomas et al., 2015). During the preparation of this publication, we the authors also did an in-depth

and accurate extraction of studies to be included in this review study. The studies were extracted independently by the two research authors and any discrepancies that arose were sufficiently resolved. This approach is crucial and ensures that results are not slanted in any direction and are exhaustive as any relevant study that fit the study's inclusion criteria is captured and included (McGowan and Sampson, 2005). The research project was also undertaken honestly and with integrity. There were no competing interests be they personal, academic, political, and financial that influenced the direction that we the study authors took in the synthesis and compilation of this research study. Finally, we the authors tried our best not to duplicate or make redundant copies of past studies. Rather we sought to provide a unique overview of the nursing interventions that nurses can adopt to promote mother-infant bonding at the NICU.

## **6 RESULTS**

Two major themes were identified from the reviewed literature that sought to identify the nursing interventions that nurses can adopt to promote mother infant bonding at the NICU. The first identified theme concerned the promotion of mother-infant interactions, and the second, mother and nurse interaction in the NICU.

### **6.1 Promotion of Mother-Infant Interaction**

On promotion of mother-infant interaction, there were studies that either highlighted the importance of physical contact and why nurses should encourage it while others also showed the beneficial effect that remote contact can have on mother infant bonding. Breastfeeding (10, 19, 21) and skin to skin contact (Kangaroo Mother Care or KMC) (7, 11, 20, 23, 25) were some of the physical practices that reportedly need to be promoted by nurses at the NICU.

Remote monitoring such as use of webcams, facetime or even photos (13, 22) was also shown to possess the ability to reduce mothers' distress at the NICU and promote maternal infant bonding. Mothers involvement in the routine care of their infants was also identified as a key contributor to mother infant bonding. On this, practices such as nappy changing, feeding, repositioning the baby, and being involved in other baby nurturing activities were found to be essential in the enhancement of baby-infant bond at the NICU (5, 9, 15, 21).

#### **6.1.1 Providing opportunities for physical contact**

There is mounting evidence of how the various forms of mother- infant contact, such as frequent visitation, skin to skin contact, and even parental talk can result in better bonding outcomes for infants and their parents during the hospitalization period and beyond. The importance of skin to skin contact, also, KMC has especially been well studied. While Kangaroo Mother Care has been associated with positive health outcomes of mothers and premature infants at the NICU, it has also reportedly been associated with improved mother-infant bonding and closeness (20).

KMC provides a warm, comforting, and calming experience that provides an opportunity for both mothers and infants to get to know each other (25). Kangaroo care also provides an opportunity for reciprocal pleasure as well as bond strengthening in an environment where this could not have happened. During the skin to skin contact moments that characterize Kangaroo care, mothers have in the past reported intense feelings of pleasure and connectedness that enhanced their feeling of being able to nurture despite the baby's prematurity (23).

Skin to skin contact has also been associated with greater emotional closeness between mother and infant while also enhancing their overall interactions. Mothers who have experienced separation from their infant at the NICU have also been associated with negative attachment behaviours that negatively affect the ability to form close bonds with their infant (7). With the advantages of Kangaroo Care on the infant's health, mother physical and psychological condition as well as mother-infant bonding, nurses at the NICU should provide opportunities for mothers to practice skin to skin care with their infants. This will go a long way in improving bonding and enhancing the infant's psychological and physical resilience going forward.

Breastfeeding is also another form of contact that has been reported to have positive effect on mother-infant bonding and has been identified as a key activity that nurses in the NICU should support (21). By initiating early breastfeeding, nurses provided an opportunity for mothers to bolster the closeness and bonding to their babies and have an experience of 'motherhood early on' (19, 21). Breastfeeding may also enhance the formation and enhancement of maternal-infant bonding via the promotion of maternal nurturing competency which aids alleviation of emotional distress in mothers and supports the bonding process (10, 21). It is for this reason that nurses and NICU attendants should encourage breastfeeding of infants by their mothers if possible, at the NICU.

### **6.1.2 Providing opportunities for remote monitoring**

The NICU setting brings about many psychosocial disruptions and physical limitations that separates infants from their mothers, ultimately affecting the bonding of infants to their mothers. The emphasize made of the importance of photographs in enhancing

closeness between mother and their infant observes that photos provide rehearsed memories of an infant's life to their mother and help parents cope with the situation by observing the improvement in health and size of their infant (13).

Use of technology that enables a mother to monitor their child at the NICU has also been identified as an effective way of breaking the separation barrier between mother and infant and promoting proximity. Facetime, a technology with the ability to provide live video feed, was used by mothers to monitor their babies at the NICU with great success. This technology reduced time taken by mothers to see their babies for the first time and worked to reduce anxiety and worries that the mother had of their child condition as they were able to view their baby and talk to a nurse about their condition. This improved proximity not only provided assurance to the mother but also enhanced the maternal-infant bond (22).

Utilizing technology to improve a mother's proximity to her baby seems like a viable route that nurses can utilize in the NICU to both reduce anxiety and fears of the mothers as well as support mother-infant bonding (13, 22).

### **6.1.3 Providing opportunities for the participation in routine care**

An enabling environment that empowers mothers to directly participate in the care of their babies has also been identified as a key component of enhancing mother-infant bonds at the NICU (21). Routine care of the infant involves nurturing actions that may include comforting, talking to, singing to, and touching the baby. Others include turning the infant, changing their nappies, feeding, and responding to their actions. Participating in care by mothers at the NICU has known health and psychological benefits to infants at the NICU. It has also been associated with reduced maternal anxiety and improved mother-infant bonding (5).

It has reported that women who were involved in the care of their infants at the NICU experienced the feelings of confidence and connection to their infants. They also felt more competent to handle their babies an action that improved their emotional competence (15). It is in order that nurses have a duty to restrict the infant access if its detrimental to

their health, however, nurses should do their best to actively involve parents in the care of their infants of they are to empower them a key players in the infants care (9).

## **6.2 Mother-Nurse Interaction**

Mother-nurse interactions also featured prominently in the list of interventions that can support mother-infant bonding. Communication that was effective, constant, consistent, empathetic, warm, positive, and symmetrical was reported to reduce psychosocial distress, enhance maternal competence, and promote mother-infant bonding. Psychosocial support in form of assurance, empathetic treatment and exhibition of trustworthiness were also essential in the promotion of mother infant bonding at the NICU (1, 2, 3, 4, 6, 8, 10, 11, 12, 14, 15, 16, 17, 18, 21, 24).

### **6.2.1 Communication**

Communication when conducted effectively between nurse and patients remain a central element of supportive care as anchored in the family-centred care (FCC) philosophy. In this research, there was a general agreement between (8, 2, 4 and 21) that appropriate and effective communication between the NICU nurse and the infant's mother could facilitate mother-premature infant bonding. From their studies, the authors described appropriate communication that supports mother-premature infant attachment as one which includes chatting: talk that is majorly on general issues and treads away from the infants condition, involves the nurses asking mothers questions and is characterized by nurses informing mothers of their availability for any clarification, question or contention. The authors noted that nurses who adopted an emotional way of expressing themselves that was caring and reassuring and demonstrated empathy and warmth were able to communicate effectively with mothers of premature infants and were able to build relationships that were supportive with the mothers. This ultimately provided a great environment which encouraged mothers to bond with their babies. Mothers at the NICU often encounter nurses who are poor communicators, disrespectful and even rude an aspect that increases the anxiety of new mothers while discouraging them to ask questions or seek assurance (12). On the other hand, clear, effective, and positive communication empowered mothers and improved their participation in active care of their infant (12).

A key theme that was highlighted by these studies was that supportive relationship between nurses and infants' mothers needed to be symmetrical and to exhibit a balance of power (2, 4, 8, 11, 16, 12). When the communication exhibited an asymmetrical nature and was nurse-led, a potential psychological barrier that hurt the communication fluency was created (16). The ineffective communication that ensued, ultimately, hindered the attachment and bonding of mother and infant (16).

### **6.2.2 Assurance**

In a cross-sectional study that interviewed mothers who had infants at the NICU at five Riyadh city hospitals reported that assurance ranked very highly in the needs of mothers with children at the NICU. Mothers, the researchers noted, need reassurance that their children were responding well to treatment, were receiving the highest quality of care and that their situation was improving (1). The importance of assurance to mothers and fathers at the NICU was also reported in a descriptive cross-sectional study that involved interviewing mothers, fathers and nurses, the authors found that the need for assurance of the child's status and quality of care they are receiving was one of the key needs of a premature infant's parents. This study emphasized the needs for nurses to provides assurance to such parents to reduce their anxiety, stress, and fears (17).

Also, another study reported that of 56 needs that parents at the NICU needed, in their evaluation of perceived needs identified assurance as a key need which ranked the highest and the first in the needs ranking of families with children at the NICU (24). Mothers at the NICU suffer significant post-traumatic stress, anxiety, anger, powerlessness, negative feelings and even depression which can affect how a mother and child interact early on and interfere with the all-important mother-infant bonding. Provision of assurance to mothers has been reported as a key stress and anxiety modulators of mother at the NICU (14, 24, 17, 1).

### **6.2.3 Empathic treatment**

Owing to the apparent psychosocial support needs, it is no wonder that several studies have highlighted ways that nurses can provide psychosocial support to mothers of premature infants at the NICU to support their emotional competence. One way that nurses can support mothers of premature infants at the NICU is by undertaking empathic treatment during nursing care at the NICU. This can be in the form of explicit consolations, provision of encouragement and hope, employment of an empathic tone during communication, holding conversations about mothers' feelings and even through providing positive attention to them (3). These assertions are also validated by other researches who have also identified that when a mother-nurse relationship characterized by constant encouragement, guidance, and emotional support is created at the NICU, mothers ability to cope is strengthened and their emotional distress is reduced (15, 18).

### **6.2.4 Exhibition of trustworthiness**

Often, mothers at the NICU identified that nurses who accurately and thoroughly informed them of their child status, medical procedure they are undergoing was the key to alleviate their emotional distress (3). Mothers according to study were glad when nurses answered questions asked clearly, consistently and in a non-contradictory manner even without the mothers asking. When nurses employed a very trustworthy stance in their interactions with mothers, mothers' emotional distress was alleviated and their trust in the medical staff and system was restored (3, 21). Another study also supports this assertion noting that, when nurses are upfront with information, are open, non-judgmental, and supportive, a trust-worthy relationship is created between them and the mother. Creation of these trustful bonds then results in improvement in mothers' self-esteem and emotional stability (10). This ultimately translates to better competence in mother-baby interaction and bonding. On trustworthiness at the NICU then, nurses need to be exhibit friendliness, consistency and initiative in sharing information and adopt a non-judgmental stance in their interactions with mothers if they are to improve mothers' confidence, reduce their emotional distress and improve their maternal competence in their interaction with their infants (6).

## **7 DISCUSSION**

The aim of this study is to identify the nursing care practices and interventions that nurses can adopt to facilitate and support the bonding of mothers and their premature infants at the Neonatal Intensive Care Unit (NICU). The discussion of the findings is in relation to the reviewed articles and Watson Theory of Human Caring.

### **7.1 Discussion in relation to the literature**

One aspect that was mentioned widely was the importance of mother-premature infant contact in promoting bonding and the importance of nurses as facilitators. This is no surprise because prematurely born infants often require hospitalization in the NICU a situation that brings about a forced separation between the mother and infant. Often these separations may last weeks or even months and ultimately may affect the all-important mother-infant closeness and bonding (Flacking et al., 2012). Most parents with infants at the NICU have constantly told of their desire to hold, touch or be in contact with the baby (Lindberg and Öhrling, 2008) and always describe it as a highly rewarding and important moment in their motherhood. Nurses have long been identified as either facilitators or facilitators to this contact and with evidence pointing to the importance of mother-infant contact in promotion of mother-infant bonding, nurses need to play a greater role as facilitators of this contact.

Nurses need to encourage of skin to skin contact, providing opportunities for mothers to breastfeed their infants and even involving mothers more in the care of their children to enhances the mother- infant interaction. However, the participation of mothers in the care is only possible if mothers allow it. Often, nurses are gatekeepers that oversee the parents' access to their infants (Gibbs, Boshoff and Stanley, 2015). Kangaroo care involves the skin-to-skin contact of mother and infant usually by placing an infant naked upright on her mother's bare chest (Cattaneo et al., 2018). Also, contact brought about by breastfeeding is crucial in the mother-infant bonding early on. This is not only from the nurturing nature of breastfeeding but by the neurochemicals released during the process that enhance mother-infant bond (Buckley, 2015). A mother's voice has been reported to improve an infant's neurofunction, feeding behaviour, visual attention, growth as well as

the vocalization of the infant (Caskey, Stephens, Tucker and Vohr, 2011; Filippa et al., 2013).

The participation of mothers in care is only possible if mothers allow it. Often, nurses are gatekeepers that oversee the parents' access to their infants (Gibbs, Boshoff and Stanley, 2015). Contact between the mother does not need to be skin to skin all the time, other forms of contacts such as visual contact, vocalizations, touch as well as use of technology have been associated with the enhancement of the mother-child relationship and closeness (Flacking et al., 2012). This can be in the form of providing opportunities for remote monitoring. Ultimately, this practice has improved their confidence as mothers and improved their emotional availability to their premature infant (Feldman, Weller, Sirota and Eidelman, 2002). The act of remote monitoring of infants by their mothers is also sought to determine the effect of using the webcam technology as a monitoring tool for mothers with children at the NICU. The author reported that there was a reduction in stress and anxiety symptoms after mothers viewed their babies via a webcam. There was also an improvement in their emotional closeness to the baby. There was however widespread agreement that the remote monitoring opportunity would not wholly substitute physical viewing and touch. Care should also be taken, however, to ensure that this intervention is not substituted wholly with physical contact and attention (Rhoads, Green, Mitchell and Lynch, 2015).

Effective communication between an infant's parent and the nurse at the NICU may go a long way in relieving stress, reducing anxiety, and managing fears. In the NICU environment, however, instances of miscommunication, ineffective communication or even lack of communication are rampant (Reid, Bramwell, Booth and Weindling, 2007). Because parental stress affects attachment, bonding and communication on the other hand exacerbates stress and anxiety, there is a need for improvement in how nurses communicate with mothers of premature at the NICU. Communication by nurses to mothers need to be constant, consistent, empathetic, warm, positive, and symmetrical if it is to reduce psychosocial distress, enhance maternal competence and promote mother-premature infant bonding.

Assurance was a practice that nurses were encouraged to adopt in their quest to promote mother-infant bonding at the NICU. Mothers need constant assurance from nurses that their infant is being provided with the best care, is being treated for pain, and that nurses and doctors care about the baby and are doing everything in their power to improve the health of their baby. If assurance is provided adequately, mothers' stress levels are reduced and their ability to interact with their premature infant at the NICU is bolstered (Feeley et al., 2016). Assurance therefore is an aspect that nurses should adopt in their care of mothers and their premature infants at the NICU.

The issue of empathetic treatment of mothers at the NICU and its role in promoting mother infant bonding at the NICU has also been highlighted expansively in literature. At the NICU, mothers often suffer from a host of physiological disorders that include stress, anxiety, guilt, hopelessness, as well as loss of control (Obeidat, Bond and Callister, 2009). Most of the time, this emotional distress mothers experience here are severe enough to pass the posttraumatic stress or acute stress disorder diagnostic criteria (Lefkowitz, Baxt and Evans, 2010). This is often caused by the nature of experiences at the NICU where the role of the infant's mother is altered, and the appearance and behaviour of the infant is fear inducing (Busse, Stromgren, Thorngate and Thomas, 2013). Mothers psychosocial distress always result in worse outcomes in their health, their ability to interact with infant and family as well as the infant's future cognition and behaviour (Grunberg, Geller, Bonacquisti and Patterson, 2018). It is for the above psychosocial support needs that that the importance of psychosocial support and empathetic treatment of mothers in NICU by nurses comes to the fore.

Another form of psychosocial support that nurses can extend to mothers of premature infants in their care is by exhibiting trustworthiness in their interactions. Mothers need their questions answered clearly, consistently and in a non-contradictory manner even without the mothers asking. Formation of a trustworthy relationship between a nurse and a mother at the NICU improves the mother's emotional stability, and self-esteem and provides an opportunity for mothers to be emotionally available to care for their children (Phuma-Ngaiyaye and Welcome Kalembo, 2016). Nurses at the NICU therefore have an important role to play in forging trustworthy relationships with mothers at the NICU if they are to assist mothers and their infants' bond effectively.

## 7.2 Discussion in relation to Watson Theory of Human Caring

From our findings, we identified promotion of mother-infant interactions activities such as routine child care, breastfeeding and skin to skin contact (Kangaroo care), providing opportunities for remote monitoring as well as enhancing mother-nurse interactions at the NICU by improvement of mother-nurse communication, provision of necessary psychosocial support to distressed mother and being a trustworthy companion at the NICU. (Flacking, Ewald, Nyqvist and Starrin, 2006; Fegran, Fagermoen and Helseth, 2008; Cockcroft, 2012; Phuma-Ngaiyaye and Welcome Kalembo, 2016; Bry and Wigert, 2019) as being crucial to the promotion of mother-infant bonding at the NICU. All these actions and activities depict the creation of caring moments where the nurse and the mothers at the NICU come together regardless of their unique life histories and beliefs in a human-to-human transaction as envisioned by Watson as his penned the theory of caring.

One key aspects of Watson's theory that has vividly come to light with this research is the concept of transpersonal caring, which is a major theme in Watson's theory of caring. Watson (2012) describes a transpersonal nurse as one who "has the ability to focus consciousness and intentionality on caring, healing, and wholeness, rather than on disease, illness and pathology"; Transpersonal caring focuses on helping patients achieve a more complete sense of harmony within the mind, body and spirit through the use of caring transactions. Transpersonal caring seeks to connect with and embrace the spirit or soul of the other through the processes of caring and healing and being inauthentic relation, in the moment (Saviato and Leão, 2016). In the present study, there was a host of transpersonal caring actions by nurses that were identified to be crucial in the promotion of mother infant bonding. Actions such as providing psychosocial support and assurance, providing encouragement and hope, providing mothers with opportunity-ties to interact with their mothers, creating trustful relationship with mothers and being present and attentive to mothers overall needs to ensure they attain a higher degree of harmony in their minds, bodies and souls. This is all in line with Watson's theory of human caring and goes a long way to cement the importance of the utilization of the human caring framework by nurses in their interactions with patients. The caring model or theory can be considered a philosophical and moral/ethical foundation for professional nursing and part of the central focus for nursing at the disciplinary level. As a model of caring, it offers a framework that

embraces and intersects with art, science, humanities, spirituality, and is now becoming a central phenomenon of nursing practice (Gonzalo, 2019). Nurses who embrace caring in their work have success in promoting the body, mind, and soul healing of those they are caring for (Fenwick, Barclay and Schmied, 2008). As such, we note that nurses working in neonatal intensive care units need to develop nursing care practices which are not only grounded upon a well-established theoretical framework but also work to support mother infant bonding. Incorporation of Watson's caring approach in nursing may therefore be one step towards promoting mother infant bonding at the NICU.

## **8 CONCLUSION**

As revealed in this current study, the nursing care practices that can be employed in the neonatal intensive care units by nurses to promote mother-infant bonding include providing opportunities for mother-infant contact such as kangaroo care and breastfeeding, providing psychosocial support, effective communication, consistent information dissemination, provision of feedback and assurance, empathetic treatment of mothers the NICU, being trustworthy and involving mothers in the care of their infants.

The research findings also indicate that the mother-infant bonding process is not always automatic and that the nature of the NICU environment complicates this attachment process. This justifiably indicates that attainment of mother-infant bonding requires facilitation by health personnel at the NICU, especially, the NICU nurse. The NICU nurse, the study highlighted, possesses the power to either promote or hinder the mother-infant attachment and bonding process. Because there is evidence that early mother-infant bonding is essential for an infant's neurological development process, nurses should take the role of facilitating this attachment process from birth seriously.

### **8.1 Strengths and limitations**

This study faced several limitations. First, some useful scientific articles which are related to the study could not be accessed at the Arcada databases. Second, twenty research articles were expected to be selected in the beginning of data collection phase, which proved very difficult to find appropriate articles for the research topic or to respond the research question which affected time frame expected to accomplish this study. Thirdly, this study is limited by not getting enough but a more suitable literature for review. Notwithstanding, as has been reiterated earlier on, those selected previous literatures are equally important and applicable in this case since the purpose and corresponding findings in the end produced some suitable answers directly or indirectly to the research question. Hence, these identified limitations do not pose any major threat to the out-come of the study.

## **8.2 Recommendations for future studies**

We recommend a similar but an in-depth research into this important and interesting topic by focusing on using primary data with questionnaire specifically designed to answer those research questions raised through a structured or semi-structured interview. In this way we believe a stronger and probably a more concrete result may be produced for a more informed conclusion to be drawn.

Also, another future research can also be conducted to investigate the bond and relationship the nurses establish with the preterm babies at the NICU since the nurse spend more time taking care of them than their respective parents.

## REFERENCES

Alsaiani, E., Magarey, J. and Rasmussen, P., 2019. An Investigation of the Needs of Saudi Parents of Preterm Infants in the Neonatal Intensive Care Unit. *Cureus*.

American Psychiatric Association. 2013. *DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS FIFTH EDITION DSM-5TM*. [online] Available at: <<https://cdn.website-editor.net/30f11123991548a0af708722d458e476/files/uploaded/DSM%2520V.pdf>> [Accessed 6 March 2019].

Anisfeld, E. and Lipper, E., 1983. Early contact, social support, and mother-infant bonding. *Journal of the American Academy of Child Psychiatry*, 22(6), p.589.

Anokye, R., Acheampong, E., Budu-Ainooson, A., Obeng, E. and Akwasi, A., 2018. Prevalence of postpartum depression and interventions utilized for its management. *Annals of General Psychiatry*, 17(1).

Barker, J., Daniels, A., O'Neal, K. and Sell, S., 2017. Maternal-Newborn Bonding Concept Analysis. *International Journal of Nursing & Clinical Practices*, 4(1).

Bialoskurski, M., Cox, C. and Wiggins, R., 2002. The relationship between maternal needs and priorities in a neonatal intensive care environment. *Journal of Advanced Nursing*, 37(1), pp.62-69.

Bowlby, J., 1988. Developmental psychiatry comes of age. *American Journal of Psychiatry*, 145(1), pp.1-10.

Braun, V. and Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), pp.77-101.

Bry, A. and Wigert, H., 2019. Psychosocial support for parents of extremely preterm infants in neonatal intensive care: a qualitative interview study. *BMC Psychology*, 7(1).

Busse, M., Stromgren, K., Thorngate, L. and Thomas, K., 2013. Parents' Responses to Stress in the Neonatal Intensive Care Unit. *Critical Care Nurse*, 33(4), pp.52-59.

Caskey, M., Stephens, B., Tucker, R. and Vohr, B., 2011. Importance of Parent Talk on the Development of Preterm Infant Vocalizations. *PEDIATRICS*, 128(5), pp.910-916.

Cattaneo, A., Amani, A., Charpak, N., De Leon-Mendoza, S., Moxon, S., Nimbalkar, S., Tamburlini, G., Villegas, J. and Bergh, A., 2018. Report on an international workshop on kangaroo mother care: lessons learned and a vision for the future. *BMC Pregnancy and Childbirth*, 18(1).

Clinton, P., 2014. A Blueprint for Practice: Pediatric Nursing: Scope and Standards of Practice. *Journal of Pediatric Health Care*, 28(1), pp.1-2.

Cockcroft, S., 2012. How can family centred care be improved to meet the needs of parents with a premature baby in neonatal intensive care?. *Journal of Neonatal Nursing*, 18(3), pp.105-110.

Corrigan, C., Kwasky, A. and Groh, C., 2015. Social Support, Postpartum Depression, and Professional Assistance: A Survey of Mothers in the Midwestern United States. *The Journal of Perinatal Education*, 24(1), pp.48-60.

Eastwood, J., Jalaludin, B., Kemp, L., Phung, H. and Barnett, B., 2012. Relationship of postnatal depressive symptoms to infant temperament, maternal expectations, social support, and other potential risk factors: findings from a large Australian cross-sectional study. *BMC Pregnancy and Childbirth*, 12(1).

Buckley, S., 2015. Executive Summary of Hormonal Physiology of Childbearing: Evidence and Implications for Women, Babies, and Maternity Care. *The Journal of Perinatal Education*, 24(3), pp.145-153.

Elo, S. and Kyngäs, H., 2008. The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), pp.107-115.

Fancourt, D. and Perkins, R., 2018. The effects of mother–infant singing on emotional closeness, affect, anxiety, and stress hormones. *Music & Science*, 1, p.205920431774574.

Fawcett, J., 2005. *Contemporary Nursing Knowledge: Analysis and Evaluation of Nursing Models and Theories*. 2nd ed. Philadelphia: F.A. Davis Co., pp.51-59.

Feeley, N., Genest, C., Niela-Vilén, H., Charbonneau, L. and Axelin, A., 2016. Parents and nurses balancing parent-infant closeness and separation: a qualitative study of NICU nurses' perceptions. *BMC Pediatrics*, 16(1).

Fegran, L., Fagermoen, M. and Helseth, S., 2008. Development of parent-nurse relationships in neonatal intensive care units - from closeness to detachment. *Journal of Advanced Nursing*, 64(4), pp.363-371.

Feldman, R., Weller, A., Leckman, J., Kuint, J. and Eidelman, A., 1999. The Nature of the Mother's Tie to Her Infant: Maternal Bonding under Conditions of Proximity, Separation, and Potential Loss. *Journal of Child Psychology and Psychiatry*, 40(6), pp.929-939.

Feldman, R., Eidelman, A. I., Sirota, L. and Weller, A., 2002, 'Comparison of skin-to-skin (kangaroo) and traditional care: parenting outcomes and preterm infant development.', *Pediatrics*, 110(1 Pt 1), pp.16-26.

Feldman, R., Weller, A., Sirota, L. and Eidelman, A., 2002. Skin-to-skin contact (kangaroo care) promotes self-regulation in premature infants: Sleep-wake cyclicality, arousal modulation, and sustained exploration. *Developmental Psychology*, 38(2), pp.194-207.

Fenwick, J., Barclay, L. and Schmied, V., 2001 "Chatting": an important clinical tool in facilitating mothering in neonatal nurseries, *Journal of Advanced Nursing*, 33(5), pp.583-593.

Fenwick, J., Barclay, L. and Schmied, V., 2008. Craving closeness: A grounded theory analysis of women's experiences of mothering in the Special Care Nursery. *Women and Birth*, 21(2), pp.71-85.

Filippa, M., Devouche, E., Arioni, C., Imberty, M. and Gratier, M., 2013. Live maternal speech and singing have beneficial effects on hospitalized preterm infants. *Acta Paediatrica*, 102(10), pp.1017-1020.

Flacking, R., Ewald, U., Nyqvist, K. and Starrin, B., 2006. Trustful bonds: A key to “becoming a mother” and to reciprocal breastfeeding. Stories of mothers of very preterm infants at a neonatal unit. *Social Science & Medicine*, 62(1), pp.70-80.

Flacking, R., Lehtonen, L., Thomson, G., Axelin, A., Ahlqvist, S., Moran, V., Ewald, U. and Dykes, F., 2012. Closeness and separation in neonatal intensive care. *Acta Paediatrica*, 101(10), pp.1032-1037.

Gibbs, D., Boshoff, K. and Stanley, M., 2015. Becoming the parent of a preterm infant: A meta-ethnographic synthesis. *British Journal of Occupational Therapy*, 78(8), pp.475-487.

Gonzalo, A., 2019. *Jean Watson: Theory Of Human Caring*. [online] Nurseslabs. Available at: <<https://nurseslabs.com/jean-watsons-philosophy-theory-transpersonal-caring/>> [Accessed 12 August 2020].

Goyal, D., Gay, C. and Lee, K., 2010. How Much Does Low Socioeconomic Status Increase the Risk of Prenatal and Postpartum Depressive Symptoms in First-Time Mothers? *Women's Health Issues*, 20(2), pp.96-104.

Grewal, A., Kataria, H. and Dhawan, I., 2016. Literature search for research planning and identification of research problem. *Indian Journal of Anaesthesia*, 60(9), p.635.

Grunberg, V., Geller, P., Bonacquisti, A. and Patterson, C., 2018. NICU infant health severity and family outcomes: a systematic review of assessments and findings in psychosocial research. *Journal of Perinatology*, 39(2), pp.156-172.

Hall, E., 2005. Being in an alien world: Danish parents' lived experiences when a newborn or small child is critically ill. *Scandinavian Journal of Caring Sciences*, 19(3), pp.179-185.

Hill, R. and Flanagan, J., 2019. The Maternal–Infant Bond: Clarifying the Concept. *International Journal of Nursing Knowledge*, 31(1), pp.14-18.

Hopwood, R., 2010. The role of the neonatal nurse in promoting parental attachment in the NICU. *Infant*, 6(2), pp.54-58.

Horwood, C., Haskins, L., Luthuli, S. and McKerrow, N., 2019. Communication between mothers and health workers is important for quality of newborn care: a qualitative study in neonatal units in district hospitals in South Africa. *BMC Pediatrics*, 19(1).

Huckabay, L. M., 1999. Impact of a research study a decade later: the use of pictures in a neonatal intensive care unit as a mode of nursing intervention to enhance maternal-infant bonding. *Scholarly Inquiry for Nursing Practice*, 13(4), pp.367-373.

Ionio, C., Mascheroni, E., Colombo, C., Castoldi, F. and Lista, G., 2019. Stress and feelings in mothers and fathers in NICU: identifying risk factors for early interventions. *Primary Health Care Research & Development*, 20.

*Watson Theory: Theory of Human Caring*. 2020. Sites.google.com. 2020. [online] Available at: <<https://sites.google.com/site/jwatsontheory>> [Accessed 12 August 2020].

Joolae, S., Joolaei, A., Tschudin, V., Bahrani, N., and Nikbakht Nasrabadi, A., 2010. Caring relationship: the core component of patients' rights practice as experienced by patients and their companions. *Journal of Medical Ethics and History of Medicine*, 3, 4.

Johnson, A., 2008. Promoting Maternal Confidence in the NICU. *Journal of Pediatric Health Care*, 22(4), pp.254-257.

Jones, L., Woodhouse, D. and Rowe, J., 2007. Effective nurse parent communication: a study of parents' perceptions in the NICU environment. *Patient Education and Counselling*, 69(1-3), pp.206-212.

Kantrowitz-Gordon, I., 2013. Expanded Care for Women and Families after Preterm Birth. *Journal of Midwifery & Women's Health*, 58(2), pp.158-166.

Ladani, M. T., Abdeyazdan, Z., Sadeghnia, A., Hajiheidari, M. and Hasanzadeh, A., 2017. Comparison of Nurses and Parents' Viewpoints Regarding the Needs of Parents of Premature Infants in Neonatal Intensive Care Units. *Iranian Journal of Nursing and Midwifery Research*, 22(5), pp. 367-371.

Lefkowitz, D., Baxt, C. and Evans, J., 2010. Prevalence and Correlates of Posttraumatic Stress and Postpartum Depression in Parents of Infants in the Neonatal Intensive Care Unit (NICU). *Journal of Clinical Psychology in Medical Settings*, 17(3), pp.230-237.

Lehning, F., Nagl, M., Stepan, H., Wagner, B. and Kersting, A., 2019. Associations of postpartum mother-infant bonding with maternal childhood maltreatment and postpartum mental health: a cross-sectional study. *BMC Pregnancy and Childbirth*, 19(1).

Lindberg, B. and Öhring, K., 2008. Experiences of having a prematurely born infant from the perspective of mothers in northern Sweden. *International Journal of Circumpolar Health*, 67(5), pp.461-471.

McEwen, M. and Wills, E., 2011. *Theoretical Basis for Nursing*. 4th ed. Lippincott Williams & Wilkins. p.182.

McGowan, J. and Sampson, M., 2005. Systematic reviews need systematic searchers. *Journal of the Medical Library Association*, 93(1), pp.74-80.

Mok, E. and Leung, S., 2006. Nurses as providers of support for mothers of premature infants. *Journal of Clinical Nursing*, 15(6), pp.726-734.

NANAP Position Statement. 2009. NAPNAP Position Statement on Pediatric Health Care/Medical Home: Key Issues on Delivery, Reimbursement, and Leadership. *Journal of Pediatric Health Care*, [online] 23(3), pp. A23-A24. Available at: <<https://www.jpedhc.org/action/showPdf?pii=S0891-5245%2809%2900048-0>> [Accessed 12 August 2020].

Nelson, J. and Watson, J., 2011. *Measuring Caring*. Springer Publishing Company.

Obeidat, H., Bond, E. and Callister, L., 2009. The Parental Experience of Having an Infant in the Newborn Intensive Care Unit. *Journal of Perinatal Education*, 18(3), pp.23-29.

Parsa, P., Karimi, S., Basiri, B. and Roshanaei, G., 2018. The effect of kangaroo mother care on physiological parameters of premature infants in Hamadan City, Iran. *Pan African Medical Journal*, 30.

Phuma-Ngaiyaye, E. and Welcome Kalembo, F., 2016. Supporting mothers to bond with their newborn babies: Strategies used in a neonatal intensive care unit at a tertiary hospital in Malawi. *International Journal of Nursing Sciences*, 3(4), pp.362-366.

Psychogiou, K., Ashworth, C., Weaver-Lowe, L., Carroll, C., Callow, C. and Edi-Osagie, N., 2020. Novel use of Facetime in supporting maternal-infant bonding. *Journal of Neonatal Nursing*, 26(2), pp.106-108.

Quinn, J., Munoz, F., Gonik, B., Frau, L., Cutland, C., Mallett-Moore, T., Kissou, A., Wittke, F., Das, M., Nunes, T., Pye, S., Watson, W., Ramos, A., Cordero, J., Huang, W., Kochhar, S. and Buttery, J., 2016. Preterm birth: Case definition & guidelines for data collection, analysis, and presentation of immunisation safety data. *Vaccine*, 34(49), pp.6047-6056.

Reid, T., Bramwell, R., Booth, N. and Weindling, M., 2007. Perceptions of parent–staff communication in Neonatal Intensive Care: The findings from a rating scale. *Journal of Neonatal Nursing*, 13(2), pp.64-74.

Rhoads, S., Green, A., Mitchell, A. and Lynch, C., 2015. Neuroprotective Core Measure 2: Partnering with Families - Exploratory Study on Web-camera Viewing of Hospitalized Infants and the Effect on Parental Stress, Anxiety, and Bonding. *Newborn and Infant Nursing Reviews*, 15(3), pp.104-110.

Røseth, I., Bongaardt, R., Lyberg, A., Sommerseth, E. and Dahl, B., 2018. New mothers' struggles to love their child. An interpretative synthesis of qualitative studies. *International Journal of Qualitative Studies on Health and Well-being*, 13(1), p.1490621.

Schmücker, G., Brisch, K., Köhntop, B., Betzler, S., Österle, M., Pohlandt, F., Pokorny, D., Laucht, M., Kächele, H. and Buchheim, A., 2005. The influence of prematurity, maternal anxiety, and infants' neurobiological risk on mother-infant interactions. *Infant Mental Health Journal*, 26(5), pp.423-441.

Simmons, L., Rubens, C., Darmstadt, G. and Gravett, M., 2010. Preventing Preterm Birth and Neonatal Mortality: Exploring the Epidemiology, Causes, and Interventions. *Seminars in Perinatology*, 34(6), pp.408-415.

Tessier, R., Cristo, M., Velez, S., Giron, M. et al., 1998, Kangaroo mother care and the bonding hypothesis, *Pediatrics*, United States, 102(2), p. e17.

Thomas, B., Tachble, A., Peiris, D., Malhi, R., Godlovitch, G. and Lin, Y., 2015. Making literature reviews more ethical: a researcher and health sciences librarian collaborative process. *Future Science OA*, 1(4).

Vaškelytė, A., Butkevičienė, R. and Klemmac, D., 2009. Assessing needs of families with premature newborns in the Neonatal Intensive Care Unit. *Medicina*, 45(4), p.320.

Vedova, A., Dabrassi, F. and Imbasciati, A., 2008. Assessing prenatal attachment in a sample of Italian women. *Journal of Reproductive and Infant Psychology*, 26(2), pp.86-98.

Villar, J., Papageorghiou, A., Knight, H., Gravett, M., Iams, J., Waller, S., Kramer, M., Culhane, J., Barros, F., Conde-Agudelo, A., Bhutta, Z. and Goldenberg, R., 2012. The preterm birth syndrome: a prototype phenotypic classification. *American Journal of Obstetrics and Gynecology*, 206(2), pp.119-123.

Watson, J., 2012. *Human Caring Science*. Sudbury, MA: Jones & Bartlett Learning.

World Health Organization. 2020. *New Global Estimates on Preterm Birth Published*. [online] Available at: <<https://www.who.int/reproductivehealth/global-estimates-preterm-birth/en/>> [Accessed 20 March 2020].

Wigert, H., Johansson, R., Berg, M. and Hellstrom, A., 2006. Mothers' experiences of having their newborn child in a neonatal intensive care unit. *Scandinavian Journal of Caring Sciences*, 20(1), pp.35-41.

Winston, R. and Chicot, R., 2016. The importance of early bonding on the long-term mental health and resilience of children. *London Journal of Primary Care*, 8(1), pp.12-14.

Saviato, R. and Leão, E., 2016. Nursing assistance and Jean Watson: a reflection on empathy. *Escola Anna Nery - Revista de Enfermagem*, 20(1).

Sng, B., Yip, C. and Han, N., 2016. Legal and ethical issues in research. *Indian Journal of Anaesthesia*, 60(9), p.684.

## APPENDIX 1 CHARACTERISTICS OF THE ARTICLES REVIEWED

**Article 1:** Alsaiani, E. M., Magarey, J. and Rasmussen, P., 2019, An Investigation of the Needs of Saudi Parents of Preterm Infants in the Neonatal Intensive Care Unit”, *Cureus*. 11(1), pp. e3887-e3887.

**Aim:** “to identify the needs of Saudi parents who had an infant in a neonatal intensive care unit (NICU) in one of five hospitals in Riyadh City, Saudi Arabia”

**Method:** Questionnaire

**Relevant results to the research:** Assurance was ranked the most important needs by parents as to comfort and other supporting needs.

**Article 2:** Bialoskurski, M., Cox, C. and Wiggins, R., 2002. The relationship between maternal needs and priorities in a neonatal intensive care environment. *Journal of Advanced Nursing*, 37(1), pp.62-69.

**Aim:** “to investigate the nature and organization of maternal needs and priorities in a neonatal unit”

**Method:** Quantitative survey based on 209 mothers with premature infants and the data were analysed with multivariate analysis.

**Relevant results to the research:** Good communication practices with professionals were valued by mothers with premature babies.

**Article 3:** Bry, A. and Wigert, H., 2019. Psychosocial support for parents of extremely preterm infants in neonatal intensive care: a qualitative interview study. *BMC Psychology*, 7(1).

**Aim:** “exploring the needs of psychosocial support of parents of extremely premature infants, and how the NICU as an organization and its staff meets or fails to meet these needs”

**Method:** Open-ended interviews were conducted with 27 parents after their infant's discharge from the NICU and inductive content analysis was performed.

**Relevant result to the research:** Parents of premature infants needed various forms of emotional support at the NICU, including support from staff, professional psychological

help, and companionship with other patients' parents. Parents were willing to share their emotional state with staff.

**Article 4:** Cockcroft, S., 2012. How can family centred care be improved to meet the needs of parents with a premature baby in neonatal intensive care?. *Journal of Neonatal Nursing*, 18(3), pp.105-110.

**Aim:** “to identify areas of practice that reflect a family centred care (FCC) approach when a baby is born prematurely”

**Method:** A descriptive design

**Relevant result to the research:** Involvement of family in the planning, implementation, and decision-making process- family centred care (FCC). Giving access of information to family and providing feedback.

**Article 5:** Fancourt, D. and Perkins, R., 2018. The effects of mother–infant singing on emotional closeness, affect, anxiety, and stress hormones. *Music & Science*, 1, p.205920431774574.

**Aims:** “to understand the impact of maternal singing on mother-infant bonding and looked to explore specifically the effect of a short period of singing on in-the-moment self-perceptions of mothers as to how they felt themselves and in relation to their infants”

**Method:** A within-subject crossover design was employed and was analysed using SPSS version 23.0

**Relevant result to the research:** Mother-infant singing has greater positive effect on both psychological and biological signs of anxiety.

**Article 6:** Fegran, L., Fagermoen, M. and Helseth, S., 2008. Development of parent-nurse relationships in neonatal intensive care units - from closeness to detachment. *Journal of Advanced Nursing*, 64(4), pp.363-371.

**Aims:** “to explore the development of relationships between parents and nurses in a neonatal intensive care unit”

**Method:** A hermeneutic approach using overt participant observation (160 hours) and in-depth interviews to study interactions between parents and nurses.

**Relevant result to the research:** Provision of trustful relationship, instilling confidence into parents and allowing parents participation. Acknowledging the need of parent-nurse discussion of processes of involvement.

**Article 7:** Feldman, R., Weller, A., Leckman, J., Kuint, J. and Eidelman, A., 1999. The Nature of the Mother's Tie to Her Infant: Maternal Bonding under Conditions of Proximity, Separation, and Potential Loss. *Journal of Child Psychology and Psychiatry*, 40(6), pp.929-939.

**Aims:** “centred on mothers' post-partum thoughts and behaviours: maternal bonding was examined under conditions of closeness, separation, and potential loss”

**Method:** Interviews

**Relevant results to the study:** Attachment behaviours such as anxiety and depression were perceived the highest traits during the mother-infant separation.

**Article 8:** Fenwick, J., Barclay, L. and Schmied, V., 2001 “Chatting”: an important clinical tool in facilitating mothering in neonatal nurseries, *Journal of Advanced Nursing*, 33(5), pp.583-593.

**Aims:** “to explores the use of 'chat' or 'social talk' as an important clinical tool that can assist nurses achieve family-centred care in neonatal nurseries”

**Method:** A grounded theory analysis of over 60 hours of interview data with 28 women, a thematic analysis of 50 hours of interviews with 20 nurses and a content analysis of 398 tape-recorded interactions between nurses and parents.

**Relevant result to the study:** The nursing act as a facilitator that helps in instilling confident and assisting parents to connect in caring for their infants in the neonatal wards.

**Article 9:** Fenwick, J., Barclay, L. and Schmied, V., 2008. Craving closeness: A grounded theory analysis of women's experiences of mothering in the Special Care Nursery. *Women and Birth*, 21(2), pp.71-85.

**Aims:** “to increase knowledge and understanding of how women begin their roles as mothers when their infant is in the neonatal nursery”

**Method:** In-depth interviews conducted with 20 women of whom 19 were midwives, 333h of taped cot side recordings and field notes.

**Relevant results to the study:** Allowing physical contact with their premature baby is a good approach through which mothers learn about and gain intimate knowledge of their infant, but also exhibit authority and ownership.

**Article 10:** Flacking, R., Ewald, U., Nyqvist, K. and Starrin, B., 2006. Trustful bonds: A key to “becoming a mother” and to reciprocal breastfeeding. Stories of mothers of very preterm infants at a neonatal unit. *Social Science & Medicine*, 62(1), pp.70-80.

**Aims:** “to explore how mothers of very preterm infants experienced the breastfeeding process emotionally and how this related to the process of becoming a mother, from the time before the infants’ birth until discharge from the neonatal unit”

**Methods:** A qualitative study, inspired by the grounded theory approach, in-depth interviews were conducted with 25 mothers whose very preterm infants had been cared for in seven NICUs in Sweden.

**Relevant result to the study:** The provision of nursing support in helping mothers to breastfeed their premature infants in a favourable manner to enhance the bonding and confidence.

**Article 11:** Hopwood, R., 2010, The role of the neonatal nurse in promoting parental attachment in the NICU, *Infant*, 6(2), pp.54-58.

**Aims:** “examining how attachment is affected in NICU, and specific methods of how it can be facilitated through positive touch and communication techniques”

**Method:** A descriptive study

**Relevant result to the research:** The nursing relationship between the mother and the premature infant can lead to a negative outcome if the quality of nursing care does not meet the needs of the parents. So therefore, the nurse plays a unique role in facilitating the positive attachment by allowing skin to skin contact, consistent flow of communication, appropriate support m which contribute to the wellbeing of the infants and conforming with the FCC.

**Article 12:** Horwood, C., Haskins, L., Luthuli, S. and McKerrow, N., 2019. Communication between mothers and health workers is important for quality of newborn care: a qualitative study in neonatal units in district hospitals in South Africa. *BMC Pediatrics*, 19(1).

**Aims:** What is the importance of communication between mums and health workers at the NICU?

**Method:** An observational qualitative case study approach

**Relevant to the research:** Good communication between health workers and mothers, empowering mothers to take control and good communication at the NICU is a necessity for a child and mothers wellbeing.

**Article 13:** Huckabay, L. M., 1999. Impact of a research study a decade later: the use of pictures in a neonatal intensive care unit as a mode of nursing intervention to enhance maternal-infant bonding. *Scholarly Inquiry for Nursing Practice*, 13(4), pp. 367-373.

**Aims:** “to determine if they provide mothers the pictures of their premature babies as part of their nursing intervention to facilitate maternal-infant bonding”

**Methods:** Interviews

**Relevant to the research:** Photos provide rehearsed memories of an infant’s life to their mother and help parents cope with the situation by observing the improvement in health and size of their infant.

**Article 14:** Ionio, C., Mascheroni, E., Colombo, C., Castoldi, F. and Lista, G., 2019. Stress and feelings in mothers and fathers in NICU: identifying risk factors for early interventions. *Primary Health Care Research & Development*, 20.

**Aims:** “the aims of this study were to explore parents’ stress levels and negative feeling after premature births and to identify the risk factors related to parents’ stress and negative feelings during their children’s neonatal intensive care unit (NICU) stay”

**Methods:** 43 mothers and 38 fathers of preterm infants filled out the Parental Stressor Scale.

**Relevant to the study:** The NICU might be a stressful place parents but early identification of these risk immediately after their children are born could help to direct specific interventions that can reduce these parents’ stress and prevent them from negative feelings.

**Article 15:** Johnson, A., 2008. Promoting Maternal Confidence in the NICU. *Journal of Pediatric Health Care*, 22(4), pp.254-257.

**Aims:** “to discuss the attributes of maternal-infant attachment, examine the challenges the NICU environment presents, and propose nursing interventions that facilitate and support the development of maternal confidence in the NICU”

**Method:** Descriptive research design

**Relevant to the research:** Allowing parent to partake in the care of their premature create an environment that facilitates maternal-infant attachment by offering mothers positive experiences.

**Article 16:** Jones, L., Woodhouse, D. and Rowe, J., 2007. Effective nurse parent communication: a study of parents’ perceptions in the NICU environment. *Patient Education and Counselling*, 69(1–3), pp.206-212.

**Aims:** “to examined mothers’ and fathers’ perceptions of effective and ineffective communication by nurses in the neonatal intensive care unit (NICU) environment, using communication accommodation theory (CAT) as the framework”

**Method:** 33 parents participated in a semi-structured interview and the interviews were coded using the CAT strategies.

**Relevant to the research:** Effective communication by nurses was accommodating and more social while ineffective communication was generally under-accommodative and more intergroup.

**Article 17:** Ladani, M. T., Abdeyazdan, Z., Sadeghnia, A., Hajiheidari, M. and Hasanazadeh, A., 2017. Comparison of Nurses and Parents’ Viewpoints Regarding the Needs of Parents of Premature Infants in Neonatal Intensive Care Units. *Iranian Journal of Nursing and Midwifery Research*, 22(5), pp.367-371.

**Aims:** “to compare the parents' and nurses' viewpoints regarding parents' needs in the neonatal intensive care units (NICU)”

**Method:** Questionnaires

**Relevant to the research:** The need for assurance of the child’s status and quality of care they are receiving was one of the key needs of a premature infant’s parents.

**Article 18:** Mok, E. and Leung, S., 2006. Nurses as providers of support for mothers of premature infants. *Journal of Clinical Nursing*, 15(6), pp.726-734.

**Aims:** “to explore the supportive behaviour of nurses as experienced by mothers of premature infants in Hong Kong”

**Method:** 37 mothers in a regional hospital NICU filled the ‘Nurses Parent Support Tool’ (NPST) which consists of four aspects: communication information support, emotional support, parental esteem support and quality care-giving support of which 6 mothers were interviewed after the completion of the tool to give examples of supportive and non-supportive behaviour.

**Relevant to the research:** Nurses must adapt to ways to offer support of encouragement, hope and so on to parents of premature infants.

**Article 19:** Obeidat, H. M., Bond, E. A. and Callister, L. C., 2009, The parental experience of having an infant in the new-born intensive care unit, *The Journal of Perinatal Education*, Springer, 18(3), pp.23-29.

**Aims:** “to explore and describe the experience of parents with an infant in the new-born intensive care unit (NICU)”

**Method:** A systematic literature review describing parental experiences that were evaluated and themes were identified.

**Relevant to the research:** Nursing interventions that promote positive psychosocial outcomes such as KMC, breastfeeding is needed to decrease parental feelings of stress, anxiety, and loss of control.

**Article 20:** Parsa, P., Karimi, S., Basiri, B. and Roshanaei, G., 2018. The effect of kangaroo mother care on physiological parameters of premature infants in Hamadan City, Iran. *Pan African Medical Journal*, 30.

**Aims:** “to evaluate the effect of Kangaroo Mother Care (KMC) on physiological parameters of premature infants in Fatemiyeh Hospital in Hamadan in 2016”

**Method:** A quasi-experimental design (one experimental and one control group with 100 patients)

**Relevant to the research:** Introduction of Kangaroo care in NICU setups has the potential of improving both the wellbeing of the mother and premature baby.

**Article 21:** Phuma-Ngaiyaye, E. and Welcome Kalembo, F., 2016. Supporting mothers to bond with their newborn babies: Strategies used in a neonatal intensive care unit at a tertiary hospital in Malawi. *International Journal of Nursing Sciences*, 3(4), pp.362-366.

**Aims:** “to investigate the strategies for supporting maternal–new-born bonding for mothers whose neonates were admitted to an intensive care unit at a tertiary hospital in Malawi”

**Method:** An explorative qualitative design consisting of 10 mothers and five nurses/midwives). In-depth interviews and audio recordings were collected.

**Relevant to the research:** Mother new-born interaction (breastfeeding and maternal involvement in baby care) and mother nurse/midwife interaction (effective communication and psychological support).

**Article 22:** Psychogiou, K., Ashworth, C., Weaver-Lowe, L., Carroll, C., Callow, C. and Edi-Osagie, N., 2020. Novel use of Facetime in supporting maternal-infant bonding. *Journal of Neonatal Nursing*, 26(2), pp.106-108.

**Aims:** “to explore the use of technology assisted communication, describe our experience, and make recommendations for its future development and use in neonatal units”

**Method:** A cross-sectional survey conducted between December 2014 and February 2015, which used pre and post intervention questionnaire.

**Relevant to the research:** The use of technology can be an intervention that allows technology to provide reassurance and promotes bonding between maternal and their newborn which supports the use of telemedicine systems.

**Article 23:** Tessier, R., Cristo, M., Velez, S., Giron, M. et al., 1998, Kangaroo mother care and the bonding hypothesis, *Pediatrics*, United States, 102(2), p. e17.

**Aims:** “the purpose of this study was to examine the relationship between intervention with Kangaroo” Mother Care (KMC) and the subsequent mental development of the infants”

**Method:** A randomized controlled trial conducted of 488 infants weighing <2001g, with 246 in the KMC group and 242 in the traditional care (TC) group.

**Relevant to the study:** KMC creates a climate where parents become progressively more aware of the baby and more prone to sensitive caring. It allows developmentally optimal

care in which parents are helped to 'manage' their biological parenting abilities and promotes the cooperation between nurses and parents.

**Article 24:** Vaškelytė, A., Butkevičienė, R. and Klemmac, D., 2009. Assessing needs of families with premature newborns in the Neonatal Intensive Care Unit. *Medicina*, 45(4), p.320.

**Aims:** "to identify needs of families with premature new-born's in the Neonatal Intensive Care Unit, perceived by parents and nurses"

**Method:** The NICU Family Needs Inventory was used for data collection. The instrument included five dimensions of needs. Reliability of the scale was identified as 0.94 using Cronbach's.

**Relevant to the research:** Assurance emerge as the most important need of the parent as to comfort that was perceived as the least important by parents and nurses.

**Article 25:** Wigert, H., Johansson, R., Berg, M. and Hellstrom, A., 2006. Mothers' experiences of having their newborn child in a neonatal intensive care unit. *Scandinavian Journal of Caring Sciences*, 20(1), pp.35-41.

**Aims:** "to describe mothers' experiences when their full-term new-born child was cared for in a NICU during the postpartum maternity care period"

**Method:** A phenomenological hermeneutic interview study. 10 mothers were interviewed once, 6 months to 6 years after the experience.

**Relevant to the research:** Kangaroo Mother Care has been associated with positive health outcomes of mothers and premature infants at the NICU, it has also reportedly been associated with improved mother-infant bonding and closeness.