

**Kangaroo Care Impact on Maternal Health: An Integrative Review**

An Integrative Review

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Alexis Lawson

Liberty University

Lynchburg, VA

June, 2023

**Kangaroo Care Impact on Maternal Health: An Integrative Review**

An Integrative Review

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Alexis Lawson

Liberty University

Lynchburg, VA

June, 2023

Scholarly Project Chair Approval:

---

Dr. Vickie Moore, RN, DNP, FNP-C

June 27, 2023

## Table of Contents

Abstract.....	5
Dedication.....	6
Acknowledgments.....	7
Kangaroo Care Impact on Maternal Health: An Integrative Review .....	8
Background.....	9
Defining Concepts and Variables .....	11
Rationale for Conducting the Review.....	11
Purpose of the Integrative Review and Clinical Question.....	12
Inclusion and Exclusion Criteria.....	12
Conceptual Framework.....	13
Section Two: Literature Review .....	13
Search Strategy .....	13
Critical Appraisal .....	14
PRISMA.....	15
The Collected Data .....	15
Synthesis .....	15
Summary.....	16
Section Three: Data Analysis and Synthesis .....	17
Thematic Analysis .....	17
Descriptive Results .....	22
Synthesis .....	22
Ethical Considerations .....	24
Timeline .....	24
Section Four: Discussion .....	25
Summary of Evidence.....	25
Implications for Practice.....	26
Limitations .....	27
Dissemination Plan .....	27
Conclusion .....	28
References.....	29

Appendix A..... 36

Appendix B..... 54

Appendix C..... 55

Appendix D..... 56

### **Abstract**

Health care should progress and change as the needs of the population change. As light is shed on the mothers' experiences during the postpartum period, there is an increasing need to find and implement evidence-based interventions to promote their health and wellness. As a vulnerable population, postpartum women require appropriate treatments and interventions to avoid postpartum complications. Three key themes of postpartum health and well-being that directly and significantly impact mothers are postpartum depression, maternal and infant attachment, and exclusive breastfeeding. This integrative review addressed the correlation between each of these themes and how kangaroo care, upright skin-to-skin contact, impacts them. Inconsistent use of kangaroo care as an intervention for mothers postpartum was discovered in this review, as it is typically used for infants. Statistical evidence supporting the use of kangaroo care to improve overall maternal health was discussed in this integrative review.

*Keywords:* kangaroo care (KC), postpartum depression, maternal and infant attachment, exclusive breastfeeding

### **Dedication**

I would like to begin by dedicating this integrative review to my husband, Justin, and my friends and family, who have supported me throughout this journey. Justin, thank you for your sacrifice, encouragement, and support every step of the way. Thank you for helping me learn that progress is always greater than perfection and that the Lord can use our gifts for His glory. Thank you for helping me reach my goals and keep persevering despite the loss we have faced along the way. This journey would not have been possible without the help that comes from the Lord and His tangible support through the people He placed in my life.

### **Acknowledgments**

I would like to give a profound thank you to my project chair, Dr. Vickie Moore, who has been the greatest mentor from the start to finish of building my integrative review. She has provided constant support, guidance, and care throughout the process. I know that I could not have accomplished this project without her leadership and mentorship.

### **Kangaroo Care Impact on Maternal Health: An Integrative Review**

As health care evolves and changes, it is imperative that health care professionals stay up to date with and implement evidence-based practices. Toronto and Remington (2020) noted that nursing relies on integrative reviews (IRs) to guide practice and reveal knowledge gaps. When evidence is identified and synthesized, health care providers can turn evidence into clinical practice and improve the care they give their patients.

A recurrent and growing problem in the United States is the incidence of premature birth. The Centers for Disease Control and Prevention (CDC, n.d.-b) defined premature birth as when an infant is born before 37 weeks of pregnancy. In 2021 in the US, preterm birth affected about one out of every 10 infants. The rate of preterm births rose 0.4% from 10.1% in 2020 to 10.5% in 2021. The World Health Organization (WHO, 2018) stated that preterm birth complications are the leading cause of death among children under the age of 5. Premature infants suffer from acute and chronic health concerns and have an increased risk of morbidity and mortality compared to term infants. Premature birth can also place an enormous strain on the family. Parents of premature infants are at risk for anxiety, depression, posttraumatic stress disorder, and overall poor health and well-being that often last for a considerable time, even after the infant is home from the hospital (Henderson et al., 2016).

Kangaroo care (KC) began in the early 1970s as “extra contact” between mothers and infants after premature birth, according to Kostandy and Ludington-Hoe (2019). Extra contact was first researched in the US and was described as early skin-to-skin holding of the infant on the mother’s bare chest. In the mid-1970s, authors note that similar research came from Bogota, Colombia. Instead of the term *extra care*, this study used the term *kangaroo care*. KC is the method of holding infants upright, skin-to-skin, on the mother’s bare chest. The term *kangaroo*



*care* reflects the way kangaroos with marsupial pouches carry their preterm offspring inside their pouch. Their offspring attach to a nipple with their bellies up against their mother's ventral surface, allowing the offspring to be fed by their mother's milk exclusively until they are old enough to leave their mother's pouch.

The impact of this literature review could be significant not just in the US but worldwide. Globally, an estimated 15 million babies are born prematurely each year, and many who survive suffer from lifelong disabilities. In low-income settings, survival rates of preterm infants are grim; half of infants born at or below 32 weeks of gestation die due to a lack of cost-effective care such as warmth and breastfeeding support or due to infection or breathing difficulties (WHO, 2018). While the benefits of KC for premature infants have been well established and publicized in the literature, maternal benefits have not been discussed as prominently in the literature. Therefore, the purpose of this IR is to review current research on the impact and efficacy of the maternal benefits of KC and discuss the maternal advantages of integrating KC into preterm infant care.

## **Background**

Over the past few decades, the impact of KC on mother and infant health and well-being has been researched. During the 1970s, research focused on KC's bond incentive (Kostandy & Ludington-Hoe, 2019). The events immediately postpartum significantly impact parental behaviors, subsequently impacting child development. Parental affection could be impacted if the initial bonding during the sensitive immediate postpartum period is interrupted, and later infant development could be suboptimal. One benefit of KC is its ability to produce the healthy relationships between mother and infant needed for neuroprotection of the infant's rapidly developing brain (Kostandy & Ludington-Hoe, 2019). During the 1980s, research continued to

grow around bonding, with findings revealing that KC early after birth resulted in higher maternal behavior scores immediately postpartum and through the next 28 to 32 days. Infant health was also researched during this decade. This research showed a 70% drop in preterm infant mortality in the first year after KC was implemented. Research started focusing on additional impact on infants around temperature regulation, prevention of heat loss, and breastfeeding.

In the 1990s, KC research focused on advancements in three key areas (Kostandy & Ludington-Hoe, 2019). The first area of research concentrated on the effects of KC on physiologic and behavioral state outcomes as measured by heart rate, respiratory rate, oxygen saturation, weight, infection rate, cortisol levels, frequency of crying, and sleep parameters. The second area was the effects of KC on breastfeeding, and the third was the impact on bonding. These areas of research led investigators into the 21st century. During the first decade of the 21st century, researchers learned that KC positively affects motor and mental development, pain management, physiological parameters, and breastfeeding. Later in the decade, studies showed that KC should be a fundamental right of infants and an essential aspect of care for low-birth-weight infants and full-term infants in all levels of care and countries. In the second decade of the 21st century, research continued in all previous areas related to KC, and new areas of research were added. The new areas of KC research include infants with congenital heart defects, infants suffering from neonatal abstinence syndrome, and considerations of KC and the microbiome.

Despite the many historical benefits of KC, there are significant barriers to implementing KC in the clinical setting. One barrier is nurses' lack of belief that KC is based on scientific facts (Chan et al., 2017). Combating the misconception that KC should be implemented based on

preference and perception rather than evidence-based scientific fact requires widespread dissemination of knowledge. Knowledge dissemination is also needed in regard to how KC impacts maternal health due to its effect on postpartum depression (PPD), maternal-infant attachment, and success in breastfeeding.

### **Defining Concepts and Variables**

The conceptual definition of KC is a method of care for preterm infants. The operational definition of KC is a way in which a parent can hold their infant upright directly against their bare skin. Many variables need to be addressed related to the use of KC in the neonatal intensive care unit (NICU). The first important variable is who is holding the infant. To mitigate this variable, this IR will address the benefits of KC when performed by the infant's biological mother or father. Variables that impact infant health and response to KC include gestational age, birth weight, clinical stability, and comorbid conditions. To diminish variables in research, only studies that address KC benefits in clinically stable infants who are not suffering from any underlying conditions other than prematurity are included in this IR.

### **Rationale for Conducting the Review**

The benefits of KC regarding infant health have been thoroughly researched, and evidence supports the use of KC to improve the health of premature infants. Previous meta-analyses found that KC reduces the risk of morbidity and mortality among low-birth-weight infants. Randomized controlled trials revealed that KC is associated with improved breastfeeding, cardiorespiratory stability, and pain response (Boundy et al., 2016).

Historical evidence supports the need for improved postpartum care for mothers of premature infants in the NICU. Qualitative research in this area has identified key themes such as “helplessness and horror,” “shattered expectations,” and “prolonged uncertainty” (Henderson et

al., 2016, p. 2). These themes play a significant role in how mothers and fathers of NICU infants cope after the birth of their child. Mothers of infants in the NICU face the need to physically heal from childbirth with the added burden of emotionally and mentally healing from unexpected birth outcomes and uncertain infant health.

The rationale for conducting this review is to advocate for maternal health and the well-being of postpartum mothers of premature infants in the NICU. Research on KC is continually growing and expanding to include maternal health and benefits for premature infants. This IR summarizes the current literature on KC's positive short-term and long-term effects on maternal health. Understanding the infant and maternal health benefits of KC may assist in raising awareness of KC as an evidence-based practice that should be implemented early and often in the postpartum period.

### **Purpose of the Integrative Review and Clinical Question**

The purpose of this IR is to review current research on the impact and efficacy of the maternal benefits of KC and discuss the maternal advantages of integrating KC into preterm infant care. This IR provides a valuable literature review to inform health care providers of best practices regarding implementing KC in the NICU setting to improve maternal postpartum health, infant and maternal bonding, and exclusive breastfeeding. The clinical question guiding the purpose of the IR is: For postpartum women utilizing KC in the NICU, what are the psychosocial and physiological benefits?

### **Inclusion and Exclusion Criteria**

The literature selected for this IR was filtered through various inclusion and exclusion criteria. The inclusion criteria applied to the literature review included sources that were published within the last 5 years, peer reviewed, full text, and available in English. Sources

included were journal articles and research studies. The majority of the sources were gleaned from the Jerry Falwell Library and Google Scholar. Exclusion criteria included any publications over 5 years old and works exclusively expert opinions. Literature not focused on the maternal benefit of KC was also excluded from this IR.

### **Conceptual Framework**

Whittemore and Knafl (2005) developed a modified framework to address issues specific to the IR method. The Whittemore and Knafl framework was used throughout the IR process to ensure proper steps were taken to identify quality literature. The IR conceptual framework includes five key components: problem identification, literature search, data evaluation, data analysis, and presentation. When quality literature is found and fits the inclusion and exclusion criteria, it must be evaluated and analyzed thoroughly to ensure quality data are obtained and used to draw conclusions in response to the clinical question being asked. Literature reviews guide clinical practice and directly impact patient care; therefore, the correct steps need to be taken in the IR to avoid any potential bias or error. Regarding KC in the NICU, it is crucial that literature and data point to evidence and not preference to set a precedent of how providers should best care for preterm infants for optimal infant and maternal outcomes.

## **Section Two: Literature Review**

### **Search Strategy**

A comprehensive literature review of various databases was performed utilizing Google Scholar and the Liberty University online Jerry Falwell Library. The key databases used were CINHAL, PubMed, and EBSCO QuickSearch. Each database was an integral part of the review and added valuable literature to support the use of KC for maternal benefit. The databases provided numerous results that were narrowed down through the search parameters. Parameters

were set for full-text, peer-reviewed articles published within the past 5 years. The key phrases used were *effects of kangaroo care on maternal health* and *impact of KMC on breastfeeding*. The articles identified by the search were analyzed by their titles and abstracts for relevance to the clinical question. When articles were deemed initially relevant, they were assessed further through an analysis of the full text and whether they met the inclusion or exclusion criteria.

### **Critical Appraisal**

Articles were selected based on inclusion and exclusion criteria and assessed for applicability and relevance related to key characteristics. Twenty-three articles were selected for this IR and evaluated for level of evidence. The initial search through the Jerry Falwell Library and Google Scholar provided many articles that needed to be analyzed for relevance to the project. The 23 articles selected were noted to provide strong evidence informing the clinical question. The articles were organized on a literature matrix that allowed the researcher the ability to analyze each study closely. Each study was analyzed for its purpose, sample population, research method, and research results. The literature matrix also addressed the level of evidence according to the Melnyk framework, limitations, and assessment of each study's overall quality. The literature matrix can be found in Appendix A for reference. According to a University of Michigan Library (2022) resource, there are a total of seven levels of evidence in Melnyk's hierarchy. The articles obtained for the literature review provided pertinent evidence regarding using KC for maternal benefit; however, they varied in their levels of evidence. This IR includes four articles that are Level 1, seven that are Level 2, six that are Level 3, three that are Level 4, and three that are Level 6.

## **PRISMA**

It is crucial to assess each source for potential bias as they are identified and added to the literature matrix. A customizable tool that focuses on the reporting of reviews and evaluating the effects of interventions and potential bias is called PRISMA. PRISMA stands for Preferred Reporting Items for Systematic Review and Meta-Analyses (Page et al., 2021). The PRISMA tool allows researchers to identify and screen studies for the IR that address the clinical question.

The critical appraisal process along with the inclusion and exclusion criteria set in place were used to guide the selection of articles for this review. Of the 6,208 sources identified through research, 200 were screened by their titles and abstracts and selected for full-text review. Once the full-text review was completed, 23 articles were selected to be included in the literature matrix. The PRISMA flow diagram for this literature review is provided in Appendix B.

## **The Collected Data**

During data collection, the project leader maintained a list of citations for sources addressing the clinical question. The sources were evaluated for relevance and accuracy and added to the literature matrix. The literature matrix was saved and reevaluated throughout the process to ensure high-quality evidence was used for the literature review. The final 23 articles were kept in the literature matrix (Appendix A) and added to the references list as well.

## **Synthesis**

The overwhelming conclusion of the literature review is that KC significantly impacts not only infant health but also maternal health and well-being. Maternal health can often be overlooked in the NICU setting, and patient care is often strictly focused on the infant. However, the literature suggests that mothers benefit significantly from KC in the areas of attachment, breastfeeding, and PPD.

Maternal attachment is shaped through the first days postpartum, and a mother's perception of their infant impacts their attachment level (Mehrpişeh et al., 2022). KC significantly improves overall maternal attachment levels while preserving long-term attachment, which decreases the mother's stress level. KC also impacts the rates and success of exclusive breastfeeding. A meta-analysis reported that infants who received KC were 50% more likely to be exclusively breastfed than infants who did not (Çağan & Genç, 2022). Exclusive breastfeeding for a minimum of 6 months is recommended by the World Health Organization (n.d) and is correlated with increased growth and development of the infant.

Additionally, KC significantly impacts maternal mental health. KC is a low-cost intervention that is feasible for most mothers during the postpartum period. KC reduces maternal depressive symptoms and physiological stress, thereby facilitating maternal well-being (Kirca & Adibelli, 2021). Improving maternal attachment, breastfeeding, and PPD significantly impacts mothers' ability to cope with having an infant in the NICU. Therefore, it is imperative that the benefit of KC on maternal health is researched and findings are disseminated to ensure barriers can be overcome and maternal postpartum health can be improved for mothers of NICU infants.

### **Summary**

In summary, the literature supports the use of KC as an effective intervention in improving maternal health during the postpartum period. The literature points to the benefit of KC in the NICU setting, where mothers of premature or ill infants face challenges not necessarily encountered by mothers of term and healthy infants. Literature provides the necessary evidence-based interventions that can be performed in the NICU setting.

Compared to mothers of healthy infants, mothers of infants in the NICU are at a higher risk for health concerns that are often overshadowed as they are trying to care for their ill infant



(Verbiest et al., 2020). Parents who give birth to an unexpected preterm infant suffer from the psychological impact of the birth and feel their role as a parent is uncertain (Mu et al., 2019). KC enhances parental competency while meeting the physical needs of the mother. The major themes found in the literature regarding the maternal benefit of KC are reduced PPD and anxiety, positive attachment and bonding behaviors, and a positive correlation with effective breastfeeding.

### **Section Three: Data Analysis and Synthesis**

#### **Thematic Analysis**

The thematic analysis of the IR addressed the impact of KC on three key postpartum areas: depression, maternal and infant attachment, and exclusive breastfeeding. These three aspects of postpartum can be viewed as a triad, as they significantly impact one another. A thematic analysis was conducted using data on the implementation of KC during the postpartum period to identify patterns in the data. Data that are replicable provide strong evidence of the efficacy of an intervention.

#### ***Postpartum Depression***

When caring for postpartum mothers, it is essential to recognize the areas of postpartum health that impact overall well-being and how they impact other areas of health. PPD has a significant impact on the overall health of a mother. PPD impacts bonding and can be a significant barrier to how a mother attaches to their infant during the postpartum period, impacting attachment throughout the child's life.

A randomized control trial by Chen et al. (2022) researched the effects of KC on 128 mothers of premature infants in the NICU. The study's main focus was investigating the effects of KC on psychological stress response and sleep quality. The study showed that mothers who

performed KC with their infant while in the NICU had healthier psychological stress responses once separated from their infant; they were able to sleep better and experienced less stress, which enhanced their physical and mental health.

Badr and Zauszniewski (2017) performed a meta-analysis of 44 studies on the predictors of PPD. Researchers found that during KC, the skin-to-skin contact triggered the release of oxytocin, which was hypothesized to minimize the risk of PPD and stress. Research indicates a correlation between KC and the decreased risk and rate of PPD. Cho and Jeong (2021) performed a controlled trial on 101 mothers who participated in KC for 1 hour for 14 days postpartum; the results showed that KC decreased the rate of PPD. Rao et al. (2019) administered anxiety and depression scales to mothers with premature infants in the NICU and noted that KC decreased both anxiety and depression in the mothers who participated. Cristóbal-Cañadas et al. (2022) completed a cohort study on 112 premature infant-mother dyads who performed KC for more than 90 minutes a day. The results revealed that the length of KC helped lower rates of PPD while also lowering cortisol levels in the mothers. Although PPD is not always preventable, Mallonga-Matilac et al. (2021) performed a cohort study that showed a decrease in the severity of depression in mothers who participated in KC.

While decreasing early PPD is important, it is also essential to decrease the rates of late PPD. Xie et al. (2019) enrolled 151 infants and mothers in their study and found that early parental engagement and interaction decreased mothers' risk of late PPD. Mehler et al. (2019) performed a randomized control trial with 88 preterm infants. Mothers-infant dyads were split into two groups; one group received 60 minutes of delivery room skin-to-skin while the other received 5 minutes of visual contact. The group that received KC had a lower rate of both early PPD and impaired bonding, even at 6 months of corrected age. It is important that health care

providers be familiar with these findings and understand that even if the infant is present in the room with the mother, it is imperative that they also perform KC if they are clinically stable enough.

### ***Maternal-Infant Attachment***

Attachment is the established and developed pattern of interaction and communication between the mother and the infant. A sustainable attachment is crucial for the mother to create early in the postpartum period to foster mental and physical growth for the infant. A positive attachment leads to improved acute and long-term outcomes for the infant, promoting social, cognitive, and behavioral development. When KC is implemented, it creates an environment for a positive attachment to grow and continue throughout the lifetime.

The impact attachment has on mothers during the postpartum period is significant. Faisal-Cury et al. (2021) noted that PPD and child developmental delay might be correlated due to weaker maternal attachment its impact on mothers' ability to care for their infant. Mothers with a positive attachment have improved overall health and well-being, higher rates of breastfeeding, and lower rates of maternal depression. Erduran and Yaman Sözbir (2022) performed a randomized control trial using intermittent KC; KC was applied for 30 minutes daily for just 10 days in the experimental group. Even this short amount of time significantly impacted the experimental group. The Maternal Attachment Inventory was administered to all mothers in the study. The mothers in the experimental group with KC scored higher on the Maternal Attachment Inventory, indicating stronger attachment to their children.

Stroud et al. (2020) performed a randomized control trial with 146 mother-infant dyads and found a significant increase in maternal attachment with KC. Mehrpisheh et al. (2022) studied 100 mothers of premature infants admitted to the NICU using a quasi-experimental

design and found a statistically significant relationship between KC and maternal attachment, leading to increased breastfeeding rates and infant weight at the time of discharge. Zehra and Rukiye (2020) performed a descriptive study of 335 term infant-mother pairs who had either cesarean or vaginal deliveries; the study showed that regardless of the delivery method, KC increased maternal-infant bonding and overall maternal well-being. Overall, it is noted that regardless of the method of delivery and whether the infant is term or preterm, KC improved maternal-infant attachment.

### ***Exclusive Breastfeeding***

Exclusive breastfeeding has many health benefits for both a mother and her infant. According to the CDC (n.d.-a), breastfeeding can decrease a mother's risk of breast cancer, ovarian cancer, type 2 diabetes, and high blood pressure. Breastfeeding benefits the premature infant by lowering their risk of asthma, obesity, type 1 diabetes, severe lower respiratory disease, acute otitis media, sudden infant death syndrome, gastrointestinal infections, and necrotizing enterocolitis. The CDC's recommendation is that a mother exclusively breastfeed until the infant is 6 months of age and continue to incorporate breastmilk into the child's diet until the child is 2 years old. Due to the health benefits and recommendations of the CDC, it is important that providers assist women in their breastfeeding journey and help them find success. KC has been a proven intervention to help increase the length of time a mother breastfeeds, decrease the time it takes for infants to successfully breastfeed, increase milk production, and increase a mother's confidence with breastfeeding.

Many studies show that KC is effective in helping mothers exclusively breastfeed for 6 months. Çağan and Genç (2022) performed a randomized control trial with 132 mothers. They noted that attachment scores and exclusive breastfeeding rates were higher at 6 months for

women who practiced KC at birth compared to the control group. Gacutno-Evardone et al. (2021) performed a meta-analysis of randomized controlled trials involving 1,202 neonates, which revealed that mothers who participated in KC were 1.9 times more likely to exclusively breastfeed from birth until 6 months compared to mothers who did not participate in KC. Kucukoglu et al. (2021) performed a quasi-experimental study to assess the success of breastfeeding from birth until 6 months and found that the infants in the KC group had higher breast milk intake and breastfeeding rates at all increments of time from discharge to 6 months of age.

Initiating breastfeeding early and often is important during the initial postpartum period. Iqbal et al. (2022) performed a quasi-experimental study to assess the frequency of successful breastfeeding and the time to initiate breastfeeding. The mean time for successful breastfeeding was significantly less for the KC group compared to the conventional group; KC helped mothers achieve higher frequencies of successful first feeds and decreased the time it took to initiate those feeds. Mekonnen et al. (2019) studied eight different pieces of literature and also found that KC decreased the amount of time it took to initiate BF among preterm and low-birth-weight infants. do Nascimento Nunes et al. (2017) performed a study that found the longer a mother-infant dyad spent time in the KC position, the more the newborn made physical contact attempts with their mother during breastfeeding, thereby improving the success of breastfeeding.

Milk production can frequently be a stressor for mothers, and mothers who breastfeed will try a plethora of interventions to find one that successfully increases their milk supply. Coşkun and Günay (2020) performed a randomized control trial with 84 infants who were premature and unable to physically breastfeed. The study examined the effects of KC on maternal stress levels and milk production. Despite being unable to physically breastfeed,

mothers who performed KC had lower scores on the Parental Stressor Scale and had higher breast milk production on average than the standard care group. KC can not only increase the rate of exclusive breastfeeding and success of breastfeeding but can also improve milk production for mothers who cannot put the infant to the breast due to their prematurity or instability. Mansoori and Salmani (2020) performed a quasi-experimental study that provided statistically significant results supporting the use of KC to increase milk expression and volume for mothers of premature infants. Yilmaz et al. (2020) studied mothers' perceptions as they breastfed, noting that mothers who performed KC had higher self-efficacy and a more positive perception of their breastfeeding journey, which could potentially improve the length of exclusive breastfeeding and satisfaction of the mother.

### **Descriptive Results**

The literature points toward the effectiveness of KC as an intervention to improve maternal well-being. KC is a cost-effective intervention that is proven to be safe and effective in decreasing maternal PPD, increasing maternal-infant attachment, and improving exclusive breastfeeding rates until infants are 6 months of age. The studies covered in this IR are diverse; they assess the impact of KC on mothers of term infants, preterm infants, infants within the United States and those in other countries, and infants born vaginally or via cesarean section. Despite the differences in the patient populations, each study proved that KC was more beneficial for the mother than conventional care. Each of the 23 studies can be used to support the implementation of KC into a mother's care postpartum.

### **Synthesis**

Maternal health can be overlooked during the postpartum period, as attention becomes focused on the infant. However, maternal health and well-being can significantly impact the

infant's short-term and long-term health. The three key areas that impact maternal health and influence infant health are PPD, maternal-infant attachment, and exclusive breastfeeding; KC is an evidence-based intervention that can be used during the postpartum period to improve these areas of maternal and infant health.

### ***Postpartum Depression***

Mothers with PPD suffer from many symptoms that impact their quality of life, such as insomnia, irritability, loss of appetite, and fatigue. PPD is often accompanied by anxiety, significantly impacting a new mother's quality of life and ability to care for her child. PPD frequently creates barriers to attachment and impairs a mother's ability to breastfeed. KC improves maternal sleep quality and stress response, which can directly lower rates of PPD (Chen et al., 2022). PPD rates are lower in mothers who participate in KC, and the severity of PPD is also decreased.

### ***Maternal-Infant Attachment***

A healthy maternal-infant attachment is essential for a child's cognitive, social, and emotional development (Cury et al., 2021). A healthy maternal attachment starts during the early postpartum period and can provide lifelong benefits for both the mother and the infant. A mother's attachment to their infant impacts their emotional and physical connection, which can impact the mother's perception of their infant and their ability to care for them. Maternal-infant attachment is also strongly linked to successful exclusive breastfeeding (Mehrpsheh et al., 2022). KC is a successful intervention for improving maternal-infant attachment for mothers of both term and preterm infants.

### ***Exclusive Breastfeeding***

The third area of significant interest for infants is breastfeeding; exclusive breastfeeding is promoted and encouraged due to its many health benefits for the mother and the infant. However, not all mothers can successfully breastfeed, and many negatively perceive their breastfeeding ability. KC has proven to improve breastfeeding outcomes, increase the length of exclusive breastfeeding, and increase maternal milk production (Mansoori and Salmani 2020). KC facilitates early and frequent breastfeeding attempts by infants even if they are born prematurely, improving the overall success of breastfeeding (do Nascimento Nunes et al., 2017).

### **Ethical Considerations**

In order to perform an IR with integrity, it is crucial that the researcher adhere to all ethical and regulatory guidelines regarding conducting research. The project leader and chair completed all required Collaborative Institutional Training Initiative (CITI) modules to gain additional knowledge and insight on properly conducting research according to biomedical and health service principles (Appendix C). CITI provided a foundation and guide for the project leader to conduct the initial review of research. Once the data collection was complete, the project leader defended the project the project chair and submitted it to the Liberty University Institutional Review Board for approval (Appendix D). No human subjects were utilized in this study, and the IR was approved to proceed as proposed.

### **Timeline**

This IR was planned and completed over four Doctor of Nursing Practice courses. Each course created benchmarks to meet to remain on track for completion. Each step of the IR process was completed according to the following timeline:

- Initial development of IR: August 2022



- Section One and Two completed: November 2022
- First defense: February 2023
- Institutional Review Board approval: February 2023
- Section Three completed: March 2023
- Section Four: April 2023
- Final draft submitted to project chair: May 2023
- Final draft sent to editor: June 2023
- Final defense: June 2023
- End of academic term: August 2023

#### **Section Four: Discussion**

##### **Summary of Evidence**

The literature analyzed within this IR provides strong evidence to support KC use during the postpartum period for mothers of both term and preterm infants. The IR demonstrates that KC is a cost-effective, evidence-based intervention with both short-term and long-term benefits for mothers and their infants. The use of KC has evolved through the years. Evidence has shown benefits for preterm infants, term infants, and even infants who suffer from congenital defects or neonatal abstinence syndrome; the evidence has now grown to include the benefits that KC has on maternal health and well-being.

Each of the themes addressed in this IR, PPD, maternal-infant attachment, and exclusive breastfeeding, offers evidence that supports the need to implement KC into the postpartum care mothers receive. PPD significantly impacts a mother's ability to care for her infant and can compromise the infant's well-being. Maternal depression affects the subsequent two themes of maternal-infant attachment and exclusive breastfeeding; it can be detrimental and is a significant

issue woman face. Maternal and infant attachment is crucial for the short-term and long-term bond mothers and infants create. A positive maternal attachment improves how a mother views her infant and how she is able to care for her infant. Maternal and infant attachment impacts the mental and physical growth of the infant and can impact the infant's long-term social, cognitive, and behavioral development. Both PPD and maternal attachment play significant roles in the success of exclusive breastfeeding. Breastfeeding improves a mother's physical health while reducing their ongoing risk of disease, similar to how breastfeeding improves infant health and reduces their risk of acute and chronic diseases.

### **Implications for Practice**

The aim of this IR was to evaluate the impact of KC on maternal health and well-being and provide a foundation of evidence that will help shape how mothers are cared for during the postpartum period. Mothers can often be overlooked during the postpartum period as attention shifts to their infants, especially when the infant is in the NICU. Historically, KC has been researched and used to improve infant health with little thought on how it directly impacts the mother. Unless KC is indicated for infant health and well-being, it is not generally suggested as a postpartum intervention to improve maternal health and well-being. The literature analyzed within this IR provides strong evidence to support the use of KC during the postpartum period as a preventative and supportive intervention for mothers. KC can significantly improve maternal postpartum well-being by decreasing the rate and severity of PPD, improving maternal and infant attachment, and improving milk production to improve the success of exclusive breastfeeding. Frequent and extended use of KC improves maternal health, thereby improving infant health.

**Limitations**

Limitations of this IR were assessed as the research was obtained. When performing an IR, the limitations must be considered when evaluating the overall findings and implications for practice. It is important to note the limitations and assess how they could impact the integrity of the IR.

The initial limitation that the project leader faced was the limited number of articles that focused on the maternal benefit of KC. A plethora of research is available to support the use of KC; however, the rationale for the implementation of KC is mainly focused on the direct benefits and impact it has on infants. In addition to this overall limitation of the IR, limitations were noted within the studies analyzed. Each study discussed potential limitations to the research, whether it was a small sample size, variability in women sampled, or barriers that could have resulted in bias. A limitation of many of the studies was the inability to implement blinding in the research, increasing the risk of bias. Despite the barriers and limitations noted in the research, the benefit of KC is clear. KC is a safe, cost-effective, and accessible intervention without disadvantages when implemented in appropriate patient populations.

**Dissemination Plan**

The research results found within this IR are intended to bring awareness to KC's impact on maternal health and well-being. The research findings in this review have the potential to impact both the short-term and long-term health of mothers and infants and should act as foundational research for future projects and studies that implement the evidence into action. The project leader intends to share the IR with a local hospital and champion change. The IR addresses the need to improve the care provided to a vulnerable population in the immediate

postpartum period. The project leader also intends to submit this IR to the American College of Obstetrics and Gynecology's *Obstetrics and Gynecology* journal for review and publication.

### **Conclusion**

The impact of PPD, impaired maternal and infant attachment, and unsuccessful exclusive breastfeeding can be lifelong for mothers and their infants. If maternal postpartum concerns are not addressed, they can lead to detrimental outcomes. The data in this study confirm the long-lasting benefits mothers receive from KC. Maternal postpartum health and well-being should be a priority within women's health, and providers should advocate for evidence-based interventions to be implemented. This IR can assist women's health providers in acknowledging the barriers to health women face during the postpartum period and recognize how KC can assist in eliminating those barriers.

### References

- Badr, H. A., & Zauszniewski, J. A. (2017). Kangaroo care and postpartum depression: The role of oxytocin. *International Journal of Nursing Sciences*, *4*(2), 179–183.  
<https://doi.org/10.1016/j.ijnss.2017.01.001>
- Boundy, E. O., Dastjerdi, R., Spiegelman, D., Fawzi, W. W., Missmer, S. A., Lieberman, E., Kajeepeta, S., Wall, S., & Chan, G. J. (2016). Kangaroo mother care and neonatal outcomes: A meta-analysis. *Pediatrics*, *137*(1), Article e20152238.  
<https://doi.org/10.1542/peds.2015-2238>
- Çağan, E. S., & Genç, R. (2022). The effects of kangaroo care at birth on exclusively breastfeeding, baby's growth and development according to attachment theory: A randomized controlled trial. *Early Child Development and Care*, *193*(3), 378–387.  
<https://doi.org/10.1080/03004430.2022.2093866>
- Centers for Disease Control and Prevention. (n.d.-a). *Nutrition recommendations and benefits*. U.S. Department of Health & Human Services. Retrieved September 15, 2022, from <https://www.cdc.gov/nutrition/infantandtoddlernutrition/breastfeeding/recommendations-benefits.html>
- Centers for Disease Control and Prevention. (n.d.-b). *Preterm birth*. U.S. Department of Health & Human Services. Retrieved September 15, 2022, from <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pretermbirth.htm>
- Chan, G., Bergelson, I., Smith, E. R., Skotnes, T., & Wall, S. (2017). Barriers and enablers of kangaroo mother care implementation from a health systems perspective: A systematic review. *Health Policy and Planning*, *32*(10), 1466–1475.  
<https://doi.org/10.1093/heapol/czx098>

- Chen, W., Wu, Y., Xu, M., & Tung, T.-H. (2022). Effect of kangaroo mother care on the psychological stress response and sleep quality of mothers with premature infants in the neonatal intensive care unit. *Frontiers in Pediatrics, 10*, Article 879956. <https://doi.org/10.3389/fped.2022.879956>
- Cho, H., & Jeong, I. S. (2021). The relationship between mother-infant contact time and changes in postpartum depression and mother-infant attachment among mothers staying at postpartum care centers: An observational study. *Nursing & Health Sciences, 23*(2), 547–555. <https://doi.org/10.1111/nhs.12847>
- Coşkun, D., & Günay, U. (2020). The effects of kangaroo care applied by Turkish mothers who have premature babies and cannot breastfeed on their stress levels and amount of milk production. *Journal of Pediatric Nursing, 50*, e26–e32. <https://doi.org/10.1016/j.pedn.2019.09.028>
- Cristóbal-Cañadas, D., Parrón Carreño, T., Sánchez Borja, C., & Bonillo Perales, A. (2022). Benefits of kangaroo mother care on the physiological stress parameters of preterm infants and mothers in neonatal intensive care. *International Journal of Environmental Research and Public Health, 19*(12), Article 7183. <https://doi.org/10.3390/ijerph19127183>
- do Nascimento Nunes, C. R., Campos, L. G., Lucena, A. M., Pereira, J. M., da Costa, P. R., de Lima, F. A. F., & de Oliveira Azevedo, V. M. G. (2017). Relationship between the use of kangaroo position on preterm babies and mother-child interaction upon discharge. *Revista Paulista de Pediatria, 35*(2), 136–143. <https://doi.org/10.1590/1984-0462/;2017;35;2;00006>

- Erduran, B., & Yaman Sözbir, Ş. (2022). Effects of intermittent kangaroo care on maternal attachment, postpartum depression of mothers with preterm infants. *Journal of Reproductive and Infant Psychology*. <https://doi.org/10.1080/02646838.2022.2035703>
- Faisal-Cury, A., Tabb, K., Ziebold, C., & Matijasevich, A. (2021). The impact of postpartum depression and bonding impairment on child development at 12 to 15 months after delivery. *Journal of Affective Disorders Reports*, 4, Article 100125. <https://doi.org/10.1016/j.jadr.2021.100125>
- Gacutno-Evardone, A. J. A., De Ocampo, F. S., & Villanueva-Uy, M. E. T. (2021). Effect of kangaroo mother care on the likelihood of breastfeeding from birth up to 6 months of age: A meta-analysis. *Acta Medica Philippina*, 55(9), 898–907. <https://doi.org/10.47895/amp.v55i9.3754>
- Henderson, J., Carson, C., & Redshaw, M. (2016). Impact of preterm birth on maternal well-being and women's perceptions of their baby: A population-based survey. *BMJ Open*, 6(10), Article e012676. <https://doi.org/10.1136/bmjopen-2016-012676>
- Iqbal, A., Iqbal, T., Bashir, F., Bilquees, Aslam, S., & Sehrish, A. (2022). Comparison of kangaroo mother care with conventional care in newborns in terms of frequency of successful first breastfeeding and time to initiate breast feeding. *Pakistan Armed Forces Medical Journal*, 72(3), 1008–1012. <https://doi.org/10.51253/pafmj.v72i3.6889>
- Kirca, N., & Adibelli, D. (2021). Effects of mother–infant skin-to-skin contact on postpartum depression: A systematic review. *Perspectives in Psychiatric Care*, 57(4), 2014–2023. <https://doi.org/10.1111/ppc.12727>

- Kostandy, R. R., & Ludington-Hoe, S. M. (2019). The evolution of the science of kangaroo (mother) care (skin-to-skin contact). *Birth Defects Research, 111*(15), 1032–1043. <https://doi.org/10.1002/bdr2.1565>
- Kucukoglu, S., Yilmaz Kurt, F., Aytakin Ozdemir, A., & Ozcan, Z. (2021). The effect of kangaroo care on breastfeeding and development in preterm neonates. *Journal of Pediatric Nursing, 60*, E31–E38. <https://doi.org/10.1016/j.pedn.2021.02.019>
- Mallonga-Matilac, N. R., Manuta-Baton, S. M., & Villanueva-Uy, M. E. T. (2021). Effect of kangaroo mother care on maternal anxiety and depression states at the neonatal ICU: A prospective cohort study. *Acta Medica Philippina, 55*(9), 916–922. <https://doi.org/10.47895/amp.v55i9.3736>
- Mansoori, M., & Salmani, N. (2020). Effect of breast milk expression during kangaroo mother care on milk volume in mothers with premature infants admitted to neonatal intensive care unit. *Journal of Evidence-Based Care, 10*(1), 44–50. <https://doi.org/10.22038/ebcj.2020.45519.2238>
- Mehler, K., Hucklenbruch-Rother, E., Trautmann-Villalba, P., Becker, I., Roth, B., & Kribs, A. (2019). Delivery room skin-to-skin contact for preterm infants—A randomized clinical trial. *Acta Paediatrica, 109*(3), 518–526. <https://doi.org/10.1111/apa.14975>
- Mehrpisheh, S., Doorandish, Z., Farhadi, R., Ahmadi, M., Moafi, M., & Elyasi, F. (2022). The effectiveness of kangaroo mother care (KMC) on attachment of mothers with premature infants. *European Journal of Obstetrics & Gynecology and Reproductive Biology: X, 15*, Article 100149. <https://doi.org/10.1016/j.eurox.2022.100149>
- Mekonnen, A. G., Yehualashet, S. S., & Bayleyegn, A. D. (2019). The effects of kangaroo mother care on the time to breastfeeding initiation among preterm and LBW infants: A



- meta-analysis of published studies. *International Breastfeeding Journal*, 14, Article 12.  
<https://doi.org/10.1186/s13006-019-0206-0>
- Mu, P., Lee, M., Chen, Y., Yang, H., & Yang, S. (2019). Experiences of parents providing kangaroo care to a premature infant: A qualitative systematic review. *Nursing & Health Sciences*, 22(2), 149–161. <https://doi.org/10.1111/nhs.12631>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., . . . Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Systematic Reviews*, 10, Article 89.  
<https://doi.org/10.1186/s13643-021-01626-4>
- Rao, P., Raajashri, R., Bethou, A., Bhat, V., & C, P. (2019). Does kangaroo mother care reduce anxiety in postnatal mothers of preterm babies? – A descriptive study from a tertiary care center in South India. *Journal of Nepal Health Research Council*, 17(1), 42–45.  
<http://103.69.125.201/index.php/jnhrc/article/view/491/447>
- Stroud, M., Voisard, C., & High, Q. (2020). *The effects of kangaroo care on parental-infant bonding the effects of kangaroo care on parental-infant bonding* [Poster presentation]. Wright State University—Lake Campus Research Symposium.  
[https://corescholar.libraries.wright.edu/cgi/viewcontent.cgi?article=1017&context=lake\\_research\\_symposium\\_abstracts](https://corescholar.libraries.wright.edu/cgi/viewcontent.cgi?article=1017&context=lake_research_symposium_abstracts)
- Toronto, C., & Remington, R. (2020). *A step-by-step guide to conducting an integrative review*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-37504-1>

University of Michigan Library. (2022, November 17). *Research guides: Nursing*.

<https://guides.lib.umich.edu/c.php?g=282802&p=1888246>

Verbiest, S., Ferrari, R., Tucker, C., McClain, E. K., Charles, N., & Stuebe, A. M. (2020). Health needs of mothers of infants in a neonatal intensive care unit: A mixed-methods study. *Annals of Internal Medicine*, 173(11 Suppl.), S37–S44. <https://doi.org/10.7326/M19-3252>

Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5), 546–553. <https://doi.org/10.1111/j.1365-2648.2005.03621.x>

World Health Organization. (2018, February 19). *Preterm birth*. Retrieved September 15, 2022, from <https://www.who.int/news-room/fact-sheets/detail/preterm-birth>

World Health Organization. (n.d). *Breastfeeding*. Retrieved September 15, 2022, from [https://www.who.int/health-topics/breastfeeding#tab=tab\\_1](https://www.who.int/health-topics/breastfeeding#tab=tab_1)

Xie, J., Zhu, L., Zhu, T., Jian, Y., Ding, Y., Zhou, M., & Feng, X. (2019). Parental engagement and early interactions with preterm infants reduce risk of late postpartum depression. *The Journal of Nervous and Mental Disease*, 207(5), 360–364. <https://doi.org/10.1097/nmd.0000000000000971>

Yilmaz, F., Küçükoğlu, S., AYTEKİN ÖZDEMİR, A., OĞUL, T., & AŞKI, N. (2020). The effect of kangaroo mother care, provided in the early postpartum period, on the breastfeeding self-efficacy level of mothers and the perceived insufficient milk supply. *The Journal of Perinatal & Neonatal Nursing*, 34(1), 80–87. <https://doi.org/10.1097/jpn.0000000000000434>

Zehra, C., & Rukiye, T. (2020). The effect of early kangaroo care provided to term babies on the maternal-fetal attachment. *International Journal of Caring Sciences*, 13, 24–34.

[http://www.internationaljournalofcaringsciences.org/docs/4\\_coktay\\_original\\_13\\_1.pdf](http://www.internationaljournalofcaringsciences.org/docs/4_coktay_original_13_1.pdf)

## Appendix A

Evidence Table

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
<p>Badr, H. A., &amp; Zauszniewski, J. A. (2017). Kangaroo care and postpartum depression: The role of oxytocin. <i>International Journal of Nursing Sciences</i>, 4(2), 179–183.  <a href="https://doi.org/10.1016/j.ijnss.2017.01.001">https://doi.org/10.1016/j.ijnss.2017.01.001</a></p>	<p>Gather evidence linking the effects of kangaroo care (KC) and postpartum depression (PPD) with underlying release of oxytocin</p>	<p>Multiple studies performed:            -Meta-analysis of 44 studies on PPD. -A study conducted with 12,361 women being scored for PPD.            -A longitudinal study on 594 women during PP period. -A longitudinal study on 6550 singleton births and level of PPD.            -A study on PPD impact on breastfeeding</p>	<p>Literature review and meta-analysis</p>	<p>Skin-to-skin contact during KC was found to trigger the release of oxytocin, which is hypothesized to minimize the risk for depressive symptoms as well as decrease maternal stress.</p>	<p>Level 1: Systematic review and meta-analysis</p>	<p>Limited number of studies are to address the effects of KC on the mother's psychological status during the Postpartum period</p>	<p>Yes, this study supports the clinical question being asked showing how KC improves maternal health</p>

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
		in 1447 mother-infant dyads. -A study of 90 mothers, 30 with term deliveries, 30 with preterm with incubator, and 30 preterm with KC					
Çağan, E. S., & Genç, R. (2022). The effects of kangaroo care at birth on exclusively breastfeeding, baby's growth and development according to attachment theory: A randomized controlled trial. <i>Early Child Development and Care</i> , 193(3), 378–387. <a href="https://doi.org/10.1">https://doi.org/10.1</a>	This study aims to determine the effects of KC at birth on exclusively breastfeeding, infant growth and development according to attachment theory.	132 pregnant women between 36 and 38 gestational weeks	Randomized control trial	A statistically significant difference was found between the groups in exclusive breastfeeding duration and mothers' attachment scale mean scores for 9 months.	Level 2: Randomized controlled trial	Study researched in a single center. Apart from this, some of the participants did not continue during the post-discharge follow-up and were from the study.	Yes, results were statistically significant for exclusively breastfeeding

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
<a href="https://doi.org/10.3389/fped.2022.879956">080/03004430.2022.2093866</a>							
Chen, W., Wu, Y., Xu, M., & Tung, T.-H. (2022). Effect of kangaroo mother care on the psychological stress response and sleep quality of mothers with premature infants in the neonatal intensive care unit. <i>Frontiers in Pediatrics, 10</i> , Article 879956. <a href="https://doi.org/10.3389/fped.2022.879956">https://doi.org/10.3389/fped.2022.879956</a>	To investigate the effect of kangaroo mother care (KMC) on the psychological stress response and sleep quality of mothers with premature infants admitted to the neonatal care unit (NICU).	126 mothers of premature infants in the NICU from January 2019 to January 2020	A randomized control trial	Total SCL-90 score and total AIS score were lower in the experimental group noting that KC can relieve adverse psychological stress and improve the sleep status of mothers of NICU premature infants after mother-infant separation	Level 2: Randomized control trial	Population was limited to mothers with premature infants at 28–34 weeks of gestation, and the findings may not be applicable to mothers with other weeks of gestation premature infants	Yes, the study shows a positive effect of KC on key maternal postpartum complications
Cho, H., & Jeong, I. S. (2021). The relationship between mother-infant contact time and changes in	Investigate the relationship between mother-infant contact time and changes in	101 mothers staying for 14 days at two postpartum care centers in Busan,	Observational study	By increasing daily KMC time by 1 h, postpartum depression	Level 3: Control trial	Depression and attachment were measured using a self-	Yes, the study notes a decrease in depression with increase of KC length

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
postpartum depression and mother-infant attachment among mothers staying at postpartum care centers: An observational study. <i>Nursing &amp; Health Sciences</i> , 23(2), 547–555. <a href="https://doi.org/10.1111/nhs.12847">https://doi.org/10.1111/nhs.12847</a>	postpartum depression and mother-infant attachment	Republic of Korea		was decreased by 4.02 points.		reported questionnaire. Which may have affected the measurement accuracy	
Coşkun, D., & Günay, U. (2020). The effects of kangaroo care applied by Turkish mothers who have premature babies and cannot breastfeed on their stress levels and amount of milk production. <i>Journal of Pediatric Nursing</i> , 50, e26–e32. <a href="https://doi.org/10.1">https://doi.org/10.1</a>	Examine the effects of KC on mothers who have premature babies and cannot breastfeed on their stress levels and amount of milk production.	84 infants who met the inclusion criteria of birth weight $\geq$ 1000 g, gestational age 27–36 weeks and postnatal age $\leq$ 28 days, infants who were feeding with a nasogastric tube,	Randomized control trial	The mothers in the KC group had higher breast milk production averages than the standard care group in all measurements. The mothers who applied KC had lower Parental	Level 2: Randomized control trial	Blinding was not feasible due to the KC intervention	Yes, results noted KC had positive impact on both physical and psychosocial health

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
<a href="#">016/j.pedn.2019.09.028</a>		orogastric tube or bottle and who were not breastfed by their mothers		Stressor Scale, subdimensions and total scale average scores than the mothers in the standard care group			
Cristóbal-Cañadas, D., Parrón Carreño, T., Sánchez Borja, C., & Bonillo Perales, A. (2022). Benefits of kangaroo mother care on the physiological stress parameters of preterm infants and mothers in neonatal intensive care. <i>International Journal of Environmental Research and Public Health</i> , 19(12), Article	The goal was to estimate the effect of KMC on physiological and biochemical parameters of preterm infant stress and maternal stress in neonatal care.	112 preterm infants. Two groups were compared according to the mean duration of KMC during 12 days of study	Cohort study	KC for more than 90 min on average per day in preterm infants is associated 12 days after the with less postpartum depression ( $p = 0.02$ ) and lower cortisol levels ( $p = 0.002$ ) in the mothers of preterm infants.	Level 4: Cohort study	The study was limited to 12 days of data collection	Yes, study noted that length of KC correlated with decrease in PPD and cortisol levels



Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
7183. <a href="https://doi.org/10.3390/ijerph19127183">https://doi.org/10.3390/ijerph19127183</a>							
do Nascimento Nunes, C. R., Campos, L. G., Lucena, A. M., Pereira, J. M., da Costa, P. R., de Lima, F. A. F., & de Oliveira Azevedo, V. M. G. (2017). Relationship between the use of kangaroo position on preterm babies and mother-child interaction upon discharge. <i>Revista Paulista de Pediatria, 35</i> (2), 136–143. <a href="https://doi.org/10.1590/1984-0462/;2017;35;2;0006">https://doi.org/10.1590/1984-0462/;2017;35;2;0006</a>	To analyze the kangaroo position duration in the initial interactions between mothers and preterm infants.	All eligible newborns, with a gestational age of 28-32 weeks and a birth weight of 1,000-1,800 g from June 11 to September 31, 2014 were included	Exploratory prospective observational study	The longer the dyad spent time in the kangaroo position, the more the newborns made physical contact attempts with their mothers during breastfeeding	Level 6: Single qualitative study	Sample size and loss, the difficulty of the team adhering to not discarding kangaroo records during the cleaning of incubators, the noisy neonatal unit	Yes, that study results support needs of KC for developmental needs of the infant

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
<p>Erduran, B., &amp; Yaman Sözbir, Ş. (2022). Effects of intermittent kangaroo care on maternal attachment, postpartum depression of mothers with preterm infants. <i>Journal of Reproductive and Infant Psychology</i>. <a href="https://doi.org/10.1080/02646838.2022.2035703">https://doi.org/10.1080/02646838.2022.2035703</a></p>	<p>To reveal the effect of intermittent KC on maternal attachment, postpartum depression of mothers with preterm infants.</p>	<p>Sixty mothers whose newborns were hospitalized in the NICU due to prematurity</p>	<p>Single center randomized controlled trial</p>	<p>The median of the total score of EPDS in the experimental group was 7, and in the control, group was 9. The median of the total score of Maternal Attachment Inventory in the experimental group was 99, and in the control, group was 97. Mothers who received intermittent KC had higher scores that can be interpreted as higher</p>	<p>Level 2: Randomized control trial</p>	<p>Conducted at a single center</p>	<p>Yes, the study has statistical significance for increased maternal attachment in KC group</p>

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
				maternal attachment than others			
Faisal-Cury, A., Tabb, K., Ziebold, C., & Matijasevich, A. (2021). The impact of postpartum depression and bonding impairment on child development at 12 to 15 months after delivery. <i>Journal of Affective Disorders Reports</i> , 4, Article 100125. <a href="https://doi.org/10.1016/j.jadr.2021.100125">https://doi.org/10.1016/j.jadr.2021.100125</a>	Evaluate the association between mother-child bonding and maternal depression at 6–8 months after birth, isolated and conjoined, with child developmental delay (CDD) at 12–15 months in a sample of vulnerable mothers.	358 low-income postpartum women with antenatal depression	A prospective cohort study with randomized trial	It is thought that between 17% and 31.7% of postpartum women with depression also experience impaired bonding	Level 2: Randomized control trial	Findings were based on secondary data analysis of a sample of pregnant women who took part in a cluster trial that aimed to evaluate the efficacy of a psychosocial intervention to prevent postpartum depression	Yes, evidence noted PPD impacts bonding adding to the background of why change is needed
Gacutno-Evardone, A. J. A., De Ocampo, F. S., & Villanueva-Uy, M. E. T. (2021). Effect	Determine the effect of KMC to the rate of exclusive breastfeeding	Identified nine eligible trials involving	Systematic review of literature and meta-analysis	KC significantly noted to increase the likelihood of	Level 1: Systematic review & meta-analysis of	Studies with high-risk bias were in the area of blinding	Yes, study shows evidence than KC increased

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
of kangaroo mother care on the likelihood of breastfeeding from birth up to 6 months of age: A meta-analysis. <i>Acta Medica Philippina</i> , 55(9), 898–907. <a href="https://doi.org/10.47895/amp.v55i9.3754">https://doi.org/10.47895/amp.v55i9.3754</a>	among preterm and LBW infants at 6 months of age.	1,202 neonates		exclusive breastfeeding by 1.9 times at birth up to 6 months	randomized controlled trials		exclusive BF rates which helps meet the WHO target
Iqbal, A., Iqbal, T., Bashir, F., Bilquees, Aslam, S., & Sehrish, A. (2022). Comparison of kangaroo mother care with conventional care in newborns in terms of frequency of successful first breastfeeding and time to initiate breast feeding. <i>Pakistan Armed Forces Medical Journal</i> , 72(3),	To compare KMC with conventional care in newborns regarding the frequency of successful first breastfeeding and time to initiate breastfeeding	120 infant-mother couples in the departments of Pediatrics and obstetrics CMH Bahawalpur from Feb 2019 to Jun 2020	Quasi-experimental study	Mean time for first successful breastfeeding was significantly less for the KC group as compared to the conventional group with a <i>p</i> value of < 0.001. KMC resulted in a higher frequency of	Level 3: Quasi-experimental design	The study was conducted on healthy term infants only.	Yes, statistical significance in lowering time to BF and success of breastfeeding with use of KC

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
1008–1012. <a href="https://doi.org/10.51253/pafmj.v72i3.6889">https://doi.org/10.51253/pafmj.v72i3.6889</a>				successful first feed, and meantime for initiation of feeding was also less than conventional care.			
Kirca, N., & Adibelli, D. (2021). Effects of mother–infant skin-to-skin contact on postpartum depression: A systematic review. <i>Perspectives in Psychiatric Care</i> , 57(4), 2014–2023. <a href="https://doi.org/10.1111/ppc.12727">https://doi.org/10.1111/ppc.12727</a>	Evaluate the effects of the skin-to-skin contact (SSC) method on postpartum depression	This review was completed with three studies meeting the research criteria. Two studies were randomized controlled studies and one study had a quasi-experimental design.	Systematic review	It was reported that the benefits of SSC included more family ties, more positive bonding behavior for the mother, encouragement to breastfeeding, better breastfeeding results, reducing stress and depression.	Level 1: Systematic review & meta-analysis of randomized controlled trials	Only leading bibliographic search engines in the field of health were used	Yes, studies note many maternal benefits to KC

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
Kucukoglu, S., Yilmaz Kurt, F., Aytekin Ozdemir, A., & Ozcan, Z. (2021). The effect of kangaroo care on breastfeeding and development in preterm neonates. <i>Journal of Pediatric Nursing</i> , 60, E31–e38. <a href="https://doi.org/10.1016/j.pedn.2021.02.019">https://doi.org/10.1016/j.pedn.2021.02.019</a>	This study investigated the effect of KC on breastfeeding rate and development in preterm neonates in the first 6 months of life.	60 preterm neonates in the NICU of two state hospitals of Turkey.	Quasi-experimental method with a pretest-posttest control group design	The KC group had higher breast milk intake and breastfeeding rates than the control group during the transition to exclusive breastfeeding and at discharge, and in the first, third, and sixth postnatal months.	Level 3: Quasi-experimental design	Risk of bias in the area of blinding	Yes, KC groups shows higher BM intake and duration of BF
Mallonga-Matilac, N. R., Manuta-Baton, S. M., & Villanueva-Uy, M. E. T. (2021). Effect of kangaroo mother care on maternal anxiety and depression states at the neonatal ICU:	Determine the effect of KMC on anxiety and depression of mothers of low-birth-weight neonates during the immediate	Mothers of low-birth-weight infants (birth weight $\leq$ 2500 grams) admitted at a tertiary hospital's neonatal intensive care	Prospective cohort study	Significant reduction in the percentage of mothers categorized as having severe depression over time	Level 4: cohort study	Other factors like the instability of the preterm infants may play a role in the depression	Yes, evidence shows reduction in severe depression with KC

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
A prospective cohort study. <i>Acta Medica Philippina</i> , 55(9), 916–922. <a href="https://doi.org/10.47895/amp.v55i9.3736">https://doi.org/10.47895/amp.v55i9.3736</a>	newborn period.	unit. A total of 171 mothers were enrolled in the study. Only 79 mothers provided KMC, and the rest (92) did not provide KMC.		among those who rendered KMC compared to those who did not		and anxiety of mothers	
Mansoori, M., & Salmani, N. (2020). Effect of breast milk expression during kangaroo mother care on milk volume in mothers with premature infants admitted to neonatal intensive care unit. <i>Journal of Evidence-Based Care</i> , 10(1), 44–50. <a href="https://doi.org/10.22038/ebcj.2020.45519.2238">https://doi.org/10.22038/ebcj.2020.45519.2238</a>	Investigate the effect of breast milk expression during KMC on milk volume in mothers with premature neonates	40 mothers with premature newborns admitted to a neonatal intensive care unit in a city in the west of Iran in 2019.	Quasi-experimental study	There was a statistically significant difference between the milk volume of the and control groups on days 4 ( $p = 0.04$ ), 5 ( $p = 0.02$ ), and 6 ( $p = 0.007$ ) and between the total volume of milk during the three	Level 3: quasi-experimental design	Possibility of forgetting to record the milk volume in the relevant checklist by mothers	Yes, statistical significance supports BF on milk volume production

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
				days ( $p = 0.01$ ).			
Mehler, K., Hucklenbruch-Rother, E., Trautmann-Villalba, P., Becker, I., Roth, B., & Kribs, A. (2019). Delivery room skin-to-skin contact for preterm infants—A randomized clinical trial. <i>Acta Paediatrica</i> , 109(3), 518–526. <a href="https://doi.org/10.1111/apa.14975">https://doi.org/10.1111/apa.14975</a>	Investigate the effects of 60 minutes delivery room skin-to-skin contact compared with 5 minutes visual contact on mother-child interaction, salivary cortisol, maternal depression, stress and bonding at 6 months corrected age.	88 preterm infants (25-32 weeks of gestational age)	A single-center randomized controlled trial	Delivery room skin-to-skin contact dyads showed a higher quantity of maternal motoric (18 vs 15, $p = .030$ ), infant's vocal (7 vs 5, $p = .044$ ) and motoric (20 vs 15, $p = .032$ ) responses	Level 2: randomized controlled trial	limited to primipara because attachment quality is significantly by the factor 'first child' as reported in preceding study of their group	Yes, study shows statistical significance for KC and skin to skin to decrease risk of maternal depression
Mehrpisheh, S., Doorandish, Z., Farhadi, R., Ahmadi, M., Moafi, M., & Elyasi, F. (2022). The effectiveness of	Evaluate the effectiveness of KMC on maternal attachments of mothers with	100 mothers of premature infants who were admitted to neonatal intensive care units	This quasi-experimental study	KC improves maternal attachment and breastfeeding in premature infants	Level 3: Quasi-experimental design	Imitation in the selection of diverse backgrounds of research objects	Yes, statistically significant results for increased maternal attachment



Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
kangaroo mother care (KMC) on attachment of mothers with premature infants. <i>European Journal of Obstetrics &amp; Gynecology and Reproductive Biology: X, 15,</i> Article 100149. <a href="https://doi.org/10.1016/j.eurox.2022.100149">https://doi.org/10.1016/j.eurox.2022.100149</a>	premature infants.						and breastfeeding rates with KC
Mekonnen, A. G., Yehualashet, S. S., & Bayleyegn, A. D. (2019). The effects of kangaroo mother care on the time to breastfeeding initiation among preterm and LBW infants: A meta-analysis of published studies. <i>International Breastfeeding Journal, 14,</i> Article	Estimate the pooled mean time to initiate breastfeeding among preterm and low birthweight infants.	A total of 467 eligible titles were identified and eight studies met the inclusion criteria	Meta-analysis	Preterm and low birthweight infants receiving KMC initiated breastfeeding 2 days 14 h 24 min earlier than conventional care of radiant warmer/incu	Level 1: Systematic review & meta-analysis of randomized controlled trials	Studies were limited in number (only eight studies) which did not enable us to determine an effect size on all outcomes	Yes, study shows decrease time to initiate BF with use of KC

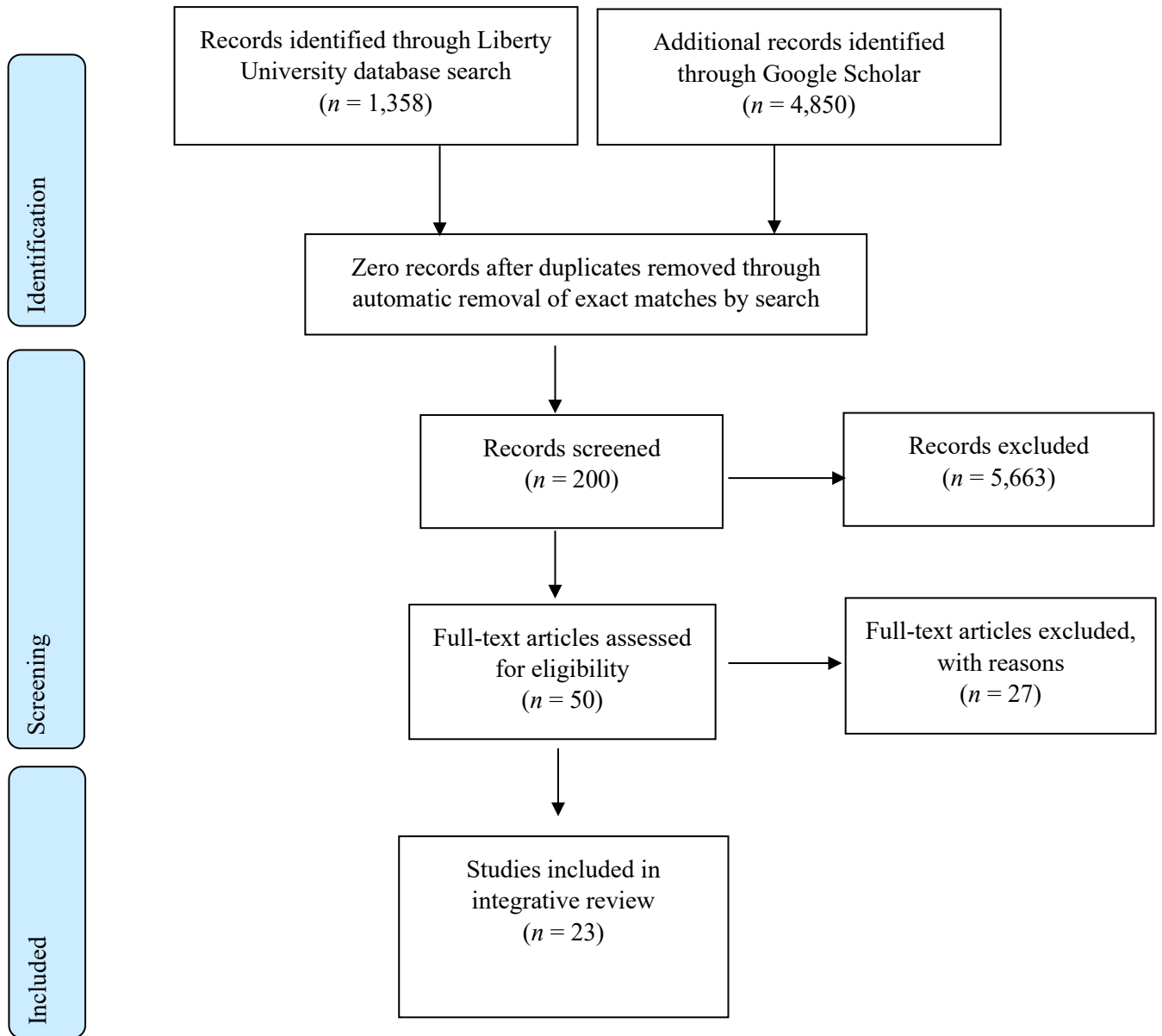
Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
12. <a href="https://doi.org/10.1186/s13006-019-0206-0">https://doi.org/10.1186/s13006-019-0206-0</a>				bator method.			
Rao, P., Raajashri, R., Bethou, A., Bhat, V., & C, P. (2019). Does kangaroo mother care reduce anxiety in postnatal mothers of preterm babies? – A descriptive study from a tertiary care center in South India. <i>Journal of Nepal Health Research Council</i> , 17(1), 42–45. <a href="http://103.69.125.201/index.php/jnhrc/article/view/491/447">http://103.69.125.201/index.php/jnhrc/article/view/491/447</a>	To assess anxiety and depression among postnatal mothers of preterm babies and to evaluate whether KMC reduces their anxiety	50 postpartum mothers with premature infants weighting 1800-2500g admitted to the NICU	Descriptive study	Anxiety and Depression Scale score was significantly less in the post KMC group compared to pre KMC group.	Level 6: Descriptive study	Risk of bias in the area of blinding	Yes, reduction in anxiety and depression noted with KC
Stroud, M., Voisard, C., & High, Q. (2020). <i>The effects of</i>	To view families as group, seeing how kangaroo	This study was conducted on 146 premature	Randomized control study	The results from this study showed that parent	Level 2: Randomized control trial	Risk of bias in the area of blinding	Yes, results were significant for increased

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
<p><i>kangaroo care on parental-infant bonding the effects of kangaroo care on parental-infant bonding</i> [Poster presentation]. Wright State University—Lake Campus Research Symposium. <a href="https://corescholar.libraries.wright.edu/cgi/viewcontent.cgi?article=1017&amp;context=lake_research_symposium_abstracts">https://corescholar.libraries.wright.edu/cgi/viewcontent.cgi?article=1017&amp;context=lake_research_symposium_abstracts</a></p>	<p>care (KC) for preterm infants can contribute to family processes, touch, attachment and bonding</p>	<p>infants and their families</p>		<p>infant bonding and attachment was increased with the families that participated in KC compared to the ones that did not. This study gave results that were significant 80% of the time.</p>			<p>attachment with KC</p>
<p>Xie, J., Zhu, L., Zhu, T., Jian, Y., Ding, Y., Zhou, M., &amp; Feng, X. (2019). Parental engagement and early interactions with preterm infants reduce risk of late postpartum depression. <i>The</i></p>	<p>Assess the impact of early parent interaction or standard care.</p>	<p>A total of 151 infants/51 other were enrolled</p>	<p>Cohort study</p>	<p>Early patient interaction noted decrease risk in late postpartum depression</p>	<p>Level 4: cohort study</p>	<p>Small sample size</p>	<p>Yes, study results are significant for not just short-term benefits of early infant interaction but long-term benefits</p>

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
<i>Journal of Nervous and Mental Disease</i> , 207(5), 360–364. <a href="https://doi.org/10.1097/nmd.0000000000000971">https://doi.org/10.1097/nmd.0000000000000971</a>							
Yilmaz, F., Küçükoğlu, S., Aytekin Özdemir, A., Oğul, T., & Aşki, N. (2020). The effect of kangaroo mother care, provided in the early postpartum period, on the breastfeeding self-efficacy level of mothers and the perceived insufficient milk supply. <i>The Journal of Perinatal &amp; Neonatal Nursing</i> , 34(1), 80–87. <a href="https://doi.org/10.1097/nmd.0000000000000971">https://doi.org/10.1097/nmd.0000000000000971</a>	Determine the effect of KMC, provided in the early postpartum period, on the breastfeeding self-efficacy level and the perceived insufficient milk supply	The mothers and their infants, to whom they gave birth in a university hospital located in either eastern or western Turkey, between December 2016 and June 2017	Quasi-experimental design	In the study, a statistically significant correlation was determined between breastfeeding self-efficacy levels of mothers in the experimental group and the perceived insufficient milk supply	Level 3: Quasi-experimental design	Risk of bias in the area of blinding	Yes, results note that KC can potentially have an important effect on breastfeeding perceptions which impacts BF as a whole

Article	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?.
<a href="https://doi.org/10.1177/097464602000000000000000434">097/jpn.000000000000000434</a>							
Zehra, C., & Rukiye, T. (2020). The effect of early kangaroo care provided to term babies on the maternal-fetal attachment. <i>International Journal of Caring Sciences</i> , 13, 24–34. <a href="http://www.internationaljournalofcaringsciences.org/docs/4_coktay_original_13_1.pdf">http://www.internationaljournalofcaringsciences.org/docs/4_coktay_original_13_1.pdf</a>	Determine the effect of early KC provided to term babies on the maternal-fetal attachment.	335 mother-infant pairs, who had vaginal or cesarean delivery in Hatay's two maternity hospitals	Descriptive study	KC given to term babies of mothers included in our study increased maternal-fetal bonding	Level 6: Descriptive design	Unable to generalize the findings to the entire country	Yes, results show that KC increased maternal-infant bonding which impacts maternal wellbeing

**Appendix B**  
**PRISMA Diagram**



## Appendix C

### CITI Training Certificate

---



Completion Date 13-Dec-2022  
Expiration Date 13-Dec-2025  
Record ID 53194615

This is to certify that:

**Alexis Lawson**

Has completed the following CITI Program course:

Not valid for renewal of  
certification through CME.

**Biomedical Research - Basic/Refresher**  
(Curriculum Group)  
**Biomedical & Health Science Researchers**  
(Course Learner Group)  
**1 - Basic Course**  
(Stage)

Under requirements set by:

**Liberty University**



Verify at [www.citiprogram.org/verify/?w317c0a1a-d474-44f3-bd7d-c3d3116b87cd-53194615](http://www.citiprogram.org/verify/?w317c0a1a-d474-44f3-bd7d-c3d3116b87cd-53194615)

**Appendix D****Institutional Review Board Approval Letter**

February 20, 2023

Alexis Lawson  
Vickie Moore

Re: IRB Application - IRB-FY22-23-1117 Kangaroo Care Impact on Maternal Health: An Integrative Review

Dear Alexis Lawson and Vickie Moore,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds that your study does not meet the definition of human subjects research. This means you may begin your project with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study is not considered human subjects research because it will not involve the collection of identifiable, private information from or about living individuals (45 CFR 46.102).

Please note that this decision only applies to your current application. Any modifications to your protocol must be reported to the Liberty University IRB for verification of continued non-human subjects research status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this determination or need assistance in determining whether possible modifications to your protocol would change your application's status, please email us at [irb@liberty.edu](mailto:irb@liberty.edu).

Sincerely,

**G. Michele Baker, MA, CIP**  
*Administrative Chair of Institutional Research*  
**Research Ethics Office**