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The Impact of Kangaroo Care on Exclusive Breastfeeding in Premature Infants

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Contents

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Executive Summary

This benchmark project emphasizes the crucial imperative of promoting exclusive breastfeeding among preterm and low birth weight infants in neonatal intensive care units (NICUs). Despite the well-documented benefits, exclusive breastfeeding rates remain disappointingly low. This evidence-based project focuses on early intervention through kangaroo care to bolster exclusive breastfeeding rates, with the overarching aim of enhancing infant outcomes and mitigating risks of mortality and morbidity. Engaging key stakeholders, including NICU leadership, nursing staff, lactation consultants, and families, is paramount for the successful implementation of the program. The project presents a detailed implementation plan encompassing various phases, from admission procedures to sustainability measures. Key components include comprehensive information dissemination to families upon admission, introductory sessions conducted by lactation consultants, and collaboration between registered nurses and lactation consultants to facilitate kangaroo care sessions. The program also outlines an infant protocol to ensure the safety and eligibility of infants for kangaroo care. Data collection methods, including chart reviews, surveys, and in-depth interviews, are employed to evaluate breastfeeding outcomes, kangaroo care sessions, and parental satisfaction.

Although presented as a benchmark initiative, discussion delves into potential challenges and considerations in implementation. Leadership strategy, innovation, sustainability, and change management are highlighted as critical elements for success. Effective leadership involves proactive communication, stakeholder engagement, and fostering a culture of collaboration and innovation within the healthcare setting. Innovation is essential for adapting evidence-based practices to meet the unique needs of the target population. Sustainability efforts encompass ongoing evaluation, resource allocation, and stakeholder buy-in to ensure the long-term viability

of the program. Change management strategies are vital for effectively implementing and sustaining organizational shifts, including staff training, policy development, and continuous quality improvement efforts.

In conclusion, this evidence-based practice program offers a comprehensive approach to address the pressing need for promoting exclusive breastfeeding in preterm infants. Recommendations include full implementation, community outreach, integration into standard care protocols, and continuous quality improvement initiatives. By empowering families and optimizing infant health outcomes, this program has the potential to significantly impact neonatal care practices and improve the well-being of preterm infants and their families.

The Impact of Kangaroo Care on Exclusive Breastfeeding in Premature Infants

Providing preterm infants with breast milk offers numerous significant advantages, such as infection prevention, the supply of essential nutrients and growth factors crucial for their development, and the recognition that breast milk is more easily digestible for preterm infants compared to formula (National Health Service, 2022). However, despite the undeniable benefits associated with breastfeeding, only one in four infants are exclusively breastfed during the first six months of life (Centers for Disease Control and Prevention, 2023). This evidence-based practice project underscores the importance of early intervention through kangaroo care to enhance the long-term exclusive breastfeeding rate among preterm and low birth weight infants, with the aim of improving infant outcomes and reducing mortality and morbidity.

Rationale for the Project

Providing premature infants with breast milk confers numerous important benefits, including protection against infections, provision of essential nutrients and growth factors vital for their development, and the inherent ease of digestion compared to formula milk (National Health Service, 2022). Despite these advantages, exclusive breastfeeding rates for the first six months of life remain low, with only one in four infants being exclusively breastfed (Centers for Disease Control and Prevention, 2023). Research findings by Pavlyshyn et al. (2021) reveal that while sixty-eight percent of infants engaged in kangaroo care were exclusively breastfed at discharge, only thirty-eight percent of those not receiving such care achieved the same status. Implementation of kangaroo care presents an opportunity to enhance outcomes for preterm and low birth weight infants (Zhang et al., 2020).

The development of the PICOT question for this project involved a comprehensive assessment of both internal and external evidence, along with an examination of patient preferences and values. The selected intervention PICOT question aims to determine the optimal treatment intervention for achieving successful outcomes. The question is as follows: In preterm and low birth weight infants in the neonatal intensive care unit (P) , how does the implementation of daily kangaroo care (I) compared to standard care without skin-to-skin contact (C) affect the success of exclusive breastfeeding (O) within the first six months of life? (T)

Literature Synthesis

An extensive examination of the available literature strongly supports the conclusion that kangaroo care significantly enhances exclusive breastfeeding rates among preterm and low birth weight infants throughout the initial six months of life. A systematic search was conducted across CINAHL, PubMed, and Cochrane databases. The keyboards identified from the PICOT question were *preterm infant, low birth weight infant, neonatal intensive care unit, kangaroo care,* and *exclusive breastfeeding.* The search was further defined to include systematic reviews, meta-analyses, randomized control trials, mixed-method studies, and qualitative studies. A total of twelve articles were extracted utilizing this methodology to adequately address the stated PICOT question. Appendix A details the chosen articles and summarizes their findings.

Implementation of kangaroo care, even for as little as thirty minutes, has demonstrated significant benefits for exclusive breastfeeding rates among infants. Research by Kucukoglu et al. (2021) reveals that when kangaroo care is implemented, 73.3% of infants are exclusively breastfed at discharge, and 26.7% are exclusively breastfed at six months of age. In contrast, only 20% of infants who do not participate in kangaroo care are exclusively breastfed at discharge, and this percentage drops to 6.7% at six months of age (Kucukoglu et al., 2021). Moreover,

El-Farrash et al. (2020) found that preterm infants who received 120 minutes of kangaroo care per day scored higher on the Infant Breastfeeding Assessment Tool (IBFAT) compared to those who received sixty minutes per day.

Increasing the duration of kangaroo care to two and a half hours per day yields even more significant results. Wang et al. (2021) demonstrated that 46.9% of infants in the experimental group, receiving two and a half hours of kangaroo care per day, were exclusively breastfed at six months of age, while only 2.9% of infants in the control group achieved exclusive breastfeeding. Similarly, when kangaroo care was provided for as little as three days, Zhang et al. (2020) reported that 57.2% of kangaroo care infants were exclusively breastfed compared to 33.2% of non-kangaroo care infants at a six-week follow-up evaluation. These findings collectively emphasize the positive impact of kangaroo care on promoting exclusive breastfeeding among infants.

According to Pavlyshyn et al. (2021), when comparing the control and experimental groups, both of which engaged in kangaroo care, infants in the experimental group who received more than three hours of kangaroo care per day exhibited a higher rate of exclusive breastfeeding at discharge compared to those who received less than three hours per day. These findings are consistent with the conclusions drawn by El-Farrash et al. (2020), suggesting that an increase in the duration of kangaroo care correlates with an increase in the rate of exclusive breastfeeding.

The World Health Organization Immediate Kangaroo Mother Care Study Group (2021) adopted a unique approach to investigating the association between kangaroo care and exclusive breastfeeding. In their study, one group of infants commenced kangaroo care within an average time of 1.3 hours after birth, while the other group initiated kangaroo care at an average time of 53.6 hours due to their critical condition (World Health Organization Immediate Kangaroo

Mother Care Study Group, 2021). The group that received kangaroo care earlier demonstrated more significant success in achieving exclusive breastfeeding from birth through a thirty-day follow-up in comparison to the latter group (World Health Organization Immediate Kangaroo Mother Care Study Group, 2021).

Project Stakeholders

The successful implementation of this evidence-based practice project necessitates the involvement of various stakeholders within the hospital setting. These stakeholders include the Chief Nursing Officer (CNO), Director of the Neonatal Intensive Care Unit (NICU), NICU managers and educators, the lactation consultant, as well as the Registered Nurses (RNs) and Patient Care Technicians (PCTs) working within the NICU. Collaboration with the Director of Nursing Research and/or Evidence-Based Practice, if available, is crucial to ensure alignment with organizational goals and best practices. Moreover, obtaining buy-in from patients and their families is paramount, necessitating clear communication regarding the benefits of kangaroo care. Partnering with community groups facilitates a smooth transition for continued breastfeeding support in the home environment.

Understanding patient preferences and values surrounding exclusive breastfeeding in preterm infants demands a comprehensive assessment that considers individual circumstances. It is imperative to acknowledge the diverse range of patient values, including cultural, spiritual, and personal beliefs, which can significantly influence breastfeeding decisions. While many mothers recognize the benefits of exclusive breastfeeding, they often encounter obstacles, such as inadequate support from healthcare providers and family members, as well as challenges with latching (Centers for Disease Control and Prevention, 2023c). The Centers for Disease Control and Prevention (2023c) Breastfeeding Report Card, 2022 underscores the prevalent issue of

mothers' inability to breastfeed as long as desired. Addressing patient preferences and values entails engaging in open, non-judgmental discussions with healthcare providers. This approach allows parents to voice their concerns, desires, and barriers, enabling healthcare providers to offer tailored guidance, support, and education. By understanding the unique circumstances of each family, healthcare providers can assist parents in making informed decisions that align with their values while prioritizing the health and well-being of their infants.

Implementation Plan

Step 1: Admission

Upon admission to the neonatal intensive care unit (NICU), families will receive comprehensive information regarding the kangaroo care and breastfeeding program, including the benefits of kangaroo care and breastfeeding for preterm infants. This information will be provided by the admitting nurse, who will also offer additional resources and support to address any questions or concerns from families. Families will be encouraged to consider participation in the program to optimize the health outcomes of their infants.

Step 2: Introduction to the Program

Families expressing interest in participating will attend an introductory session conducted by the lactation consultant. During this session, families will receive detailed information about the program's goals, implementation procedures, and the role of kangaroo care in promoting infant health and bonding.Adequate time will be allocated for families to ask questions and express any concerns. They will also have the opportunity to meet the lactation consultant and establish rapport.

Step 3: Practice Implementation

Registered nurses and the lactation consultant will collaborate to facilitate daily kangaroo care sessions for participating families. These sessions will be scheduled based on the infant's stability and clinical condition, ensuring the safety and well-being of the infant. Kangaroo care will commence following a thorough assessment to ensure the infant meets the eligibility criteria outlined in the Infant Protocol. The registered nurse will document the duration of each kangaroo care session and the percentage of feeds provided through breastfeeding through the electronic health record.

Infant Protocol

Infants eligible for kangaroo care must meet specific criteria. Exclusions include infants with invasive lines (arterial lines, umbilical catheters), open chest from surgery, or hemodynamic instability. Infants on minimal stimulation protocols may be excluded at the discretion of the healthcare provider. Continuous monitoring of the infant's temperature will occur throughout kangaroo care sessions. If temperature instability arises, the infant will be returned to the isolette. Infants experiencing an increase in apnea or bradycardia events during kangaroo care may be temporarily excluded until these events resolve.

Step 4: Discharge from the Program

Documentation of breastfeeding outcomes will be collected at the time of discharge. This documentation will include the percentage of feeds provided through breastfeeding and any challenges encountered. Families will be informed about continued access to lactation support services for six months following discharge from the NICU.

Step 5: Follow-Up

Follow-up evaluations will be conducted at one month, three months, and six months post-discharge to assess breastfeeding outcomes and provide ongoing support to participants.

Feedback from program participants will be collected at the conclusion of the six-month follow-up period to evaluate program effectiveness and identify areas for improvement. This feedback will inform future iterations of the kangaroo care and breastfeeding program.

Timetable/Flowchart

The detailed timetable of this implementation plan is included below.

Week 1-2: Preparation Phase

- Identify key stakeholders, including NICU leadership, nursing staff, and lactation consultants.
- Develop educational materials and training sessions for NICU staff on kangaroo care and breastfeeding.
- Schedule introductory meetings with families upon admission to the NICU to introduce the program.

Week 3-4: Program Introduction

- Conduct introductory sessions with families interested in participating in the program.
- Begin implementing kangaroo care sessions for eligible infants under the supervision of RNs and lactation consultants.
- Initiate documentation of breastfeeding outcomes for participating families.
- Offer comprehensive educational sessions for NICU staff on the importance of kangaroo care, breastfeeding techniques, and the role of the lactation consultant in supporting families.

Week 5-8: Program Implementation

- Continuously monitor and assess kangaroo care sessions, adjusting schedules as needed based on infant stability and clinical condition.
- Provide ongoing support and education to participating families regarding breastfeeding techniques, infant care, and kangaroo care benefits.
- Conduct regular staff meetings to address any challenges or concerns encountered during program implementation and share best practices.
- Collaborate with hospital leadership to ensure adequate resources and support for program sustainability.

Week 9-12: Program Evaluation

- Collect and analyze data on breastfeeding outcomes, duration of kangaroo care sessions, infant weight gain, and temperature stability.
- Conduct follow-up evaluations with participating families to assess satisfaction and gather feedback on the program.
- Identify areas for improvement based on program evaluation findings and adjust protocols as necessary.
- Provide additional training and support to NICU staff on addressing common challenges related to kangaroo care and breastfeeding.

Week 13-16: Sustainability Planning

- Develop a sustainability plan to ensure the continued success of the kangaroo care and breastfeeding program beyond the initial implementation phase.

- Train new staff members on program protocols and procedures to maintain consistency in program delivery.
- Establish mechanisms for ongoing program monitoring and quality improvement, including regular audits of documentation and adherence to protocols.
- Collaborate with community partners to expand access to breastfeeding support services and resources for families after discharge from the NICU.
- Celebrate program milestones and successes with staff and families to maintain enthusiasm and engagement in program activities.

Data Collection Methods

The primary outcome of the kangaroo care and breastfeeding program is the exclusive breastfeeding rate among participating families. This will be measured as the percentage of feeds provided through breastfeeding compared to formula feeding or other supplementation. This will be documented in the electronic health record. Another important outcome is the duration of kangaroo care sessions per day. This will be measured in minutes and documented by the registered nurse during each session. Data on exclusive breastfeeding rates and duration of kangaroo care sessions will be collected through chart review. Registered nurses will document these variables in the infants' medical records during their NICU stay. Surveys will be administered to participating families at multiple time points, including admission, discharge, and follow-up visits (see Appendix C). These surveys will assess parental satisfaction with the program, confidence in breastfeeding and kangaroo care, and perceived barriers to adherence. In-depth interviews will be conducted with a subset of participating families to gather qualitative feedback on their experiences with the program (see Appendix D). This qualitative data will

provide valuable insights into the factors influencing program effectiveness and participant satisfaction.

A significant increase in the exclusive breastfeeding rate among participating families compared to baseline data will indicate the success of the intervention. Consistent and prolonged kangaroo care sessions, as evidenced by the duration and frequency of sessions documented in medical records, will suggest successful program implementation.

Evaluation

For this project it is estimated that fifty preterm infants (born before thirty-seven weeks gestation) will enroll. Measures of central tendency, including mean, median, and mode, will be utilized to summarize continuous variables such as duration of kangaroo care sessions or infant weight gain. These statistics provide a concise summary of the average or typical values within the dataset. Variability measures, such as standard deviation or range, will complement measures of central tendency by providing information about the spread or dispersion of data points around the mean. For qualitative data collected from interviews or open-ended survey questions, thematic analysis will be employed to identify recurring themes, patterns, or meanings within the data.

Cost/Benefit Analysis

This implementation project incurs various costs, including staffing, training, educational materials, monitoring, evaluation, and equipment. Staffing costs encompass the time dedicated by nurses, lactation consultants, and other healthcare professionals to implement and support the program. Training costs involve educating NICU staff on kangaroo care and breastfeeding techniques. Development and distribution of educational materials for families contribute to educational material costs. Resources are allocated for monitoring kangaroo care sessions,

collecting data on breastfeeding outcomes, and conducting follow-up evaluations, representing monitoring and evaluation costs. These expenses are integral to the successful implementation and sustenance of the program, aiming to optimize health outcomes for preterm infants and foster breastfeeding practices among families in the neonatal intensive care unit.

Kangaroo care and breastfeeding interventions have demonstrated significant benefits that can lead to cost savings within healthcare systems. These interventions are associated with a reduced length of stay in the neonatal intensive care unit due to improved health outcomes for preterm infants, thereby reducing healthcare expenses (Centers for Disease Control and Prevention, 2023). Additionally, kangaroo care has been linked to a lower incidence of complications such as respiratory distress syndrome and necrotizing enterocolitis, further contributing to cost reduction (National Health Service, 2022). Increased rates of breastfeeding, facilitated by the program, offer numerous health advantages for infants and mothers, including decreased risks of infections and chronic diseases, translating into long-term cost savings within healthcare (Centers for Disease Control and Prevention, 2023). Moreover, these interventions promote improved neurodevelopmental outcomes and overall infant health, potentially diminishing the necessity for expensive interventions later in life (Centers for Disease Control and Prevention, 2023). Overall, the implementation of kangaroo care and breastfeeding programs presents a compelling case for both short-term and long-term cost-effectiveness within healthcare systems.

This project offers significant health benefits for preterm infants, including enhanced weight gain, reduced infection risks, and improved neurodevelopmental outcomes, as evidenced by El-Farrash et al. (2020). Despite upfront costs, the program proves to be cost-effective due to potential savings from reduced NICU stays, decreased healthcare utilization, and long-term health improvements. Moreover, the program aligns with broader healthcare objectives of promoting maternal and infant health, addressing healthcare disparities, and enhancing patient

outcomes. Ethically, providing families with evidence-based interventions like kangaroo care and breastfeeding reflects principles of autonomy, beneficence, and non-maleficence, emphasizing the program's ethical justification alongside its health and economic merits.

Discussion of Results

Although this paper outlines a benchmark project rather than an implemented initiative, it's essential to acknowledge the potential challenges and considerations that may arise in the execution of the intervention. Leadership strategy is paramount in navigating these challenges, requiring proactive communication, stakeholder engagement, and a commitment to fostering a culture of collaboration and innovation within the healthcare setting. Innovation plays a critical role in adapting evidence-based practices to meet the unique needs of the target population, necessitating flexibility and openness to novel approaches. Sustainability is another key aspect, requiring ongoing evaluation, resource allocation, and stakeholder buy-in to ensure the long-term viability of the program. Change management strategies are crucial for effectively implementing and sustaining organizational shifts, including staff training, policy development, and continuous quality improvement efforts. Moving forward, it is expected that implementation of the project will provide valuable insights into these areas, facilitating learning and growth to optimize outcomes for preterm infants and their families. Through proactive problem-solving, strategic leadership, and a commitment to continuous improvement, the challenges inherent in implementing such a program can be addressed, paving the way for successful adoption and long-term impact in the neonatal care setting.

Conclusions/Recommendations

In conclusion, this project presents a comprehensive approach to addressing the critical need for promoting exclusive breastfeeding among preterm and low birth weight infants in the

neonatal intensive care unit. Drawing upon evidence-based practices and recognizing the significant benefits of kangaroo care and breastfeeding, this program aims to improve infant outcomes, reduce mortality and morbidity, and empower families in their journey towards optimal health for their infants.

Through the implementation of structured protocols and comprehensive support systems, this project seeks to address the barriers and challenges faced by families in maintaining exclusive breastfeeding. By integrating kangaroo care into the care plan for preterm infants, the program not only fosters physical well-being but also enhances bonding between infants and parents, laying the foundation for healthy development and long-term health outcomes.

Recommendations for the continuation of the project would include full implementation into neonatal intensive care units, community outreach and education, integration into standard care practices, and continuous quality improvement. Long-term follow-up studies can provide valuable insights into the sustained effects of kangaroo care and breastfeeding support interventions on infant health and development. Collaboration with local healthcare providers, community organizations, and support groups can raise awareness about the benefits of kangaroo care and breastfeeding and provide ongoing support to families after discharge from the NICU. Finally, it is vital to implement mechanisms for continuous quality improvement to monitor program effectiveness and identify areas for enhancement. Regular audits, feedback mechanisms, and interdisciplinary collaborations can facilitate ongoing refinement of protocols and interventions to meet the evolving needs of families and infants in the neonatal intensive care units.

In summary, this program represents a significant step towards promoting evidence-based practices and improving outcomes for preterm infants and their families. By emphasizing the

importance of kangaroo care and breastfeeding support, this program not only enhances the health and well-being of infants but also empowers parents to play an active role in their infant's care and development. It is imperative to continue building upon the foundation laid by this project, leveraging research, education, and collaboration to further advance the field of neonatal care and support families in providing the best start in life for their infants.

References

Brimdyr, K., & Cadwell, K. (2021). Connecting the dots between fetal, premature, and full-term behaviour while in skin-to-skin contact: The nine stages of instinctive behaviour. *Breastfeeding Review, 29*(3), 17-24.

Centers for Disease Control and Prevention. (2023, April 4). *Why it matters.* Breastfeeding. https://www.cdc.gov/breastfeeding/about-breastfeeding/why-it-matters.html

El-Farrash, R. A., Shinkar, D. M., Ragab, D. A., Salem, R. M., Saad, W. E., Farag, A. S., Salama, D. H., & Sakr, M. F. (2020). Longer duration of kangaroo care improves neurobehavioral performance and feeding in preterm infants: A randomized control trial. *Pediatric Research, 87*, 683-688. https://doi.org/10.1038/s41390-019-0558-6

Jónsdóttir, R. B., Jónsdóttir, H., Skúladóttir, A., Thorkelsson, T., & Flacking, R. (2020). Breastfeeding progression in late preterm infants from birth to one month. *Maternal & Child Nutrition, 16*(1), Article e12893. https://doi.org/10.1111/mcn.12893

Karimi, F. Z., Sadeghi, R., Maleki-Saghooni, N., & Khadivzadeh, T. (2019). The effect of mother-infant skin to skin contact on success and duration of first breastfeeding: A systematic review and meta-analysis. *Taiwanese Journal of Obstetrics and Gynecology, 58*(1), 1-9. https://doi.org/10.1016/j.tjog.2018.11.002

Kucukoglu, S., Kurt, F. Y., Ozdemir, A. A., & Ozcan, Z. (2021). The effect of breastfeeding and development in preterm neonates. *Journal of Pediatric Nursing, 60*, 31-38. https://doi.org/10.1016/j.pedn.2021.02.019

MedlinePlus. (2021, April 14). *Necrotizing enterocolitis.* https://medlineplus.gov/ency/article/001148.htm

Mekonnen, A. G., Yehuualashet, S. S., & Bayleyegn, A. G. (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*, 12. https://doi.org/10.1186/s13006-019-0206-0

Monteiro Gomes, A. L., Andrade de Castro, L. N., Magesti, B. N., Santos de Silva, A. C., Marques de Santos, L., & Christoffel, M. M. (2023). Association between the type of physical contact and exclusive breastfeeding at hospital discharge. *Revista de Enfermagem Referência, 6*, 1-7. https://doi.org/10.12707/RVI22030

National Health Service. (2022, December 9). *Breastfeeding your premature baby.* https://www.nhs.uk/conditions/baby/breastfeeding-and-bottle-feeding/breastfeeding/premature-baby/#:~:text=Giving%20your%20premature%20baby%20your,baby%20to%20grow%20and%20develop

Pavlyshyn, H., Sarapuk, I., Casper, C., & Makieieva, N. (2021). Kangaroo mother care can improve the short-term outcomes of very preterm infants. *Journal of Neonatal-Perinatal Medicine, 14*(1), 21-28. https://doi.org/10.3233/npm-200455

Wang, Y., Zhao, T., Zhang, Y., Li, S., & Cong, Z. (2021). Positive effects of kangaroo mother care on long-term breastfeeding rates, growth, and neurodevelopment in preterm infants. *Breastfeeding Medicine, 16*(4), 282-291. https://doi.org/10.1089/bfm.2020.0358

World Health Organization Immediate Kangaroo Mother Care Study Group. (2021). Immediate "kangaroo mother care" and survival of infants with low birth weight. *The New England Journal of Medicine, 384*(21), 2028-2038. https://doi.org/10.1056/nejmoa2026486

Yang, J., Guo, Y., & Dai, Y. (2022). Impact of kangaroo mother care intervention on immunological and pulmonary functions of preterm infants during breastfeeding. *Evidence-Based Complementary and Alternative Medicine, 2022,* Article 3180871. https://doi.org/10.1155/2022/3180871

Zhang, B., Duan, Z., Zhao, Y., Williams, S., Wall, S., Huang, L., Zhang, X., Wu, W., Yue, J., Zhang, L., Liu, J., & Zhao, G. (2020). Intermittent kangaroo mother care and the practice of breastfeeding late preterm infants: results from four hospitals in different provinces of China. *International Breastfeeding Journal, 15.* https://doi.org/10.1186/s13006-020-00309-5

Appendix A

Evidence Table

Citation: (i.e., author(s), date of publication, & title)	**Conceptual Framework**	**Design/ Method**	**Sample/ Setting**	**Major Variables Studied and Their Definitions**	**Measurement of Major Variables**	**Data Analysis**	**Study Findings**	**Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])**
1. Brimdyr et al., 2021, Connecting the dots between fetal, premature, and full-term behaviour while in skin-to-skin contact: The nine stages of instinctive behaviour.	N/A	Expert opinion	Detailed the 9 stages of behavior and connection with skin to skin care ; Served as background for further article searches	IV = N/A DV = N/A	N/A	N/A	N/A	Level VI S: Provides background information W: Not a strong level of research FTI? Yes C: Skin to skin / KC greatly improves patient status and outcomes R: Encourage and optimize skin to skin care, especially in the golden hour
2. El-Farrash et al., 2020, Longer duration of kangaroo care improves neurobehavioral performance and feeding in preterm infants: A randomized control trial	N/A	PDB RCT EG1= 60 min KC EG2= 120 min KC CG= routine care	N = 120 PTI S: 1 hospital AR: NR exclusion	IV= length of KC DV=BF success	IV = measured by nurses DV = IBFAT	Statistical package for social science version 22	IBFAT EG1: 9±0.97 EG2: 10.7±0.92 CG: 6.6±1.31	Level II S: PA of 90% W: cannot follow PTI long term FTI?: Yes C: PTI doing KC have higher rates of BF

		daily KC	27 HU PTI 5 IVH 1 ES 1 DS 8 DTP					
3. Jónsdóttir, R. B., Jónsdóttir, H., Skúladóttir, A., Thorkelsson, T., & Flacking, R. (2020). Breastfeeding progression in late preterm infants from birth to one month	N/A	CHS EG = PTI CG= term infants	N = 122 PTI; 269 term infants S: 1 hospital AR: NR	IV = term vs preterm DV = BF success	DV = survey	IBM SPSS 24.0	preterm 58% EBF at 1 month term 77% EBF at one month	Level IV S: large sample size W: cohort study FTI? Yes C: More intervention is needed in PTI to increase EBF
4.Karimi et al., 2019, The effect of mother-infant skin to skin contact on success and duration of first breastfeeding: A systematic review and meta-analysis	N/A	MA/Systematic Review EG = KC CG = no KC	N = 9 articles EG = 593 infants CG = 553 infants	IV = KC DV = duration of first BF	DV = length of first BF	Comprehensive meta-analysis software version 2.	EG saw statistically better results in breastfeeding	Level I S: type of study W: few clinical trials FTI? Yes C: KC increases EBF success R: Conduct more clinical trials

5. Kucukoglu et al., 2021, The effect of breastfeeding and development in preterm neonates	N/A	QE EG = 30 PTI (30 min KC) CG = 30 PTI (routine care) PRT/POT	N= 60 PTI S: 2 hospitals AR: 14.3%	IV= length of KC DV= BF rates	IV= KC; HKCFUF DV; BF rates; FPPDF	(SPSS version 18). Percentage distribution, mean, chi-square test, and t-test were used for analysis.	6 MOS DC: EG: PD = 26.7% BF CG: PD = 6.6% BF	Level III S: PA of 85% W: EG/CG from different hospitals; FTI?: Yes C: EG had higher rates of BF R: HCP should encourage KC to improve BF rates
6. Mekonnen et al., 2019, The effects of kangaroo mother care on the time to breastfeeding initiation among preterm and LBW infants: A meta-analysis of published studies.	N/A	MA EG = KC CG = conventional care	N = 467 eligible articles; 8 met inclusion criteria 1900 participants total	IV = KC DV = time to initiate BF	DV = measured through charting	Cochrane review manager-5-3 Chi-square	7 articles = KC breastfed first 1 article = conventional care breastfed first	Level I S: large sample size FTI? Yes C: 7 articles saw that KC infants were breastfed first; 1 article showed conventional care R: Continue to encourage KC
7. Monterio Gomes et al., 2023, Association between the type of physical contact and exclusive breastfeeding at hospital discharge	N/A	CSS EG1: skin to skin EG2: touch EG3: kiss CG: no contact	N = 78 mothers ; 79 PTI S: 1 hospital AR: NR	IV = type of physical contact DV = EBF rates	DV = measured through survey and interview	SPSS 22.0 R version 3.4.1 descriptive analyses	25 EBF at discharge 54 not EBF at discharge Any contact: 16 EBF at discharge No contact at all: 9 EBF at discharge	Level IV S: variations of KC/ contact W: small sample size FTI? Yes C: No statistical association was found between the type of physical contact at birth and the presence of exclusive breastfeeding at hospital discharge. R: Continue to encourage KC; Conduct larger studies

8. Pavlyshyn et al., 2021, Kangaroo mother care can improve the short-term outcomes of very preterm infants	N/A	RS EG: 3+ hours of KC CG: less than 3 hours of KC	N= 52 PTI S= 1 hospital AR= NR	IV = length of KC DV = BF outcomes	DV= measured at time of DC	Stat Soft STATISTICA Version 13 Mann-Whitney U-test was used to compare numerical data	EG: 68.2% BF at DC CG: 37.6% at DC OR 3.70	Level IV S: similar results to other research studies W: small sample size FTI?: Yes C: KC increases rates of BF at time of DC R: Implement and encourage KC throughout NICU stay to optimize BF post DC
9. Wang et al., 2021, Positive effects of kangaroo mother care on long-term breastfeeding rates, growth, and neurodevelopment in preterm infants	N/A	L RCT EG = 2.5 hours KC CG= routine care daily KC in hospital	N= 79 PTI-mother dyads S= 1 hospital AR= 7.06%	IV= length of KC DV= BF outcomes	IV = nurses charting DV= questionnaire	SPSS version 25	EG: 46.9% BF at 6 MOS CG: 2.9% BF at 6 MOS	Level II S: PA = 80% W: only 1 hospital FTI?: Yes C: KMC improves long term BF success R: Increase KMC to promote long term BF success
10. World Health Organization Immediate Kangaroo Mother Care Study Group, 2021, Immediate “kangaroo mother care” and survival of infants with low birth weight	N/A	RCT EG: immediate KC CG: incubator care	N = 3211 infant mother dyads S= five hospitals, different countries	IV = KC DV=BF outcomes	DV = follow up with participants	Post hoc analyses	EG: 86.2% BF CG: 85.3% BF	Level II S: large sample size; evidence was strong → trial was stopped W: trial stopped early; blinding not possible FTI?: Yes C: early KC intervention increases exclusive BF

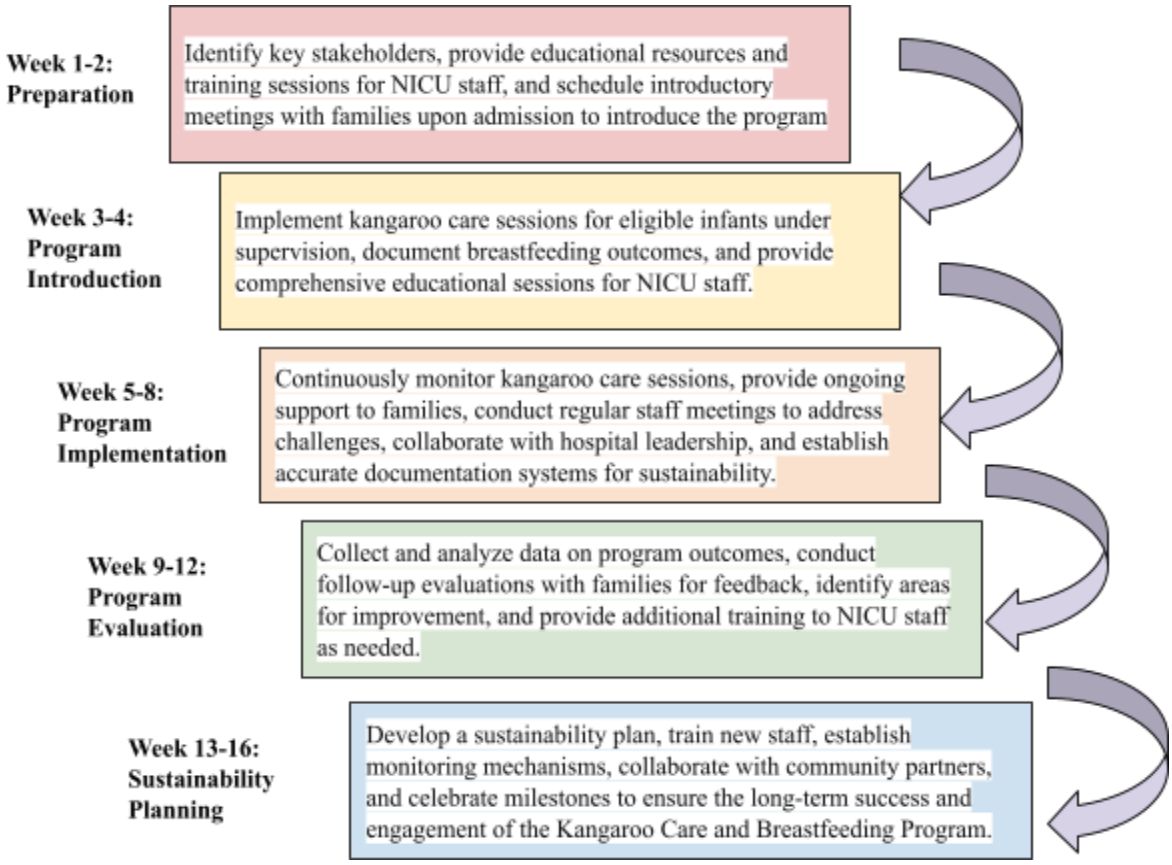
			AR = 0.87%					R: Implement KC as soon as possible for best long term changes at exclusive BF
11. Yang et al., 2022, Impact of kangaroo mother care intervention on immunological and pulmonary functions of preterm infants during breastfeeding	N/A	RCT EG: KC CG: no KC	N = 86 infant mother dyads S = 1 hospital AR= NR exclusions: CV disease, grade IV hemorrhage ; genetic, congenital disease too severe	IV = KC DV= BF success, health outcomes,	DV = BSES, SDS, SAS	Data processing by SPSS 23.0 Count data by chi-square test measurement data paired or unpaired t-test	EG: Latch scores 7.07 ± 0.98 Weight gain 4.29 ± 0.58 CG: Latch scores 6.25 ± 1.77 Weight gain 3.78 ± 0.42	Level II S: RCT W: smaller sample size than other research FTI?: Yes C: Early KC intervention increases weight gain and latch scores R: Encourage early KC intervention
12. Zhang et al., 2020, Intermittent kangaroo mother care and the practice of breastfeeding late preterm infants: results from four hospitals in different provinces of China	N/A	QE EG: KC CG: no KC	N= 844 PTI-mother dyads S= 4 hospitals AR= 16.2%	IV=length of KC DV= BF outcome	DV: survey	Stata version 14 and SAS version 9.3	KC OR: 2.09 359/627 BF at follow up No KC OR: 1.00 72/217 BF at follow up	Level III S: large sample size W: not RCT FTI?: Yes C: KMC encourages BF and promotes continuing it long term R: Encourage implementation of KMC to facilitate exclusive BF long term

Legend: AR = attrition rate; BF = breastfeeding; BSES = breastfeeding self-efficacy sclae; C = conclusion; CG= control group; CHS = cohort study; CS = chi square test; CSS = cross-sectional study; CV = cardiovascular; DC = discharge; DS = Down Syndrome; DTP = declined to participate; DV = dependent variable; ES = Edward's Syndrome; HO = health outcomes; EG = experimental group; FPPDF = feeding patterns and physical development form; FTI= feasible to implement; HCP = healthcare professionals; HKCFUF = home kangaroo care follow-up form; HU = hemodynamically

unstable; IBFAT = infant breastfeeding assessment tool; ITA = investigate the association; ITE = investigate the effect; IV = independent variable; IVH = intraventricular hemorrhage; KC = kangaroo care; KMC = kangaroo mother care; L = longitudinal; LBW = low birth weight; M = mean; MA = meta-analsysi; MOS = months; NICU = neonatal intensive care unit; NM = neonatal morbidity; NR = not reported; OR = odds ratio; P = proportion; PA = power analysis; PD = percentage distribution; PDB = prospective double blinded; POT = post-test; PRT = pre-test; PTI = preterm infants; PTN = preterm neonates; R = recommendation; RCT = randomized control trial; RS = retrospective study; S = setting; SAS = self-rating anxiety scale; SD = standard deviation; SDS = self-rating depression scale; ST= strength; STO = short term outcomes; TT = t-test; VS = vital signs; QE = quasi experimental; W = weakness

Appendix B

Flowchart



Appendix C

Caregiver Satisfaction Survey

Thank you for taking the time to provide feedback on your experience with our program. Your input is invaluable in helping us improve our services. Please take a few moments to complete this survey. Your responses will remain confidential.

Participant Information:

- Family Name: [Optional]
- Child's Name: [Optional]
- Date of Admission: [MM/DD/YYYY]
- Date of Discharge: [MM/DD/YYYY] (if applicable)
- Follow-up Visit Date: [MM/DD/YYYY] (if applicable)

Parental Satisfaction:

Please rate your overall satisfaction with the program on a scale of 1 to 5, with 1 being "Very Dissatisfied" and 5 being "Very Satisfied."

1 2 3 4 5

Confidence in Breastfeeding:

Please rate your confidence in breastfeeding during your time in the program on a scale of 1 to 5, with 1 being "Not Confident at All" and 5 being "Extremely Confident."

1 2 3 4 5

Confidence in Kangaroo Care:

Please rate your confidence in practicing kangaroo care during your time in the program on a scale of 1 to 5, with 1 being "Not Confident at All" and 5 being "Extremely Confident."

1 2 3 4 5

Perceived Barriers to Adherence:

Please indicate any barriers you encountered that affected your ability to adhere to the program recommendations. Check all that apply.

___ Lack of Time

___ Lack of Support

___ Financial Constraints

___ Physical Discomfort

___ Lack of Information/Understanding

___ Other (please specify):

Additional Comments:

Please use this space to provide any additional comments or feedback you have about your experience in the program.

Thank you for participating in our survey. Your feedback is greatly appreciated and will help us enhance our program to better meet the needs of families like yours.

Appendix D

Caregiver Interview Questions

1. Can you describe your overall experience with the program?
2. What aspects of the program did you find most beneficial for you and your child?
3. Were there any specific challenges you faced during your time in the program? If so, can you elaborate on them?
4. How did you feel about the support and guidance provided by the program staff?
5. Can you share any memorable moments or interactions you had with the program staff or other families?
6. What motivated you to participate in the program, and did it meet your expectations?
7. How did you perceive the impact of the program on your confidence in breastfeeding and practicing kangaroo care?
8. Were there any particular resources or information provided by the program that you found especially helpful?
9. In what ways do you think the program could be improved to better support families like yours?
10. Do you have any suggestions or recommendations for future families participating in the program?