Giving birth: a systematic review of the value of skin to skin contact in a medicalized birth

By Kiara Defrancq, MChiro, MSc APP (Pediatrics) DC

Kiara Defrancq, MChiro, MSc APP (Pediatrics) DC
Roeselare, West-Vlaanderen, Belgium
Contact: kiara.defrancq@hotmail.com
+32 497 62 31 12

ABSTRACT

Purpose: The musculoskeletal system sets the foundation of the infant's future growth and development. Skin-to-skin care (SSC), also referred to as kangaroo mother care, should be employed as a routine postnatal practice to enhance optimal growth and health of the newborn. Unfortunately, the benefits of this practice are underestimated by many healthcare professionals and parents are not always made aware of this beneficial alternative to conventional neonatal care. Therefore, the aim of this review is to evaluate the impact of medical interventions as well as reduced or no skin-to-skin contact on the newborn's physiology on a long-term basis. **Methods:** The literature search was conducted using Pubmed, Medline, CINAHL, Cochrane Library and Alt Health Watch to review the current evidence using the keywords skin-to-skin, breastfeeding, newborn and outcomes. In total, 31 articles met the inclusion and exclusion criteria and were eligible for this review. **Results:** The literature search concluded that skin-to-skin care (SSC) between mother and child is beneficial for the infant's tactile, auditory, sensory, motor, vestibular, parasympathetic and sympathetic development as well as their mental state. Currently, conservative healthcare professionals continue to employ conventional protocols and underestimate the importance of encouraging early mother kangaroo care. Also, more investigation should be encouraged focusing on the impact medical interventions, such as intravenous lines, extraction, etc. have on the infant's physiology and the child-mother bonding. C-section, prematurity and low birth weight may contribute to the complexity of the neonate's situation, however, with appropriate surveillance, SSC is not impossible. There is disagreement about the optimal timing and the duration that SSC should be employed. **Conclusion:** The research states that (early) skin-to-skin contact is the most simple, cost-effective and life-saving 'intervention' a child can get. There is enough supporting material showing its benefits on the child's mental and musculoskeletal health. More research is warranted to establish the most beneficial timing and duration for maternal-infant skin-to-skin care.

Introduction

In this decade, giving birth is a medicalized event rather than an intimate moment between two partners.[1] Based on human anatomy, a woman in active labor should be able to walk around as her body prepares to give birth. Unfortunately, inductions and epidural pain relief have become common practices that compromise fetal blood flow and oxygen supply leading to reduced oxytocin hormone and destabilization of the newborn's system.[1] As a consequence, an escalation in medical interventions, such as Caesarean section and forceps vacuum extraction, have become more common putting more stress on the neonate's regulating system.[1]

Skin-to-skin contact (SSC), often referred to as kangaroo (mother) care, is the practice of placing a naked newborn on the mother's bare chest, and covering them with a protective blanket.[2] It is a practice that attempts to replicate the environment of the womb to facilitate the neonate's transition into a world full of stimuli.[3] Unfortunately, many parents reported their infant being taken away immediately after birth without being informed of a medical reason. This is in contradiction to the recommendations of the World Health Organization[4] and the United Nations Children's Fund[5] who recommend skin-to-skin immediately after birth for at least one hour or until a first feed was accomplished and a bond established. Currently, maternal-infant separation post-birth is an underestimated clinical stressor for the neonate knowing that mortality and morbidity rates have shown to be reduced significantly when early SSC is introduced.[6,7]

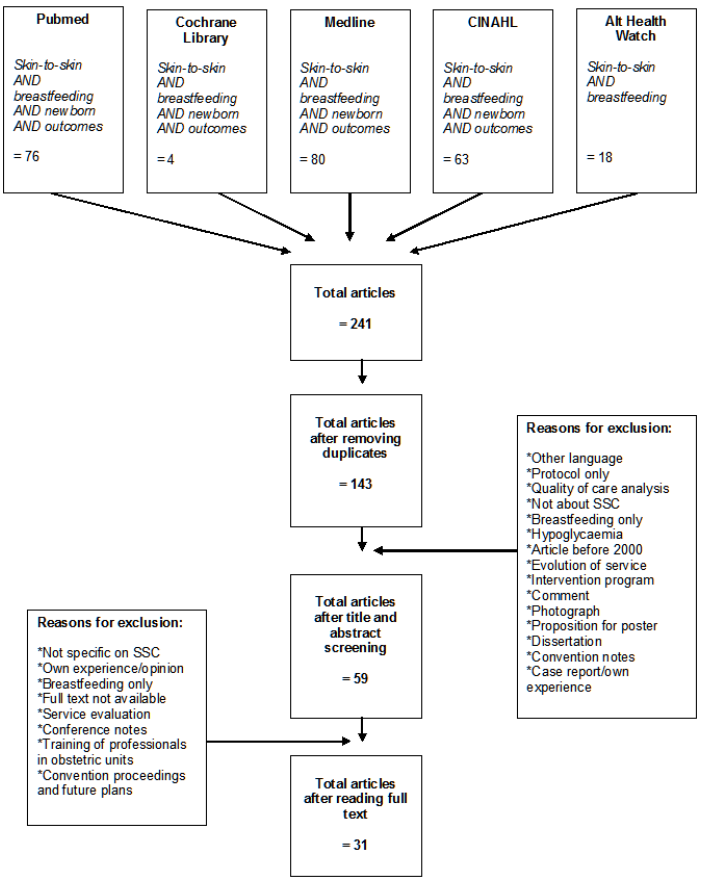
Therefore, the question arises whether it is possible to implement SSC immediately after birth by removing identified barriers. The purpose of this review is to identify the barriers interfering with immediate skin-to-skin contact and to explore the long-term benefits of this practice. The purpose of this review is to identify how the important practice of immediate skin-to-skin contact can be implemented in the medical environment without putting the neonate in danger.

Methods

A systematic search of the following online databases was

performed: PubMed, Medline, CINAHL, Cochrane Library and Alt Health Watch. Inclusion criteria required that articles were specifically about skin-to-skin contact and were in the English language. Articles published before the year 2000, dissertations, protocols, convention notes and case reports were excluded. All others were eligible for inclusion. The key terms used within the search were skin-to-skin, breastfeeding, newborn and outcomes. The Boolean command was 'AND'. In total, 241 articles were retrieved, of which 31 were eligible for this article (see Figure 1 for PRISMA flow diagram).

Figure 1: PRISMA flow diagram



Results

The literature looked at the process of giving birth and the impact identified medical interventions have on the long-term health of the neonate. In total, 31 articles were retrieved.

Skin-to-skin (SSC) is the gentle way to stimulate auditory, tactile, vestibular and thermal senses. Dani et al. found that the infant goes through several behavioral phases during SSC with its mother.[9] Birth cry, relaxation, awakening, activity, crawling, resting, familiarization, suckling (including massaging the mother's breast) and sleeping are the nine interactions enhancing the baby's engagement of all of its senses.[9] Moreover, SSC promotes self-modulation of the neonate's autonomic nervous system resulting in a shift from sympathetic dominance (fight or flight) towards parasympathetic dominance (rest and digest) thus enhancing biliary tract motility and gastrointestinal activity.[8] In addition, cardiorespiratory stability and oxygenation are eased by the vertical position in which skin-to-skin practice takes place. The upright position enhances the function of the neonatal diaphragm and it has been shown that it improves the efficiency of the pulmonary system. Improved efficiency reduces the episodes of apnea, bradycardia, respiratory stress syndrome and events of sudden oxygen desaturation, also in premature infants.[8,10,11] Also, Sarparast and colleagues reported a higher weight gain in 10.62% of their low birth participants who had received kangaroo mother care (KMC), otherwise known as skin-to-skin contact.[12] A more recent study by Conde-Agudelo and Diaz-Rossello reported not only improved weight gain, but also significant length and head circumference gain in low birth weight infants.[13] However, KMC infants showed no better psychomotor development compared to their controls at 12 months of corrected age.[13] Another benefit was noted by Moore et al.[14] They found that early SSC showed statistically significant better overall performance on all measures on breastfeeding status (earlier establishment of successful and efficient breastfeeding, earlier exhibition of pre-feeding behaviors, competent suckling) when compared to those receiving standard care, which meant the neonate was held swaddled in a blanket. A later study by Thukral et al. confirmed this association.[15] They reported that patients in the early SSC group were more likely to exclusively breastfeed at 48 hours and continue at least six weeks post-birth.

With regards to maternal-infant synchrony, meaning the matched behavior and biological rhythms between mother and child, Johnson stated that the mother-infant touch increased the oxytocin hormone and that with every breastfeeding session, the mother-infant bonding multiplies.[16] Also, this nurturing hormone let the infant feel at ease promoting regulation of emotions which may contribute to a reduction in the occurrence of chronic illnesses.[16] Moreover, Moore et al. reported higher mean scores for breastfeeding effectiveness and higher blood glucose levels in the SSC group compared to standard care.[17]

Unfortunately, several barriers to providing SSC have been identified. Caesarean surgery for example. Redshaw et al. reported that only 67% of mothers having a C-section held their infant within five minutes post-birth and only 33% held their child for longer than twenty minutes which is statistically significant knowing that 90% of women having an unassisted vaginal birth held their infant within five minutes and 67% for longer than twenty minutes.[18] Bavaro et al. explained this decrease by stating that the used anal-

gesia during this surgical intervention are responsible for a higher number of sedated mothers.[19] Neuraxial anesthesia is the most used anesthetic choice for C-section both spinal and epidural and not only does this negatively influence immediate SSC but there is the question whether it has safety implications for the infant.[19] Even though paternal-infant skin-to-skin time does not necessarily result in establishing exclusive breastfeeding, it is still strongly encouraged if the mother is not able or willing to do it.[20] It promotes development of a healthy microbiome and subsequently immunity via the familial bacteria on the skin of the father as it did not have microbial colonization via the birth canal and at the same time, it gives the father the opportunity to bond with his child.[20,21]

Currently, premature and/or low birth infants discharged from the neonatal intensive care unit (NICU) show altered learning scaffolds for motor, tactile and multisensory explorations of the environment as well as for social-emotional interactions.[22] This can be related to the repeated painful procedures they have to undergo, which alters their sensory processing to both light touch and nociception.[22] Cong et al. reported that preterm infants in NICU experience at least 643 acute procedures (23 daily) and 1193 hours of chronic events (43 daily) during their first four weeks in hospital.[6] More parental presence demonstrated improved function of the neurochemical system and it modulated stress regulation which indicated that skin-to-skin practice could be used as a pain and stress treatment.[6] Although many pre- and full-term infants undergo painful needle-related procedures (e.g. vaccinations, blood sampling…) during their first hours to first months of life, rarely is skin-to-skin suggested as a natural self-regulator or painkiller for both infant and mother.[23,24] Walter-Nicolet et al. reported a reduced hypothalamus pituitary-adrenal activity in response to pain with SSC.[25]

Disagreement still exists about the optimal duration of SSC or KMC. Casper et al. recommends at least three hours a day, while Park believes at least 20 out of 24 hours should be spent skin-to-skin.[3,11] The International Network on Kangaroo Mother Care recommends almost continuous skin-to-skin contact as the best 'intervention', emphasizing its benefits in NICU's.[20]

Discussion

With regards to the question whether skin-to-skin has beneficial impacts for the (long-term) development of the newborn, there is no doubt. Better (exclusive) breastfeeding outcomes, improved height, weight and head circumference measurements, higher physiological and cardiorespiratory stability are amongst it's benefits. SSC also engages all of the infant's senses stimulating long-term neurological and musculoskeletal development.[8,10,11]

Unfortunately, these benefits are overshadowed by the current medicalization of giving birth pre-, peri- and postnatally.[8,10,11] Although healthcare professionals do acknowledge the benefits of skin-to-skin care for neurologic and musculoskeletal development of the infant, they still have difficulties transitioning from the prevailing techniques and technologies. Naturally, a newborn needs to only experience skin-to-skin time with the mother to enhance all regulatory systems and to stimulate a first breastfeed taking place.[1] Unfortunately, an interview study at the postoperative ward, after C-section, confirmed that healthcare professionals working there, do not consider SSC practice important to implement.[26] They believe that carrying out postnatal examination procedures performed before placing the neonate in the mother's arms, will not disrupt the skin-to-skin long-term benefits.[26] Moreover, Moreira et al. reported that some procedures, such as giving the newborn extra oxygen and/or carrying out upper airway or gastric aspiration, are done out of habit regardless whether they are actually necessary or not.[27] The presence of a doula has therefore been suggested. She can act as the communication channel between parents and physicians and is able to guarantee that all interventions are in the best interest of the newborn.[26,28]

Another promising alternative would be the presence of a transition nurse. Several nurses have reported that it is often confusing who carries the responsibility of the child when several physicians are carrying out their interventions. For example, the nurses want to check the vital signs of the infant while the midwife's role is to protect, promote and support early breastfeeding.[28] Both want to have access to the newborn but who is in charge when something goes wrong? A transition nurse would be the ideal solution to resolve this dilemma.[26,28]

When considering barriers to skin-to-skin contact, prematurity or birth by C-section are two of the many challenges for early kangaroo mother care. It was raised by Penn that healthcare professionals in NICU's are often focused on short-term life-saving events.[29] Also, intensive care unit nurses did admit that gaining access to the mother to start postoperative monitoring was their main concern compared to the midwife's priority of establishing skin-to-skin.[26]

In the future, educating all healthcare professionals, who are involved in pregnancy and birthing processes, what skin-to-skin is and how it can be achieved even in more challenging cases, would be beneficial. Important to mention is the influence of the anesthesiologist on skin-to-skin interactions. The review by Stevens et al. identified an article stating that C-section babies having SSC with their father started to reach the nipple sooner than when having SSC with their mother.[30] They attributed this finding to chlorhexidine which was applied to the mother's chest be-

fore surgery. Also, failure to establish SSC due to maternal refusal was related to the mother's feeling of drowsiness due to intrapartum epidural or other analgesia resulting in anxiety to nurture their infant.[19,29]

However, as previously mentioned, these barriers could be overcome by the presence of a doula or transition nurse within the birth room, who prioritizes the newborn's and mother's health, implements SSC when possible and prevents them from any harm happening.[30,31]

Another co-factor affecting early SSC is the fear of hypothermia in low birth weight or premature infants. Nevertheless, Browne found that the naturalistic environment of the mother's body can provide sufficient warmth to maintain thermoregulation.[24] A later study by Hubbard and Gattman looked at pre-term infants (<34 weeks and 6 days), under the condition that they were stable and monitored closely, increased physiologic stability was observed.[20] Reduced length of hospital stay was a consequence of KMC.[32,33]

Unfortunately, this review identified several limitations to the included studies. First of all, not all studies were clear on the definition of skin-to-skin. Also, it was not always stated clearly whether the child was placed naked on the mother's bare chest or whether he or she was wrapped into a blanket. Thirdly, the reasons for not offering SSC were not always indicated. Whether it was a parental choice, or because the present healthcare professionals were busy carrying out their normal routines without considering the benefits of early SSC for mother and child or out of organizational and/or psychosocial reasons as suggested by Zwedberg and colleagues.[26] They commented on the high workload at the postoperative ward as well as a mixed population in the maternity ward. Often, there are women present on the ward who have had a miscarriage or stillbirth. It is viewed as inappropriate to have mother's engaging in SSC and breastfeeding in close proximity.

In conclusion, the duration and timing of SSC or KMC were not always clearly defined. Does early SSC mean it was within a couple of minutes? Or hours? How long should it be maintained to be highly beneficial? Future research investigating SSC postnatally should be designed to resolve the question of optimal SSC durations and promote achieving SSC as soon as possible postnatally.

Conclusion

Care for newborns and their mother pre-, peri- and postnatally is a sensitive measure of the functionality of any health system. Under the condition that the newborn is stable, skin-to-skin is the best, most simple and cost-effective life-saving and life-prolonging practice a child can receive. There exists enough supporting documentation showing the effectiveness of kangaroo mother care on the musculoskeletal and mental health of the newborn. Healthcare professionals and the mother infant dyad would benefit from further education on the benefits of skin-to-skin immediately after birth to include practical guidelines and to implement it within the context of what they perceive as medically necessary interventions and postnatal routines.

References

1. Bergman J, Bergman N. Whose choice? Advocating birthing practices according to baby's biological needs. *The Journal of Perinatal Education* 2013; 22(1): 8-13.

2. Sharma A. Efficacy of early skin-to-skin contact on the rate of exclusive breastfeeding in term neonates: a randomized controlled trial. **African Health Sciences** 2016; 16(3): 790-797.

3. Park L. A home. *International Journal of Childbirth Education* 2010; 25(1): 19-20.

4. World Health Organization. *WHO recommendations on Newborn Health*. https://apps.who.int/iris/bitstream/handle/10665/259269/WHO-MCA-17.07-eng.pdf;jsessionid=2F615EC9607857F666438FE8AC18392C?sequence=1. 2017. 5 January 2019.

5. Unicef. *The Baby Friendly Standards*. https://www.unicef.org.uk/babyfriendly/about/standards/. 2019. 5 January 2019.

6. Cong X, Wu J, Vittner D, Xu W, Hussain N, Galvin S, Fitzsimons M, McGrath JM, Henderson WA. The impact of cumulative pain/stress on neurobehavioral development of preterm infants in NICU. *Early Human Development* 2017; 108: 9-16.

7. Lawn JE, Mwansa-Kambafwile J, Horta BL, Barros FC, Cousens S. 'Kangaroo mother care' to prevent neonatal deaths due to preterm birth complications. *International Journal of Epidemiology* 2010; 39: i144-154.

8. Jefferies AL. Kangaroo care for the preterm infant and family. *Paediatrics Child Health* 2012; 17(3): 141-143.

9. Dani C, Cecchi A, Commare A, Rapisardi G, Breschi R, Pratesi S. Behavior of the newborn during skin-to-skin. *Journal of Human Lactation* 2015; 31(3), 452-457.

10. Aucott S, Sonohue PK, Atkins E, Allen MC. Neurodevelopmental care in the NICU. *Mental retardation and developmental disabilities research reviews* 2002; 8: 298-308.

11. Casper C, Sarapuk I, Pvalyshyn H. Regular and prolonged skin-to-skin contact improves short-term outcomes for very preterm infants: A dose-dependent intervention. *Archives of Pediatric* 2018; 25(8): 469-475.

12. Sarparast L, Farhadi R, Sarparast M, Shafai S. The effect of kangaroo mother care on neonatal outcomes in Iranian Hospitals: A review. *Journal of Pedatric Reviews* 2015; 3(1): e195.

13. Conde-Agudelo A, Diaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants (Review). *Cochrane Database of Systematic Reviews* 2017; 8

14. Moore ER, Anderson GC. Randomized controlled trial of very early mother-infant skin-to-skin contact and breastfeeding status. *Elsevier* 2007; 52(2): 116-125.

15. Thukral A, Sankar MJ, Agarwal R, Gupta N, Deorari AK, Paul VK. Early skin-to-skin contact and breast-feeding behavior in term neonates: A randomized controlled trial. *Neonatology* 2012; 102: 114-119.

16. Johnson K. Maternal-Infant bonding, A review of the literature. *International Journal of Childbirth Education* 2013; 28(3): 17-22.

17. Moore ER, Bergman N, Anderson GC, Medley N. Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database of Systematic Reviews* 2016; 16.

18. Redshaw M, Hennegan J, Kruske S. Holding the baby: Early mother-infant contact after childbirth and outcomes. *Midwifery* 2014; 30: e177-187.

19. Bavaro JB, Mendoza JL, McCarthy RJ, Toledo P, Bauchat JR. Maternal sedation during scheduled versus unscheduled cesarean delivery: implications for skin-to-skin contact. *International Journal of Obstetric Anaesthesia* 2016; 27: 17-24.

20. Hubbard JM, Gattman KR. Parent-infant skin-to-skin contact following birth: History, benefits, and challenges. *Neonatal network* 2017; 36(2): 89-97.

21. Guala A, Boscardini L, Visentin R, Angellotti P, Grugni L, Barbaglia M, Chapin E, Castelli E, Finale E. Skin-to-skin contact in cesarean birth and duration of breastfeeding: A cohort study. *The Scientific World Journal* 2017.

22. Maitre NL, Key AP, Chorna OD, Slaughter JC, Matusz PJ, Wallace MT, Murray MM. The dual nature of early-life experience on somatosensory processing in the human infant brain. *Current Biology* 2017; 27(7): 1048-1054.

23. Bueno M, Costa RN, de Camargo PP, Costa T, Harrison D. Evaluation of a parent-targeted video in Portuguese to improve pain management practices in neonates. *Journal of Clinical Nursing* 2018; 27: 1153-1159.

24. Browne JV. Early relationship environments: physiology of skin-to-skin contact for parents and their preterm infants. *Clinics in Perinatology* 2004; 31: 287-298.

25. Walter-Nicolet E, Annequin D, Biran V, Mitanchez D, Tourniaire B. Pain management in newborns: From prevention to treatment. *Pediatric Drugs* 2010; 12(6): 353-365.

26. Zwedberg S, Huss M, Karlsson E, Poignant M. Intensive care nurses' experiences of infants and partners' presence on the postoperative ward after an emergency caesarean section; an interview study. *Intensive and Critical Care Nursing* 2017; 41: 71-76.

27. Moreira MEL, da Gama SGN, Pereira APE, da Silva AAM, Lansky S, Pinheiro RS, Gonçalves AC, Leal MC. Clinical practices in the hospital care of healthy newborn infant in Brazil. *Cadernos de Saude Publica* 2014; 1: S1-S2.

28. Brady K, Bulpitt D, Chiarelli C. An interprofessional quality improvement project to implement maternal/infant skin-to-skin contact during cesarean delivery. *Journal of Obstetric, Gynecologic & Neonatal Nursing* 2014; 43: 488-496.

29. Penn S. Overcoming the barriers to using kangaroo care in neonatal settings. *Nursing children and young people* 2015; 27: 22-27.

30. Stevens J, Schmied V, Burns E, Dahlen H. Immediate or early skin-to-skin contact after a Caesarean section: a review of the literature. *Maternal and Child Nutrition* 2014; 10: 456-473.

31. Sundin CS, Mazac LB. Implementing skin-to-skin care in the operating room after cesarean birth. *The American Journal of Maternal Child Nursing* 2015; 40(4): 249-255.

32. Boo NY, Jamli FM. Short duration of skin-to-skin contact: Effects on growth and breastfeeding. *Journal of Pediatrics and Child Health* 2007; 43: 831-836.

33. Charpak N, Ruiz-Pelaez JG, Figueroa Z, Charpak Y. A randomized controlled trial of kangaroo mother care: Results of follow-up at 1 year of corrected age. *Pediatrics* 2001; 108(5): 1071-1079.