

Skin-to-skin care: The power of touch

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Abstract

Skin-to-skin care (SSC) is the prolonged holding of a diaper-clad neonate to the bare chest of the mother shortly after birth. It facilitates and strengthens the maternal-infant bond, in turn bettering the health and wellness of each. The therapeutic effects of SSC have been widely researched and discussed. Despite its popularity, however, new mothers may not know nor understand the nuances of SSC, thereby discontinuing its practice too soon to reap all available benefits. This paper features analyses of disparate studies illustrating the vast benefits that mothers and their neonates obtain from SSC. Searches were conducted utilizing the CINAHL Plus database of peer-reviewed articles using key terms ‘skin-to-skin care’, ‘preterm’, and ‘kangaroo care.’ The objective of this literature review is to promote earlier initiation of SSC and better maternal knowledge and understanding of short-term and long-term effects of SSC. Further, labor and delivery nurses will be able to provide their patients with pertinent knowledge to guide home skin-to-skin care. The analyses of the findings will contribute to a growing area of study and are aimed at improving the health of mothers and infants in the nation and bettering the nurse and patient education system in the healthcare environment.

Keywords: skin-to-skin care, kangaroo care, mothers, preterm, neonates, development

Introduction

Skin-to-skin care (SSC) ¹ is a method of care that began in the 1970s. A shortage of incubators in Bogotá, Columbia necessitated the use of natural, maternal body heat to provide physiological stabilization and comfort to the newborns. Clinical trials were performed to assess the applications of SSC. The results of the studies indicated that SSC is both safe and did not have increased risks associated with the practice. By the early 1990s the success of SSC spread and news of its significance arrived in Europe and the United States where it later became a popular option of care (Feldman, 2004). Although holding a swaddled newborn infant is standard practice, SSC is unique in that it is prolonged holding. In addition, physical barriers such as clothing, are limited if not completely removed. The practice of SSC can ameliorate some of the postnatal complications that mothers and preterm infants face. Such complications include, but are not limited to, difficulty maintaining body temperature, difficulty breathing, difficulty feeding, and infections (World Health Organization, 2013). SSC has proven to be widely beneficial to both full-term (Feldman-Winter & Goldsmith, 2016; Phillips, 2013) and preterm infants. This literature review, however, reflects upon studies that analyze the short-term and long-term effects of SSC on the mother-preterm infant dyad. Special measures

should be taken when dealing with the delicate life of a preterm infant. The ways in which they are cared for during the immediate postpartum period will have an effect on their later development. There is a “sensitive” period after birth “during which close contact between the mother and infant may induce long-term positive effect on mother-infant interaction” (Bystrova et al., 2009). Although the research that Bystrova and colleagues performed assessed SSC of full-term infants, the existence of a “sensitive period” for preterm infants can be extrapolated because they are born early and underdeveloped and mothers may experience trauma as a result of the preterm birth (Muller-Nix et al., 2004).

It is thus important, if not imperative, that the medical community assist mothers with the provision of SSC as soon as possible after the birth in order to ensure that the dyad benefits from its physiological and psychological effects.

The Benefits of Skin-to-Skin Care

Researchers have studied the disparate effects of SSC on the mother, the infant, and the dyad relationship. Such effects range from physiological stabilization (Phillips, 2013) to decreased maternal postpartum depressive symptoms (Bigelow, Power, MacLellan-Peters, Alex & Claudette, 2012). SSC also assists mothers with breastfeeding, improves breastfeeding

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¹ For a list of terms and abbreviations please consult the glossary at the end of the article

outcomes (Hake-Brooks & Anderson, 2008), and is proven to alleviate pain that preterm neonates experience due to stressful standard procedures (Castral, Warnock, Leite, Haas, & Scochi, 2008; Lyngstad, Tandberg, Storm, Ekeberg, & Moen, 2014). However, there are barriers that may inhibit the immediate implementation of SSC or interrupt it, such as visitors to patient rooms and maternal perceptions of lack in privacy (Anderson et al., 2003; Ferrarello & Hatfield, 2014). A better understanding of SSC will lead to community championing of SSC standardization in the hospital as well as instill confidence in mothers to continue the practice at home.

Benefits to the Mother

Mothers face many disparate challenges during the journey of motherhood. Their experiences are affected by the presence of prenatal and postnatal complications that accompany preterm neonate birth (Muller-Nix et al., 2004) such as postpartum depression and stress. The mental and physical health of the mother, if poor, may cause devastating effects to the mother-neonate relationship, thereby hindering the development of the baby. In order to improve their quality of life, the care that is provided at the time of and after birth should be of the best quality. For both the mother and infant to thrive, both should be at the optimal level of health and wellbeing. The strength of one affects the strength of the other and the converse is also true. SSC is strongly correlated to improved health of the mother and her outlook on motherhood, especially because she is capable of caring for a being other than herself. It is intrinsically and extrinsically rewarding to the human being.

Breastfeeding

SSC allows mothers to easily breastfeed due to the proximity and position of the neonate (Feldman, 2004). Once comfortable with holding the neonate, breastfeeding is less of a challenge. Infant latch is instinctual preterm babies, however, may have some difficulties. It is the responsibility of the nurse to guide the mother to breastfeed the preterm infant. SSC can ease the difficulties and make breastfeeding a more enjoyable experience for the mother and the neonate. Further, oxytocin is a hormone that is released during breastfeeding via hand movement and suckling (Feldman, 2004). It is a hormone well-known to foster love and trust, positive feelings that facilitate the emotional bonding between mother and neonate. The presence of oxytocin during the postpartum period has been known to help return the uterus to its pre-pregnancy size and reduce uterine bleeding after birth. Oxytocin thus functions in a healing fashion, both physically and emotionally. It is only one aspect of breastfeeding's numerous benefits. In a study conducted

by Vittner et al. (2017), increase in oxytocin levels as a result of SSC improved parental and neonatal well-being. The neonates experienced decreased stress as indicated by decreased salivary cortisol levels and parents reported decreased anxiety (Vittner et al., 2017). SSC facilitates breastfeeding in the hospital, it also helps prolong breastfeeding long after the postpartum period of six weeks. A randomized controlled clinical trial that assessed the impact of kangaroo care (KC) on breastfeeding illustrates the importance of immediate SSC or KC (Hake-brooks & Anderson, 2008). Mothers that participated in providing SSC for unlimited amounts of time continued to breastfeed much more than those in the control group provided standard care, or those who held the neonates were wrapped in blankets, during the hospital stay. Nurses measured the amount and type of feeding on a three-tiered scale: mothers' own breastmilk, formula, or little to feeding, and researchers analyzed the recorded data. The nurse researchers were also responsible for educating the mothers; they helped the mothers with the breastfeeding processes initially and taught them how to recognize subtle infant cues and how to respond to the cues. When the researchers followed up with the mothers at 6 weeks and 3 months and then interviewed the mothers at 6, 12, and 18 months, they found that the KC dyads breastfed for about 5 months compared to 2 months for the control group. Mothers in the KC dyads also breastfed with more of their own milk and provided less of the mixed formula (Hake-Brooks & Anderson, 2008).

Improved mental health

Preterm birth causes a lot of stress for the mother. She may be concerned with the health of her neonate, especially if the outlook is grim. Preterm infants require immediate attention in order to address the complications that accompany their entrance into the outside world and this may lead to separation, hindering immediate SSC. Although SSC as soon as possible is desired, it is not always allowed, as the priority of healthcare providers is to ensure that the neonate is stable. This separation is both stressful for the neonate and the mother, who may feel extremely anxious and become depressed. A study of mothers with full-term infants revealed that SSC can appease the stress and decrease postpartum depressive symptoms (Bigelow et al., 2012). Mothers self-reported how they felt and their salivary cortisol levels were measured at 1 month postpartum. Researchers found that mothers who participated in the practice of SSC had lower levels of cortisol at the one-week and one-month visits when the samples were collected. Cortisol is a hormone that is released during times of stress (Bigelow et al., 2012). Studies of mothers and their preterm infants and the cortisol levels are not abundant, however, some longitudinal studies illustrate that SSC can improve how

the mother feels about her skills and understanding preterm infant cues. The comfort and fluency of the mother-infant interactions may indicate less distress and more eustress.

Benefits to Neonates

The premature neonate is fragile and highly impressionable. SSC improves the physiological stabilization and maturity of the neonate. The abundant care and attention they are given will better their childhood development, during a time that they may experience decreased motor and cognitive skills (Feldman, Eidelman, Sirota, & Weller, 2002). The health of the neonate affects the relationship that the infant has with the mother. Because preterm neonates may have difficulties with attention and focus, mothers have a difficult time interacting with the neonate. This causes disruptions in their relationships and may hinder the bonding. SSC can ameliorate the postnatal complications, and improve the physical and mental state of the neonate, thereby strengthening the dyad bond. It is of utmost importance to analyze the benefits in order to educate mothers about how they can proactively care for their neonates and further promote SSC in the home setting after the dyad is discharged from the hospital.

Physiological stabilization and development

As outlined earlier, SSC improves the mother's ability to breastfeed; the proximity allows her to learn her infant's cues and respond with fluency and ease. Not only does breastfeeding facilitate the mother, it is beneficial to the neonate as well. The mother is able to bond with her neonate and learn more about the beautiful human she has nurtured. When the neonate is held to the mother's bare chest, he or she is exposed to the microbes that are on the mother's skin. The microbes from the hospital, called nosocomial pathogens, will trigger the mother's immune system to develop antibodies against the pathogens, which can be harmful and illness-inducing. The antibodies that the mother's body builds are then transmitted to the neonate via breastmilk. This creates protection for the neonate and strengthens the immune system (Hake-Brooks & Anderson, 2008). Breastfeeding also has been shown to improve motor maturity. In a longitudinal study conducted by Ruth Feldman and Arthur Eidelman, infants that received large quantities of breastmilk "showed better neurobehavioral profiles...they were also more alert during social interactions, and their mothers provided more affectionate touch" (Feldman & Eidelman, 2003a).

Because preterm neonates may also experience dysbiosis, imbalanced gut function, they may have trouble with some bodily functions and experience discomfort. SSC assists with the maturation of the

microbiome in the preterm neonate. The microbiome is the host of microorganisms that are accumulated throughout life. Those that are acquired early in life, postnatally especially, will affect the health and development of the individual. Through samples of saliva taken from the neonates' mouths, the researchers concluded that preterm neonates that participated in SSC with their mothers had an abundant collection of microbes that resembled those of the older, healthier neonates (Hendricks-Muñoz et al., 2015).

Management of pain

Preterm infants are sensitive to stimuli such as bright lights, loud noise, and touch, frequently prevalent in neonatal intensive care units (NICUs). Their senses may be heightened and they may be more prone to feeling distress as a result. Measures have been designed to appease the anxiety and pain that standard procedures may elicit. Researchers have analyzed pain in preterm infants; one particular study measures the change in facial action (NFCS), behavioral state, crying, and heart rate, all of which have been linked to the expression of pain (Castral, Warnock, Leite, Haas, & Scochi, 2008). When mothers held their neonates for fifteen minutes before, during, and fifteen minutes after the standard heel prick procedure, researchers recorded the neonates' faces and analyzed the NFCS (brow bulge, eye squeeze, naso-labial furrow, open lips vertical mouth stretch, horizontal mouth, lip purse, taut tongue and chin quiver). They found that neonates held by their mothers and engaged in SSC had lower NFCS scores; i.e. they cried less during the procedure and had shorter cry duration during the recovery period. Compared to the neonates that did not have SSC with their mothers, those that did "appeared calmer and more organized during wound compression and recovery" (Castral et al., 2008).

Decreased stress and anxiety

In addition to the standard procedure of heel pricks, neonates experience many diaper changes during the duration of the hospital stay and later when they are discharged. The excessive stress that neonates experience during diaper changes may cause "long-term sequelae and sensitize the infant to pain and stress later in life" (Lyngstad, Tandberg, Storm, Ekeberg, & Moen, 2014). In their randomized crossover pilot study, Lyngstad et al. investigate if diaper changes cause stress in the preterm infant and if SSC can appease it (2014). The researchers analyzed changes in skin conductance and determined that diaper changes are indeed stress-inducing and the soothing touch of the mother does in fact decrease neonate stress. Although mothers did not engage in SSC, they were present for the diaper change and were able to touch the neonates' heads and bodies while speaking to them in soothing voices. The mothers in the control group were instructed not to touch the

infants and not to speak to them. The infants in close proximity to their mothers during the routine procedure had lower heart rates and respiratory rates, as well as less skin conductance, indicative of lowered stress levels. Because preterm infants may find diaper changes to be painful due to heightened algesia, sensitivity to pain, it is important to analyze how the mother's touch in this research facilitated the amelioration of stress. The neonate could not lie in the prone position on the mother's chest due to the space needed to perform the diaper change, thus, changes can be made to the method of SSC so that it is possible. One solution might be allowing the mother to change the diaper. Healthcare professionals will need to teach the mother, especially if the preterm neonate is her first child, however, this may increase her comfort with providing care measures and facilitate the transition from hospital to home care after the dyad is discharged.

Neonate self-regulation and maturation

Another complication that preterm infants face is difficulty in self-regulation of their physiological mechanisms, due primarily to their underdevelopment. One study illustrates the effects that SSC can have on the preterm neonate's autonomic and neurobehavioral health. Analysis of vagal tone, how respiration affects heart rate variability, determines the infant's ability to regulate the body in response to stress. In one study, 35 preterm infants received KC for a total of 29.76 hours over the course of 24.31 days (Feldman & Eidelman, 2003b). Infants that had KC with their mothers had "more rapid improvement in state organization in terms of longer periods of quiet sleep and alert wakefulness and shorter periods of active sleep (Feldman & Eidelman, 2003b). The findings of this study are valuable, because preterm infants typically exhibit less organized sleep-wake rhythmicity (Feldman & Eidelman, 2003b). Sleep is important to the physical health of the preterm infant, as it is a time of recovery and rest. In addition to aiding self-regulation in the preterm infant, SSC promotes arousal. The preterm infant may have difficulties responding to stimuli, or they may be too sensitive to them. In a study by Ruth Feldman, Aron Weller, Lea Sirota, and Arthur Eidelman, preterm infants from different hospitals were matched and compared (2002). The study was conducted in Israel, where KC is standard care in some hospitals; thus, randomization of the groups would not have been ethical. They found that at 3 months, "KC infants had higher thresholds to negative emotionality and more efficient arousal modulation while attending to increasingly complex stimuli" and at 6 months "longer duration of and shorter latencies to mother-infant shared attention and infant sustained exploration in a toy session were found for KC infants" (Feldman et al., 2002).

Benefits to the dyad

SSC benefits the mother and the preterm neonate individually. They bolster physical and mental health conditions. When each individual in the dyad is healthier and happier, the relationship between the two is less strained. The relationship, if strong, can further benefit the health of the mother and neonate; it is therefore important to analyze how SSC can benefit the dyad as a pair. Many of the long-term effects of SSC entail the development of the neonate and the mother-neonate relationship. The focus is primarily on the psychological and cognitive maturation as well as the interactions of the dyad and how SSC facilitates engagement and enrichment.

Maternal sensitivity

SSC provides moments of peace for the mother. She is able to look at, touch, talk to, and breastfeed her infant. The time that she spends with her infant will increase her sensitivity to infant cues and affect her competency of motherhood. The parent-child interaction is dependent upon the development of the neonate. The converse is also true. Thus, it is of great importance to review and discuss how SSC can play a role in bolstering both interactions and neonate cognitive and motor development. Another study by Ruth Feldman, Arthur Eidelman, Lea Sirota, and Aron Weller analyze the impact that KC has on mother-child interactions. The researchers found that after KC, the interactions between the mother and child were more positive at 37 weeks gestation. The mothers "showed more positive affect, touch, and adaption to infant cues" while the infants displayed higher levels of attention, alertness, and less gaze aversion (Feldman, Eidelman, Sirota, & Weller, 2002). Feldman et al. hypothesize that the improved interactions were a result of better parental mood, perceptions, and interactive behavior. Their home visits entailed studies of their interactions, namely maternal sensitivity by analyses of "acknowledgement of infant's interactive signals, elaboration of the child's vocalizations and movements, warm and positive affect, affectionate tone of voice..." (Feldman et al., 2002). These factors, and others, were witnessed more in the dyads that experienced KC during the immediate postpartum period and continued it after the hospital stay.

Improved interactions

Families that experience KC engage in reciprocal interactions and engage in affectionate touch, more so than families that do not participate in KC. Families participated in a training program that educated them on the importance of SSC (Feldman, Weller, Sirota, & Eidelman, 2003). Those that engaged in SSC during the postpartum period were more likely to touch their preterm infant during play at three months. The infants

“showed less negative affect” and the family style was more cohesive.” In addition, the infant was placed in closer proximity during play, thereby improving and increasing mutual gaze and touch when the mother, father, and infant played together (Feldman et al., 2003).

Development throughout childhood

Finally, a study that followed preterm infants across their first ten years of life reveal that KC infants have improved physiologic organization and mother-child reciprocity (Feldman, Rosenthal, & Eidelman, 2014). The research highlights the importance of early intervention and the ability of improved care in the hospital to benefit the dyad in the long run. KC was implemented for two consecutive weeks, an hour per day, and preterm infants were then visited and studied seven different times over the first decade of their life. The researchers visited them and analyzed their physiological and cognitive health and measured the mental health of the parent and the relationship between mother and child. They assessed sleep organization, stress reactivity, cognitive development via standardized tests, and much more. At term age, KC infants had more organized sleep cycles and mothers reported lower anxiety; however, at ten years, a difference between KC mothers and control mothers was not found. This may illustrate the ability of preterm infants to later match infants of further development in life; whether this is due to the SSC intervention or not remains unknown. It is, however, hypothesized that SSC facilitates speedy maturation. Furthermore, following the KC intervention, the mothers provided “more attachment behavior across the postpartum period and showed greater mother-child reciprocity at ten years” (Feldman et al., 2014). The primary, pertinent findings of this research include “an attenuated stress response, more mature autonomic functioning, organized sleep, better cognitive control...” (Feldman et al., 2014). This research is the first to illustrate the power of prolonged postnatal touch and care having an impact long after the postpartum period. It further proves that interventions during the early stages can better the health state of preterm infants and their mothers, underlining the importance of studying SSC and promoting its implementation into standard hospital practice.

Barriers to Skin-to-Skin Care

Despite the significance of the findings in the aforementioned studies and the fact that they are only a few of the many that discuss the benefits of SSC, barriers to skin-to-skin care remain present in the hospital setting. Hindrances prevent the immediate implementation of SSC and may interrupt it. A few

studies and surveys have been conducted to gauge the opinions of the mothers and the nurses caring for them.

A survey of fourteen mothers and fifteen nurses in a mixed methods research study revealed that there are many hindrances preventing immediate SSC postpartum. Although the study included mothers of healthy, full-term infants, it can be hypothesized that the reported barriers may be similar to those that preterm mothers experience. Preterm mothers may experience the barriers on a different scale, i.e. their anxiety may be heightened and they may be in varying states of stress; it is important to discuss this study in order to better gauge necessary actions in order to overcome the barriers. Mothers reported others wanting to hold the baby, safety concerns in relation to grogginess and fatigue, visitors in the room, and pain from Cesarean sections. The nurses caring for them noted that visitors in the room, the mothers’ grogginess, mothers’ concerns about modesty, mothers’ unawareness of SSC’s benefits, and others wanting to hold the baby were barriers (Ferrarello & Hatfield, 2014).

Skin-to-skin contact should continue in the home setting as well. It is equally important to implement SSC in the hospital as it is in the domestic environment. Although other stressors and responsibilities in the home may exist, it is vital that the mother continues to practice what she has learned from the nurses during her stay, because of the existing and further researched benefits to both the mother and neonate.

Research conducted by Blomqvist, Frölund, Rubertsson, and Nyqvist (2012) illustrates the perceived barriers by parents in the NICU. The researchers found that a majority of the parents they studied continued the provision of KC to some extent once they were discharged from the hospital; they wanted to assess the reasons for continuation or lack thereof. Blomqvist et al. found that parental understanding of the benefits of kangaroo care motivated them to be persistent about its practice. However, at home, there were many distractors that limited the time that mothers could spend providing KC and SSC. Further, many of the parents would practice SSC when they felt that it was comfortable, but not frequently throughout the day. This study, amongst others, emphasizes the importance of the NICU environment and its staff in influencing parents, mothers especially, to continue SSC in the home. One major finding in this study is as follows: support from the other parent, support from the staff members, the time and opportunity to be with the infant a majority of their stay, and the privacy that the NICU staff allowed improved parental willingness to participate in SSC and continue it after discharged from the hospital (Blomqvist et al., 2012). Further research is needed to assess how well nurses are educating their parents and providing the optimal environment for SSC in order to improve outcomes of mother-neonate SSC in the home

and elsewhere after being educated in the hospital setting. Potential solutions to overcome the barriers mentioned in the aforementioned studies include improving nursing practice and communication between hospital staff and patients.

Significance and Implications

Critical analyses of SSC is imperative to better understanding the improvements that should be made to hospital policies. Mothers, when educated about the benefits of SSC, are more likely to participate in active touch and care of their preterm infant. When doing so, they are able to reap the benefits of improved self-image, improved mental health, a strengthened bond and healthy perception of their neonate, and more. The detrimental effects of entering the world too early are ameliorated with skin-to-skin care and neonates are able to self-stabilize their physiological states and have improved developmental outcomes as they grow. The medical community should guide mothers and their families to provide an environment that promotes and facilitates the provision of SSC in order to improve the health and development of the preterm infant. Further research is needed to assess the optimal amount of time that the dyad contributes to sharing skin-to-skin contact. In addition, more studies that analyze the function of SSC to facilitate mother-neonate attachment should be conducted. Research thus far has indicated that the benefits of SSC far outweigh the risks. Thus, continuing to assess hospital policies and nursing education about SSC is pertinent and valuable to the field of healthcare and understanding of life.

Glossary of abbreviations and key terms

Dyad: a pair of individuals in an interactive, significant relationship

Full-term: infants born at 37 weeks gestation or later

KC: Kangaroo care; used interchangeably with SSC; primarily used to describe care for preterm infants

Neonate: newborn infants less than one month old

Preterm: infants born before 37 weeks gestation

Premature: infants born before 37 weeks gestation and lacking full organ development

SSC: Skin-to-skin care; mother holds naked or diaper-clad infant to her bare chest for prolonged period of time

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