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A Delphi Survey – Enhancing Parents' Knowledge and Practice of Kangaroo Mother Care

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Abstract:

Aim: This research aimed to establish directives for an education programme that will improve parents' knowledge and practice of kangaroo mother care (KMC) for preterm babies.

Methods: The Delphi method was used to assess expert consensus on the directives that could improve parent knowledge/skills for KMC practice. The panel of experts included international and local (South African) representatives. Data from focus group interviews, together with the literature review, were used to populate the 134 statements for the Delphi survey. Panelists rated the likely usefulness of each statement for inclusion as a directive for KMC.

Results: A 100% response rate was achieved in rounds 1 and 2. After Round 3, consensus was achieved in 89,9% statements for inclusion as directives for KMC. Panellists rated a few statements differently but overall, there was considerable agreement about which statements were essential for inclusion in a KMC programme. The statements that panellists disagreed on related to problems associated with KMC and the characteristics of a suitable instructor.

Conclusions: We identified directives for a KMC education programme. The implementation of these directives needs to be evaluated to see that it enhances KMC practice for preterm babies.

Keywords: Delphi, Kangaroo Mother Care, Patient education, Preterm babies.

"Approximately one in ten babies will spend time in a newborn intensive care unit (NICU). (1) Studies indicate that preterm birth significantly contributes to infant morbidity and mortality. Though mortality rates have been declining for preterm infants, there remains a significant percentage of infants born at the earliest gestational age who die in the NICU."

1. Introduction

Kangaroo Mother Care (KMC) is a high-impact, low-tech, low-cost intervention addressing preterm newborns' morbidity and mortality. (1,2) KMC is recommended as routine care for all clinically stable newborns who weigh 2000g or less. (3-5)

Despite KMC being introduced more than four decades ago and regarded as the intervention with the highest impact on newborn survival and health,(6) some countries still find the goals of increased coverage and sustained practice elusive. Despite several policies in South Africa (SA) and the Maternal, Newborn, Child, and Women's Health (MNCWH) strategic plan, implementation remains uneven. (7) Education programs to increase parental awareness of the benefits of KMC are needed. (8) Most education and training strategies focus on healthcare providers. (9) The World Health Organisation (WHO) guidelines stress the importance of parents adopting KMC due to an informed decision. (5) In order to achieve this, patient education is necessary. (10) Patient education is a cornerstone of caring for patients, with strong evidence that it improves health outcomes too. (11)

Successful education depends on an understanding and application of theories and models of behavior change to health education. (10,11) Theories focusing on individual health behavior include the health belief model, theory of reasoned action, and stages of change models. (12) A model that applies to KMC implementation is the stages of change theory, developed by Prochaska, DiClemente, and others. (13) The stages of change theory depict that the behavior change takes place over a period of time. This applies to KMC implementation: Although Dr. Rey introduced KMC in 1978, institutions have been slow to adopt this practice. (14)

"Parental "NICU blues" are defined by the intersection of four factors in figure 1: NICU trauma, baby blues, postpartum mood and anxiety disorders (5), and NICU grief. NICU blues may contain varying levels of these four factors. Both parents are included in this biopsychosocial, transitory, and non-pathological model of predicted cogent symptoms in the NICU."

KMC is still underutilized, despite all its benefits. (15) Mothers still demonstrate a lack of knowledge of KMC, according to recent studies. (16-19) Thus, it is evident from the literature that there is a need to improve patient education on KMC.

2. Patients and Methods

This study followed an exploratory sequential design. A mixed methods approach was used, which combined qualitative and quantitative methods. (20) The study's first phase was a qualitative exploration of inquiry using focus groups. Data from the qualitative phase and the literature review were used to populate statements for the Delphi survey. The Delphi survey was used as the data collection tool for the quantitative phase of the study. The goal of the Delphi was to obtain expert opinions and to obtain consensus on the directives that could improve parent knowledge/skills for KMC practice. (21)

This study was approved by the Faculty of Health Sciences Ethics Committee at the University of the Free State (HSREC 16/2016). The Free State Department of Health granted permission to re-

Figure 1: Illustration of the three-round Delphi survey applied in this study

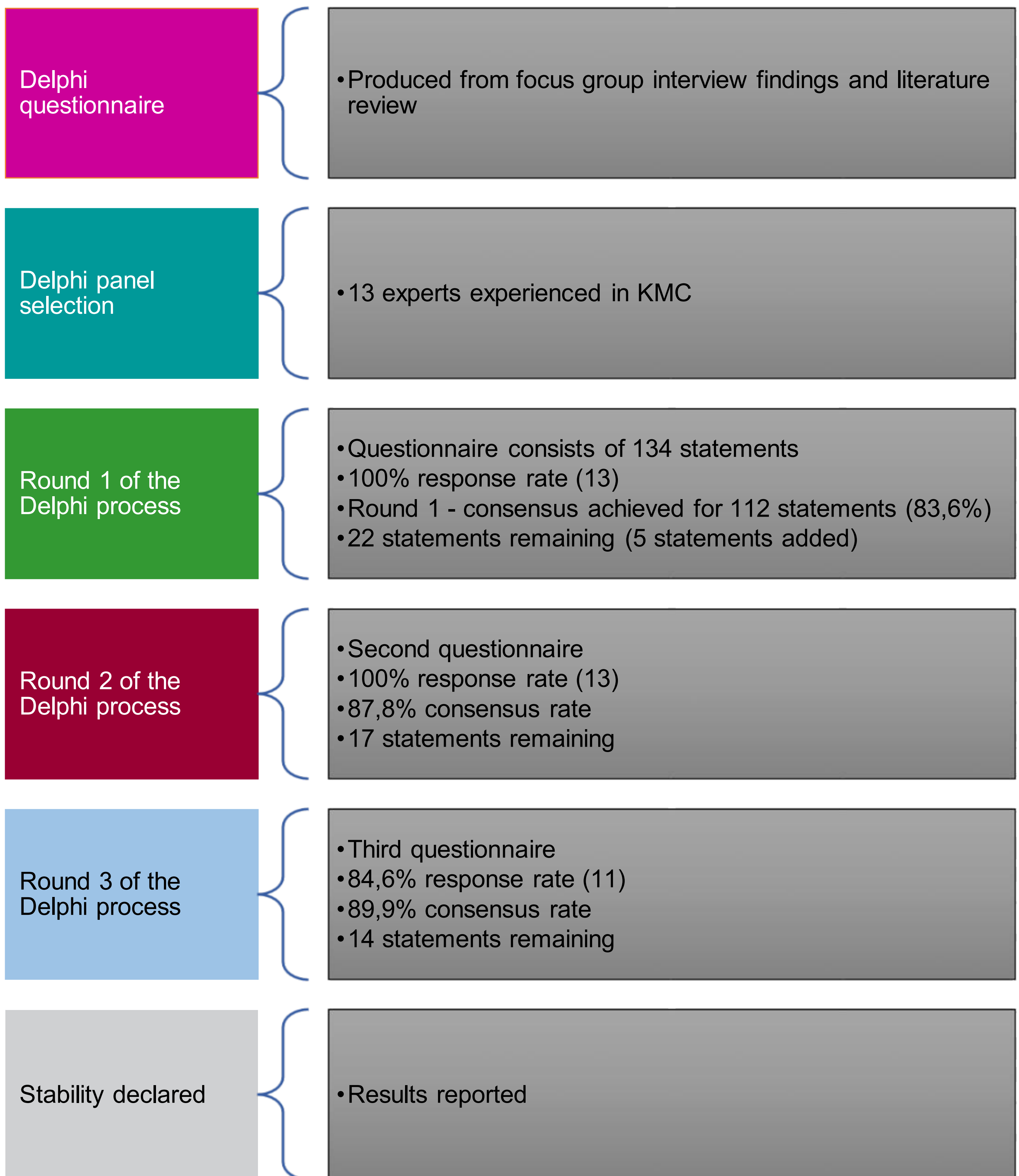

Table I: Criteria used to inform selection of the panel members who participated in this study

	Designation	Qualifications	Years of experience in KMC	Involved in teaching and training of KMC	Previous or current KMC committee member
1	Neonatologist	MB ChB, FCPaeds, Certificate in Neonatology	11 – 15 years	Undergraduate and postgraduate training	Yes
2	Emeritus professor in paediatrics and neonatology	MD (Paediatrics)	20 + years	Training and awareness campaigns on KC	Yes
3	Retired neonatologist	MB ChB, M Med (Paeds), registered sub specialist	20 + years	Undergraduate and postgraduate training	
4	Neonatologist, previous head of a unit	MB ChB, M Med (Paeds), DGG, FCPaeds	16 – 20 years	Undergraduate and postgraduate training	
5	Head of a clinical unit, associate professor	MB ChB, FCPaeds (SA), PhD registered neonatologist	11 - 15 years	Undergraduate and postgraduate training	
6	Paediatrician, previous head of a neonatal unit	MB ChB, M Med (Paeds)	11 – 15 years	Undergraduate and postgraduate training	
7	Emeritus professor, postgraduate advisor at a school of medicine	MB ChB, FCPaeds (SA), registered neonatologist	20 + years	Undergraduate and postgraduate training, training of nurses	
8	Head of a neonatology unit	MD (Paediatrics) Doctorate in Medical Sciences	11 – 15 years	Training of undergraduate and postgraduate students	
9	Principal family physician	MB ChB, M.Fam Med. Masters in Health Professions Education	16 – 20 years	Training of undergraduate and postgraduate and allied health students	
10	Nursing manager	Paediatric nursing specialist, professional/registered nurse	20+ years	Training students and training delegates at KC conferences	Yes
11	Neonatal nursing specialist	Professional/registered nurse, neonatal nursing specialist, lactation specialist	11 – 15 years	Training undergraduate and postgraduate students	
12	Speech therapist	B. Speech-Language & Hearing Therapy, Masters in speech pathology	6 - 10 years	Training students	
13	Researcher Associate	Postgraduate Diploma in Nursing Education, PhD in Nursing Science	5 years	Training nursing students	

Table II: Benefits of Kangaroo Mother Care

	Benefits of Kangaroo Mother Care
1.	Kangaroo care is safe, and benefits are evidence-based.
2.	Bonding between the baby and parent is strengthened. This helps to reduce parental anxiety and it has a calming effect on the baby.
3.	KMC leads to improved growth, weight gain and increased head circumference.
4.	Breastfeeding is promoted and improved, as increased milk production improves. Breastfeeding is initiated earlier and continued for a longer time.
5.	Babies sleep for a longer duration.
6.	Babies have better neurodevelopmental outcomes.
7.	KMC has been proven to reduce infections.
8.	KMC reduces the risk of malnutrition.
9.	KMC provides physiological stability, such as good temperature control, heart rate, respiratory rate.
10.	KMC meets the basic needs for survival of the new-born.
11.	Babies cry less and experience less pain during painful procedures when they are held in the KMC position.
12.	KMC improves mother's confidence about caring for their babies.
13.	Maternal satisfaction is enhanced.
14.	Fathers and other family members can support the mother and also provide KMC.
15.	KMC empowers parents to care for their baby.

search patients and healthcare providers.

A non-random purposive sampling technique was employed to select participants. The researcher identified 29 participants who met the criteria for inclusion according to the matrix (see Table I). In total, 13 people responded and were willing to participate in the study.

"A parent in the NICU needs a meaningful, loving, and nurturing relationship with their baby. In Ainsworth and colleagues' classic maternal attachment studies,(10) maternal attachment involves physical and psychological accessibility."

The Delphi questionnaire was divided into six sections which covered; the participants' demographic details, the proposed content for a parent education program, and other aspects related to programming development. Participants were required to indicate their responses according to a Likert scale.

During each round, the participants completed the questionnaire and returned it to the researcher via email. The researcher then collected and analyzed the data and gave all participants feedback. Feedback reflected the groups' opinions on the research Issues. The participants were allowed to reassess their initial opinions and answers they had given in previous rounds, and they were allowed to change or maintain their original opinion. (22)

Analysis was twofold; firstly, to provide feedback between rounds and, secondly, to identify when consensus had been reached. A consensus of 75% was accepted for this study. (23) If no consensus and no further changes occurred after the last round, stability was declared.

"It is imperative for NICU psychologists and medical and nursing staff to help parents make sense and meaning of their initial distress specific to identifiable physical changes, situational stressors, and loss (16). Parents often express relief in knowing that predictable NICU blues may be additive to or better explained to both parents than the term baby blues in addition to hormonal changes."

Analysis was accomplished by combining computer packages (survey monkey tool) and manual techniques. Descriptive statistics were applied because the questionnaires were designed to collect nominal and ordinal data.

Table III: Summary of all the statements in which stability was achieved

Statements	Essential	Useful	Unnecessary	Responses
Parents need to understand the background to KMC. The following information should be included:				
Parents should be briefly informed of how kangaroo mother care developed.	**1**	**2**	**3**	1 1 2 2 2 2 2 2 2 2 1 **Round 3** (2) 73%
The following statements are pivotal and should be conveyed to parents during the training process:				
When appropriate, kangaroo mother care for the dying baby should be encouraged	**1**	**2**	**3**	1 1 1 2 2 1 1 1 1 2 1 **Round 3** (1) 73%
The following benefits of kangaroo mother care must be emphasised to parents:				
Babies also grow in length faster	**1**	**2**	**3**	1 1 1 2 1 1 2 1 1 2 2 **Round 3** (1) 64%
Family relationships are enriched	**1**	**2**	**3**	1 2 1 2 1 1 1 1 1 2 1 **Round 3** (1) 73%
It reduces postpartum haemorrhage	**1**	**2**	**3**	1 2 1 2 1 2 1 1 1 3 1 **Round 3** (1) 64%
Parents need to be aware of potential problems they may experience during kangaroo mother care. The following concerns must be anticipated and addressed:				
Parents may fall asleep on top of their babies	**1**	**2**	**3**	2 3 2 1 1 1 2 2 2 1 2 **Round 3** (2) 55%
The baby may still cry when doing kangaroo mother care	**1**	**2**	**3**	1 2 1 2 1 2 2 2 1 1 1 Round 3 (1) 55%
The baby may get very hot and sweat during kangaroo mother care	**1**	**2**	**3**	1 2 2 2 1 2 1 2 1 1 1 Round 3 (1) 55%

Statements	Strongly Agree	Agree	Disagree	Strongly Disagree	Responses
The coordinator should have the following characteristics:					

Statements		Essential	Useful	Unnecessary	Responses
They must work in a full-time capacity	**1**	**2**	**3**	**4**	3 2 1 2 1 3 2 2 3 1 3 **Round 3** (1) 36% (2) 36% **72% in agreement**
They do not have to be a health professional	**1**	**2**	**3**	**4**	3 3 2 3 2 2 2 2 2 3 2 **Round 3** (2) 64% **64% in agreement**
The person in charge of the kangaroo unit should ideally take on this role	**1**	**2**	**3**	**4**	3 2 2 3 2 2 3 2 3 1 3 **Round 3** (1) 9% (2) 45,5% (3) 45,5% **54,5% in agreement**
Requirements for educators involved in teaching parents about kangaroo mother care:					
Nursing staff are sufficient to meet the teaching demands of mothers in kangaroo mother care	**1**	**2**	**3**	**4**	2 2 3 3 1 3 2 3 2 1 3 **Round 3** (1) 18% (2) 36% **54% in agreement**

3. Results

3.1 Demographic details

The panel of experts included international and local (SA) representatives. The average age of the panelists was 55.6 years - their ages ranged from 30 to 70 years. The majority of the expert panel was female (76,9%). The fields of expertise ranged from neonatologists, pediatricians, and family medicine specialists to those working in nursing and allied health sciences.

3.2 Findings of the three-round Delphi process (see Fig 1)

A 100% response rate was achieved for Rounds 1 and 2. Participants agreed on 112 of the 134 statements in the first round, giving an 83,6% overall consensus. After Round 1, five statements were added to the questionnaire. In Round 2, a consensus was achieved for 122 of the 139 statements, giving an 87,8% overall consensus. Only 11 of the 13 participants completed Round 3 of the Delphi survey, achieving an 84,6% response rate. After Round 3, consensus had been achieved in 125 of the 139 statements, giving an 89,9% overall consensus. As no consensus and no further changes occurred after the last round, stability was declared. Stability was reached on 14 (10,1%) statements.

4. Discussion

Information deemed necessary for inclusion in a patient education program can be grouped into:

A. Content about KMC

B. Equipment needs

C. Instructors, instructional media, and methods

1.1.1 Content about KMC

The benefits listed in Table II are all considered essential content for inclusion into a KMC education program aimed at parents. A benefit listed in Table II but not common in other guides is preventing malnutrition. This benefit is important in the setting of this study, as malnutrition is a major cause of morbidity and mortality in SA. The panel did not deem it necessary to explain the origins of KMC; or the association with the kangaroo, although many experts explained that they found it useful.

Benefits that did not meet the criteria for inclusion into a KMC program in the Delphi consensus process are listed in Table III.

Literature on teaching strategies recommends that the essential information should be focused on first. (24)

Experts advise against warning parents that they may feel discomfort during KMC; fall asleep on top of their babies; that the babies might still cry even while in the KMC position; and that babies may become hot and sweaty. These messages may lead to nega-

tive attitudes about KMC and cause anxiety. Teaching mothers by demonstrating how to secure the baby in the KMC position safely will assist in alleviating such fears.

1.1.2 Equipment needs

For adopting KMC practice, the panel agreed that a lack of equipment was a barrier. This is also supported in other studies. (25)

1.1.3 Instructors, instructional media, and methods

Parents should be exposed to KMC prior to the birth of their babies. This has been shown to improve their knowledge about KMC. (26) Antenatal clinics and prenatal birth classes were identified as suitable for introducing the concept of KMC.

A wide variety of resources, such as; videos, pamphlets, posters, and websites on the internet, are readily available. Health educators must carefully consider which tools will be most effective for their target group. The initial assessment of the patient will guide these decisions.

No consensus was reached on the ideal candidate for the role of instructor. Not all experts believed that it needed to be a health professional, nor did they agree that the nurse in charge should fulfill this role. Nursing staff should not be solely responsible for teaching mothers about KMC; instead, an interdisciplinary team is required. Administrative staff and cleaning personnel who interact with patients regularly should not be involved in teaching mothers about KMC. Furthermore, they recommend that personnel involved in teaching parents must receive training. Collaboration among various disciplines is encouraged in the literature so that the team can develop that teaching protocols.

Protocols should outline provider responsibilities to save time and prevent confusion.[13]

4.2 Conclusion:

The overall aim of this study was to produce directives for a patient education program to enhance KMC practice. Table I summarizes the recommended content for inclusion into a KMC education program. This research incorporated the perceptions and experiences of multiple stakeholders involved in KMC. The Delphi survey provided validation by experts, who reached a consensus on what is deemed relevant for inclusion in a patient education program.

References:

1. *Arya S, Naburi H, Kawaza K, Newton S, Anyabolu CH, Bergman N, et al.Immediate "Kangaroo Mother Care" and Survival of Infants with Low Birth Weight. NEJM. 2022;384:2028-2038 http://dx.doi: 10.1056/NEJMoa2026486*
2. *Lassi ZS, Middleton PF, Crowther C, Bhutta ZA. Interventions to improve health and later survival: An overview of systematic reviews. EBioMedicine. 2015;2:985-1000. http://dx.doi.org/10.1016/j.ebiom.2015.05.023*
3. *World Health Organization. WHO recommendations on newborn health:guidelines approved by the WHO Guidelines Review Committee. 2017. https://apps.who.int/iris/handle/10665/259269. License: CC BY-NC-SA 3.0 IGO*
4. *Campbell-Yeo ML, Disher TC, Benoit BL, Johnston CC. Understanding Kangaroo care and its benefits to preterm infants. Pediatric Health, Medicine and Therapeutics. 2015;6:15-32. https://doi.org/10.2147/PHMT.S51869*
5. *World Health Organization. Kangaroo Mother Care: a practical guide. 2003. https://apps.who.int/iris/handle/10665/42587*
6. *Aliganyira P, Kerber K, Davy K, Gamache N, Sengendo NH, Bergh A. Helping small babies survive: an evaluation of facility-based kangaroo mother care implementation progress in Uganda. Pan African Medical Journal. 2014;19:137. http://www.panafrican-med-journal.com/content/article/19/37/full/*
7. *Ramokolo V, Malaba T, Rhoda N, Kauchali S, Goga A. A landscape analysis of preterm births in South Africa: systemic gaps and solutions. South African Health Review. 2019;1:133-144. https://journals.co.za/doi/abs/10.10520/EJC-1d2aeafa22#:~:text=https%3A//hdl.handle.net/10520/EJC-1d2aeafa22*
8. *Loyd LG, De Witt W. Neonatal mortality in South Africa: How are we doing and can we do better? South African Medical Journal. 2013;103(8):518-519.*
9. *Bergh A, Charpak N, Ezeonodo A, Udani RH, Van Rooyen E. Education and training in the implementation of kangaroo mother care. South African Journal of Child Health. 2012;6(2):38-45.*
10. *Jotterand F, Amodio A, Elger BS. Patient education as empowerment and self-rebiasing. Medicine, Health Care and Philosophy. 2016;19(4):553-561. https://doi.org/10.1007/s11019-016-9702-9*
11. *Simonsmeier BA, Flaig M, Simacek T, Schneider M. (2021): What sixty years of research says about the effectiveness of patient education on health: a second order meta-analysis. Health Psychology Review. 2022;16(3):450-474. https://doi.org/10.1080/17437199.2021.1967184*
12. *Sharma M. Theoretical foundations of health education and health promotion. 4th ed. Burlington: Jones and Barlett Learning; 2022.*
13. *Glanz K, Rimer BK, Viswanath K. Health behaviour and health education theory, research and practice. 4th ed. San Francisco: Jossey-Bass; 2008.*
14. *Gomez HM, Sanabria ER, Marquette CM. The mother kangaroo programme. Journal of International Child Health. 1992;3(1):55-67.*
15. *Campbell-Yeo, ML, Disher TC, Benoit BL, Johnston CC. Understanding Kangaroo care and its benefits to preterm infants. Pediatric Health, Medicine and Therapeutics. 2015; 6: 15-32.*
16. *Roba AA, Binoy S, Naganuri MA. Knowledge, attitude and practice of kangaroo mother care by postnatal mothers who gave birth to preterm and low birth weight babies in public hospitals, Eastern Ethiopia. Journal of Neonatal Biology. 2017;6(3):1-5. https://www.researchgate.net/publication/299392314*
17. *Muddu GK, Boju SL, Chodavarapu R. Knowledge and awareness about benefits of kangaroo mother care. Indian Journal of Paediatrics. 2013; 80(10):799-803. doi: 10.1007/s12098-013-1073-0.*
18. *Namnabati M, Talakoub S, Mohammadizadeh M, Mousavi-asl F. The implementation of kangaroo mother care and nurses' perspective of barriers in Iranian' NICUs. Iranian Journal of Nursing and Midwifery Research. 2016;21(1):84-88. doi: 10.4103/1735-9066.174753.*
19. *Solomon N, Rosant C. Knowledge and attitudes of nursing staff and mothers towards kangaroo mother care in the eastern sub-district of Cape Town. South African Journal of Clinical Nutrition. 2012;25(1):33-39. https://doi.org/10.1080/16070658.2012.11734400*
20. *Curry L, Nunez-Smith M. Mixed Methods in health sciences research - A practical primer. Thousand Oaks: Sage; 2015.*
21. *Balasubramanian R, Agarwal D. Delphi technique – A review. International Journal of Public Health Dentistry. 2012;3(2):16-25.*
22. *Keeney S, Hasson F, McKenna H. Consulting the oracle: ten lessons from using the Delphi technique in nursing research. Journal of Advanced Nursing. 2006;53(2):205-212. doi: 10.1111/j.1365-2648.2006.03716.x*
23. *Linstone HA, Turoff M. The Delphi method. Technique and application. Addison- Wesley: London; 1975.*
24. *Rankin SH, Stallings KD, London F. Patient education in health and illness. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 2005.*

25. Smith ER, Bergelson I, Constantian S, Valsangkar B, Chan GJ. Barriers and enablers of health system adoption of kangaroo mother care: a systematic review of caregiver perspectives. BMC Pediatrics. 2017;17:35. doi: 10.1186/s12887-016-0769-5.
26. Desai R, Darji N, Ganti S, Darji NI, Seth JK. Educational intervention on kangaroo mother care among ANC women. NHL Journal of Medical Sciences 2013;2(1):69-74.

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