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Chapter

Literacy on Skin-to-Skin Contact

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Abstract

Strong scientific evidence supports the importance of practicing skin-to-skin contact immediately after childbirth. It is considered a unique time that provides vital advantages and short- and long-term health benefits for infants and mothers. Skin-to-skin contact has proved to enhance social and emotional development and attachment. Other benefits of skin-to-skin contact are the high impact on promoting breastfeeding and healthy eating behaviors. It promotes neurophysiological adjustment to postnatal life. Newborn infants who received SSC cry less, and mothers experience fewer maternal depression symptoms. The newborn infants experienced less pain responding to vitamin K intramuscular injections. This practice has a great value, and it is a natural and instinctive behavior; therefore, it is essential to convey understandable information to pregnant women and their families, permitting them to follow health-informed decisions to support SSC as the best start for their babies.

Keywords: Skin-to-skin contact, breastfeeding, infant health, nutrition, development

1. Introduction

Personal health literacy (PHL) is defined as a person’s capacity to procure, understand, and use health information and services needed to make appropriate health decisions and pursue actions for themselves and others [1]. Then, literacy on skin-to-skin contact (SSC) aims to convey understandable information pristinely, providing evidence-based information.

The mother and newborn infant have a physiological need to stay together in SSC, immediately after delivery and in the days and months following birth [2]. SSC is the naked newborn infant’s contact with the abdomen or maternal breast without any separation; it is immediate and uninterrupted after birth and should happen for at least sixty minutes without interruptions [3–5].

This chapter presents the relevant scientific evidence on SSC, for a significant impact on health and nutrition during the life of the human being [3, 5].

Current research shows the multiple benefits for both mother and newborn infant [4, 6]. The first hour of life is a particular time called the sensitive period; the newborn baby presents high levels of catecholamines that keep the child in an alert state; meanwhile, the mother’s hormonal response of oxytocin and prolactin supports bonding [6, 7]. The practice calms and relaxes both mother and baby, meanwhile regulating the baby’s heart rate and breathing, helping them to better adapt to life outside the womb, stimulating digestion and interest in feeding, regulating temperature, enabling the colonization of the baby’s skin with the mother’s friendly bacteria,
thus protecting the baby against infection, and stimulates the release of hormones to support breastfeeding and mothering [7].

In the neonatal unit (NU) improves oxygen saturation, reduces stress levels, particularly following painful procedures, encourages pre-feeding behavior, assists with growth, may reduce hospital stay; improves milk volume if the mother expresses following a period of SSC, with the expressed milk containing the most up-to-date antibodies [6, 7].

In summary, the advantages for a mother's health include the early expulsion of the placenta and reduction of hemorrhage [2, 7]. SSC empowers mothers and enhances parent-infant bonding [4–6, 8–13]. Immediate SSC promotes breastfeeding, increasing successful exclusive breastfeeding [4] and increasing maternal self-efficacy [1–5]. SSC stimulates the eating behaviors of rooting, sucking, and lactating [3]. The advantage for the infant includes decreased stress due to childbirth [6], better thermoregulation, and less crying [6]. Mediated by SSC, the infant acquires a correct grip, feeding sessions are more satisfactory and prolonged, and positive weight gain and development occur. Besides, SSC supports socio-emotional development. Simultaneously, positive feeding behaviors are timely established while improving the newborn infant’s digestion [3] and increasing immunity [3]. SSC reduces the risk of infant mortality, nosocomial infections, hyperthermia, and duration of hospital stay [14, 15].

Although SSC is a natural and easy practice to implement, its application still has barriers [3, 16]. The traditional separation between mother and newborn infant is still promoted for evaluations, medical procedures, and other routine processes [3]. It requires a commitment from public health policies and maternal and childcare facilities [16].

SSC literacy should be carried out at all levels, both for maternal and child health personnel and for the community, pregnant women, families, and leaders; SSC may be protected by implementing evidence-based routines at the maternities and hospitals that serve mothers and babies. Therefore, this chapter is essential to promote the advantages of carrying out this beneficial practice from the beginning of life.

2. Definition and history of skin-to-skin contact (SSC)

SSC is defined as the practice where a baby is dried and laid directly on the mother’s bare chest after childbirth; meaning that the naked newborn infant is in contact with the abdomen or maternal breast without any separation, both covered in a warm blanket; it is immediate and uninterrupted and for at least an hour or until after the first feed; for at least sixty minutes without interruptions [3, 4, 17]. SSC is a natural and straightforward practice sustained on the need mother, and newborn infant have a physiological and emotional need to stay together in SSC immediately after delivery and in the days and months following birth [2, 17].

In 1978 in Colombia, where preterm infants’ mortality reached 70%, early attachment was introduced to alleviate health complications associated with overcrowding, prematurity, nosocomial infections, and the problem of sharing incubators. Dr. Edgar Rey Sanabria, Professor of Neonatology at the National University of Colombia, found that mothers who implemented SSC with low-weight premature infants achieved high rates of exclusive breastfeeding, lowered infant mortality, and decreased the time of internment; also, infant mortality decreased from 70% to 30% [3].
3. Skin-to-skin contact and breastfeeding and eating behaviors

SSC supports socio-emotional development. Relevant scientific evidence on SSC shows a high impact on promoting breastfeeding [3, 5, 17]; SSC stimulates the eating behaviors of rooting, sucking, and lactating [3]. Mediated by SSC, the infant acquires a correct grip, feeding sessions are more satisfactory and prolonged, and positive weight gain and development occur. Simultaneously, positive feeding behaviors are established timely while improving the newborn infant's digestion [3] and increasing immunity [3].

The evidence shows that SSC is an accessible practice promoting breastfeeding during the neonatal period [2, 5, 18], protecting against infections and future allergies [16, 19]. Breastfeeding promotes increased blood circulation and temperature in the breast area, promoting breast milk production and helping keep the newborn infant warm [3, 5].

SSC and immediate breastfeeding are closely related and mutually beneficial [3, 5, 20]. Newborn infants' SSC is related to the timely initiation of breastfeeding [2, 17, 21] within the first hour of life, becoming a fundamental practice for child survival and proper development [3, 16, 19]. This protective benefit extends to six months of age.

UNICEF recommends that breastfeeding begins within the first hour of life, continues exclusively for the first six months of life, and continues with healthy and adequate complementary foods until the infant is two years old [16, 19]. SSC allows the infant to stand firmly against the mother's breast, often between her breasts, with the mother in a semi-reclined, supported position [3, 9]. Preterm infants can latch onto the breast and suck from week 27 of gestation; as soon as they are stable, they can begin breastfeeding [3, 9]. SSC facilitates a transition to exclusive breastfeeding [3, 5, 9].

SSC beyond childbirth can facilitate the duration of breastfeeding. SSC enhances positive maternal interactions at one week, two months, and three months after delivery, supporting mothers' decision to practice breastfeeding [22].

4. Skin-to-skin contact and early adjustments to life

SSC promotes neurophysiological adjustment to postnatal life [3, 4, 19]. It helps achieve stability while transitioning from uterine life to living outside of the womb [3]. SSC helps populate the newborn infant's microbiome while preventing hypothermia because it regulates the newborn infant's body temperature while stabilizing the cardio-respiratory system and regulating blood glucose [3, 5]. SSC has a positive stimulus on a newborn infant's digestion because it promotes colonization from the mother's beneficial bacteria [5].

5. Skin-to-skin contact and psychosocial health and development

After birth, the newborn infant experiences a sensitive period that enhances positive behaviors development beyond the first day of life [2, 5, 18]. Furthermore, researchers found that SSC promotes psychosocial health, increasing the infant's perception as an active agent in social interactions in her surrounding space [18].

In a longitudinal study, they found that SSC during the postpartum period has long-term benefits for child development. Premature infants who received SSC during the first weeks of age, at age ten [10] showed reduced stress response, improved
mature autonomic functioning, organized sleep, better cognitive control, and better mother-child interaction [23].

A twenty-year longitudinal study indicates that Kangaroo Mother Care (KMC) had significant, long-lasting social and behavioral protective effects 20 years after the intervention [24].

6. Skin-to-skin contact and psychosocial health and parents’ anxiety and depression

Newborn infants who received SSC cry less after the first hour of life [3, 5], and mothers and infants experience and exhibit more relaxed behaviors [2, 3, 5, 18]. Mothers experience fewer maternal depression symptoms and postpartum stress [25, 26]. Also, the newborn infant can reach states of calm more quickly because they recover faster from the stress caused by birth, as evidenced by measuring cortisol’s blood levels [2, 17].

SSC generates feelings of attachment between the mother and her newborn infant, allowing them to recognize each other and respond to the infant’s needs in a timely and secure manner [5, 18]. Parents who have practiced SSC also feel more confident in caring for their infants [4, 5]. Besides, parents develop strong feelings toward the newborn infant and feel more security and less anxiety [3, 5, 8, 25].

The enhanced interaction results in more positive interactions, increasing the mother’s satisfaction in the postpartum period, which contributes to a better relationship and successful breastfeeding [2, 5, 20, 21]. Practicing SSC, the mother suffers a decrease in uterine bleeding, and her chances of suffering a postpartum hemorrhage decrease [16, 19]. Mothers release hormones, oxytocin and endorphins, which positively reduce postpartum uterine bleeding [3, 5]. Newborn infants, who experienced SSC, suck efficiently, contributing to a woman’s breast health [16, 19]. The physiological hormonal effect includes positive maternal feelings, calmness, and anxiety reduction [5, 21].

In cesarian section cases, where the mother’s health is unstable and caring for preterm and underweight infants, the father can also provide SSC. These two scenarios empower the father to assist with the newborn infant’s care, creating trust and attachment [3, 8]. The father warms the infant in these circumstances because his chest temperature does not fluctuate [3], as in postpartum women. Infants who were attached to their fathers cry significantly less and sleep soundly. Infants can immediately transition to SSC with their mother and begin breastfeeding [3]. From fathers’ SSC, newborn infants benefit by stabilizing body temperature and improving cardio-respiratory function and glucose levels [3, 5]. Fathers who experienced SSC experienced greater feelings of attachment and feelings of closeness to their newborn infants [3, 8].

SSC stimulates the release of oxytocin (OT), decreasing infant salivary cortisol (SC) levels. Facilitation of SSC may be an effective intervention to reduce parent and infant stress in the neonatal intensive care units (NICU), promoting responsiveness and synchrony in parent-infant interactions [27].

7. Skin-to-skin contact and cesarian section, preterm and premature newborn infants

The protocols promote the mother and her newborn infant’s separation in cesarian delivery, an essential barrier for SSC. It is not promoted that the father practices SSC
if the woman cannot achieve it. Positive action is to spread the benefits that entail this natural and simple practice, both at the individual and community level and to support SSC at the public health policy level [3, 16, 19].

Scientific evidence shows that, in intensive care units. SSC in stable infants improves physiological stability, growth, and weight gain and reduces the need to supply oxygen externally [3], acquiring stability in cardio-respiratory function [2, 17].

SSC benefits to preterm and premature newborn infants have been demonstrated widely by the Kangaroo Mother Program (KMP) [2], an early, continuous, and prolonged SSC between mother and newborn infant. It should be started as soon as the infant presents an absence of severe apnea, desaturation, and bradycardia [3]. KMP has shown benefits for infant survival, bodily regulation, and successful breastfeeding initiation [16, 21].

Furthermore, preterm and underweight infants who experience SSC are discharged in fewer days. If infants receive SSC, their system is colonized with normal maternal flora, promoting a strengthened immune system [3]. SSC protects infants from prevalent infections in care units and predisposing allergens [3]. Furthermore, infants who received skin-to-skin contact were discharged faster than those who did not [3].

8. Skin-to-skin contact and procedural pain

Preterm infants (PTI) who received SSC had markedly reduced procedural pain (5; 28-31) on the scale when heel pricks were experienced [28, 29]. SSC reduces procedural pain in newborn infants [30–32] and significantly reduces the duration of crying by releasing oxytocin [3, 5, 29]. Oxytocin, becoming a natural analgesic, the cry lasts less, and the infant comes to a calm and relaxed state sooner [3, 28, 31, 33].

A Cochrane meta-analysis showed that infants in skin-to-skin contact during intra-muscular injection (IM) were more prone to low pain after IM and during pain recovery; based on cut-off scores for the Neonatal Infant Pain Scale (NPS). Most infants can be expected to experience a reduction in pain related to at least ten [10] minutes of the duration of SSC before the painful procedure is effective for PTI experiencing heel pricks and for term infants (TI) receiving (IM) injection [31].

The newborn infants that received Kangaroo Care (KC) experienced less pain responding to vitamin K intramuscular (IM) injections, and the duration of crying was less than newborn infants that did not receive KC [34].

C-section newborn infants who received SSC showed a significantly lower score on the Neonatal Infant Pain Scale (NIPS), responding to vitamin K injection administered sixty minutes after birth [32]. Besides, mothers experienced an increased satisfaction rate regarding their childbirth experience [32].

PTI born thirty [33] weeks gestational age or older showed a statistically significant reduction of pain, assessed using facial action (NFCS), sleep-wake (Behavioral state), infant cry and heart rate (HR), during the puncture, heel squeeze, and the post phases of heel prick when experiencing SSC fifteen [15] minutes before, during, and after the procedure [35].

The heart rate (HR) of preterm newborn infants that received heel Stick was significantly minor in those who received KC for thirty [33] and fifteen [15] minutes, as well as their recovery, was shorter, revealing a significant effect on reducing autonomic pain response in PTI [33].
PTI during a blood sampling procedure with venepuncture showed a significantly smaller increase in oxygenated hemoglobin when lying in their mothers’ chest in SSC, compared to those laying in their incubator or crib [31].

9. Literacy on the nine developmental stages of the newborn infant

Health staff working in maternities and MCH facilities should receive training to fully understand the newborn infant’s instinctive behavior while SSC during the first hour of life of the healthy alert newborn infant [6]. The mother and the family should receive education on the newborn infants’ behaviors on SSC during the antenatal encounters with MCH staff [6]. Widström and colleagues found that the parents aware of the nine stages respond positively and identify the newborn infant’s actions [6].

SSC supports the baby’s journey through the nine instinctive stages—birth cry, relaxation, awakening, activity, rest, crawling, familiarization, suckling, and sleeping. The sensitized family and health staff will guard the newborn infant’s behavior of SSC and the nine stages, acknowledging that the mother and her baby must stay together for the first hours of life [6]. Besides, the evidence shows that interrupting the natural stream of the nine stages and SSC is related to fewer rates of early breastfeeding [2, 17, 21, 36].

After Childbirth, stage 1 is initiated, called birth crying, and it is when the babies’ lungs expand for the first time, and the newborn infant starts to breathe, clearing the aerial ways. The baby is on keen alert and should be placed in a semi-prone mother’s chest where the newborn infant leads to stabilize the breathing rate [5]. Besides, the mothers’ confidence grows when she has the baby in her chest [2, 19, 20, 23, 26].

Stage 2 is called relaxation; the newborn infant stays quietly and relaxes over the mothers’ chest, listening to her heartbeat. During stage 2, it is recommended to apply the APGAR assessment and the IM and other procedures [10]. It is essential to leave the baby without interrupting [5].

Following is stage 3, awakening means the transition from relaxation to activity. During this stage, the baby does tiny movements of the head, arms, and fingers; the newborn moves the mouth, opens the eyes, and blinks [4, 5].

Stage 4 is activity; the baby moves the upper part of the body; the newborn’s head may be lifted to search for the mother’s chest. The baby’s limbs expand to reach the woman’s breast; rooting is evident during the activity stage. In preparation for breastfeeding, the newborn moved the tongue; the evidence links the secretions of the Montgomery glands with the baby’s behavioral responses [4–6]. The newborn touches the nipple and receives the taste through hand-to-breast movements, stimulating the rooting and crawling movements to reach the breast [4–6, 37, 38]. It is not recommended to interfere with the sensory olfactory connection between the newborn and her mother [39]. Furthermore, the fetus learned to recognize the mother’s voice; now, the mother should talk to the newborn to cause eye contact in the first half-hour of life, promoting bonding between them [6, 36, 40].

Stage 5, called resting and may be present in the other stages, the newborn may require resting at any other stage, health staff and parents must respect the baby’s rhythm not interrupting SSC and separating the infant from the mother’s touch [4–6].

Stage 6 is crawling; the baby moves from the chest to the nipple; during this stage, the infant exercises the stepping reflex, contributing to the contractions in the uterus,
helping to expel the placenta and decrease hemorrhage [4–6]. It is helpful to place a supportive pillow or towel to protect the newborn efforts to reach the nipple, and it is necessary; the mother may support the baby by putting her palm under the newborn foot [6].

Stage 7 is called familiarization; the newborn is gaining confidence; the mother should respond to the calls the baby is making while approaching the nipple and licking it. There should not be interrupting or rushing; the 7th stage can be 20 minutes or longer [6]. Besides, the rooting reflex and the infant’s tongue coordination increase, preparing the baby to start suckling the colostrum [6].

Stage 8 is suckling; the infant attaches to the mother’s nipple and starts breastfeeding. The baby should widely open the mouth to the entire areola [2–5], protecting against damage to the nipple. When suckling starts, the newborn is wholly focused on the task; the health staff does not need to help the newborn to attach to the mother’s breast; the evidence is clear about the importance to start breastfeeding during the first hour of life to promote successful breastfeeding [2–7].

Stage 9 is sleeping; the newborn finishes to suckle in at least one hour after birth, becoming quiet and subsequently falling asleep. The OT promotes releasing gastrointestinal hormones (GIH), such as cholecystokinin (CKK) and gastrin [2–6]. The high levels of CKK cause a relaxing postprandial sleep in both the baby and the mother [6]. During the nine stages, health staff must accompany the mother and the baby through keen observation of the newborn health status and breathing functions.

10. Barriers to skin-to-skin contact

Although SSC is a natural and easy practice to implement, its application still has barriers [2, 3, 16]. It requires a commitment from public health policies and maternal and childcare facilities [16]. The traditional separation between mother and newborn infant is still promoted for evaluations, medical procedures, and other routine processes [3]. Sometimes health staff does not recognize the importance of SSC and its implications for the infant and his family [16, 19]. They may be resistant to change, and it is essential to promote awareness and perform routine training [16, 19, 41]. Some parents’ beliefs about keeping the newborn infant warm and the importance of remaining in an incubator are a barrier to SSC [37]. In other cases, family visits do not allow parents’ privacy to experience SSC with their newborn infants [37, 38]. Additionally, crowded maternities can also be uncomfortable for the mother, the father, and the newborn infant [38, 41].

11. Conclusions

Undoubtedly, skin-to-skin contact has robust evidence that supports the importance to introduce the practice immediately after childbirth. It is considered a unique time to enhance the bonding between the newborn infant and the mother; besides providing vital advantages and short- and long-term health benefits for infants and mothers.

It is imperative to improve the understanding of SSC as a great value and a need for the newborn infant and the mother. SSC is a natural and instinctive behavior; therefore, it is indispensable to present the scientific evidence in an organized,
understandable, and evidence-based manner to support maternal and child health professionals who wish to implement the practice in hospitals and maternal and child care centers. Nevertheless, the friendly information must be available for pregnant women and their families, permitting them to follow health-informed decisions to support SSC as the best start for their babies.

Promoting skin-to-skin contact between the baby and the mother is a unique experience with profound benefits for families and communities. It is valuable for health staff at maternity units and parents to understand the nine stages of infant behavioral development in the first hour of life; it is a sensitive period that promotes bonding and early attachment.

Conflict of interest

“The authors declare no conflict of interest.”

Acronyms and abbreviations

- PHL: personal health literacy
- SSC: skin-to-skin contact
- KMC: Kangaroo Mother Care
- UNICEF: United Nations Infant and Children’s Fund
- OT: oxytocin
- SC: salivary cortisol
- NICU: neonatal intensive care units
- KMP: Kangaroo Mother Program
- PTI: preterm infants
- TI: term infants
- NPS: Neonatal Infant Pain Scale
- NFCS: neonatal facial action
- HR: heart rate

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