REVIEW ARTICLE

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The power of skin-to-skin contact in the maintenance of breastfeeding

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ABSTRACT

Objective: To determine the relevance of skin-to-skin contact (SSC) in breastfeeding support. **Materials and methods:** An exhaustive review of the literature available in databases such as PubMed, SciELO, Elsevier and Google Scholar was carried out. The methodology included the formulation of questions using PICO in neonates (P): how does CPP (I) compared to separation (C) influence breastfeeding maintenance (O)? We selected studies published between 2019 and 2024 that examined the relationship between CPP and breastfeeding. **Results:** CPP was observed to facilitate earlier initiation and continued maintenance of breastfeeding, with higher initiation rates in infants who received CPP at birth. In addition, it was shown to be associated with physiological benefits that strengthen emotional bonding and improve newborn health, such as temperature regulation and oxytocin production. **Conclusions:** CPP is crucial for successful breastfeeding and for fostering strong mother-infant bonding. Promoting this practice from birth is essential to improve maternal and newborn health.

Keywords: mother-kangaroo method; skin-to-skin contact; breastfeeding; bonding; infant health; psychosocial support.

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INTRODUCTION

Immediate skin-to-skin contact between the mother and her newborn, especially during the first hours after birth, is widely recognized for its importance in the initial establishment of breastfeeding (BF). This technique involves placing the baby directly on the mother's bare chest, which helps regulate the newborn's temperature, stabilizes their heart rate and breathing, and promotes emotional attachment (1). In this way, chances of successful breastfeeding increase. However, the benefits of this practice go beyond the initiation of breastfeeding, as they also facilitate its long-term continuity. Studies have shown that skin-to-skin contact (SSC) can be a crucial factor in prolonging exclusive breastfeeding and reducing premature weaning rates. This initial intervention strengthens the mother-child bond, reduces maternal stress, and promotes adequate milk production. Despite the current evidence, there are still limitations in the correct application of this

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practice in certain settings, and not all studies have thoroughly evaluated its impact on the total duration of breastfeeding (1, 2).

According to research, SSC, in contrast to the mother-infant separation at birth, improves breastfeeding indicators (early initiation, prevalence and duration of exclusive breastfeeding) and physiological stability during initial adaptation, reducing the risk of hospitalization before hospital discharge (3). Practicing SSC in the maternity area promotes a reduction in formula use and strengthens mothers' confidence in their ability to breastfeed, fostering breastfeeding from the very first moments of life. This strategy is especially crucial in hospitals where mother-infant separation is common, since its implementation can significantly improve various child health indicators.

The most recent studies on SSC and BF show that this practice is key to promoting exclusive breastfeeding (EBF), especially if done within the first hour after birth. In Colombia, where the average duration of EBF is 2 months, a study demonstrated that implementing SSC, at any time after birth, significantly improved all EBF indicators, achieving an average duration of 5 months of this type of feeding. At the third month, 79.9% of newborns with immediate SSC and 80.1% of those who experienced early SSC were being breastfed. At the sixth month, these percentages were 27.3% and 25.5%, respectively (3). However, Mena-Tudela et al. (4) mention that although both indicators, immediate SSC and EBF, are commonly recommended due to their proven benefits, they are far from being implemented in practice due to the lack of supportive policies, uninformed EFB promoters, and healthcare professionals and medical practices that limit early initiation of breastfeeding, particularly in cases of cesarean delivery.

This article provides updated information on SSC, which is an important intervention in maternal health. Through a careful review of the most relevant studies, this research not only guides future work, but also highlights the need to examine this technique as a key factor in maintaining BF. The benefits of skin-to-skin contact for newborn health, early initiation of breastfeeding and the prolongation of this practice are identified, as well as the importance of establishing effective protocols and overcoming obstacles in its implementation. The need to reduce the use of infant formula by promoting SSC is also emphasized.

Unlike other studies on breastfeeding that do not delve into the SSC, this review aims to highlight its role in the initiation and continuity of breastfeeding, offering a valuable perspective to improve the health of mothers and their families in different communities.

MATERIALS AND METHODS

This research consisted of a bibliographic review aimed at analyzing the impact of SSC on the maintenance of EBF. This type of review made it possible to collect and synthesize relevant scientific information, providing a comprehensive overview of the available evidence.

The review was conducted between August and October 2024, period in which a systematic search for scientific articles and relevant theses related to the research question was conducted.

Research question

The PICO model (patients, intervention, comparison and outcomes) was used to guide the search:

- P: Newborns (up to 6 months) and postpartum women
- I: Skin to skin contact during the first hour of life
- C: Absence of skin-to-skin contact
- O: Maintenance of EBF during the first 6 months

Search strategy

The search was conducted in several scientific databases using specific terms in each language and Boolean operators, as shown below:

Table 1. Search strategies in databases.

Database	Search strategy
PubMed	('skin-to-skin' [Title]) AND 'breastfeeding' OR ('continuity of breastfeeding [Title]') AND ('contato pele a pele' [Title]) AND ('contacter peau à peau' [Title])
SciELO	'contacto piel a piel' AND 'vínculo madre-hijo'
Elsevier	('skin-to-skin' [terms]) AND ('lactation' [terms])
Google Scholar	'piel a piel' AND 'mantenimiento de la lactancia'

Selection criteria

Studies published from 2019 onwards in Spanish, Portuguese, English and French were included. Systematic, quasi-experimental, observational studies, case-control studies, and bibliographic reviews were considered. Articles of less than 5 years old or those that did not directly address the relationship between SSC and BF were excluded.

RESULTS

A total of 50 writings, including articles, theses and books were initially gathered; however, this number was reduced to 40, as the aim was to include mostly scientific articles, whether bibliographic or systematic. In addition, an effort was made to minimize the number of theses included. Many of the documents considered in the study focused solely on one of the two variables analyzed; for example, they addressed only BF or SSC, leading to their exclusion. All documents were read and evaluated to determine their usefulness in arguing the influence of one variable over the other.

Physiology of the mother-child bond

SSC between mother and child is crucial for establishing an emotional bond and facilitating BF. This immediate contact after birth not only promotes breastfeeding, but also regulates the temperature of the newborn and releases hormones such as oxytocin, which strengthens emotional attachment (4). For example, it can stimulate the baby to suckle more effectively, which favors milk production in the mother. However, an argument against this practice is that, in cases of cesarean sections or complications, immediate contact may not be possible, which could hinder breastfeeding and affect bonding. Despite these limitations, it is essential to promote this method whenever possible, as its physiological and emotional benefits are crucial for the health of both the newborn and the mother. An example of this is the initiative known as the natural cesarean technique, in which the baby is placed on the mother's breast at the moment of birth (4). The study conducted at the Hospital General Universitario de Castellón, Spain, indicates that newborns who received SSC after a natural cesarean showed significantly higher breastfeeding initiation rates (97.6%) compared to those born via conventional cesarean section (CC), where no breastfeeding initiation was achieved (5). This is because this contact triggers a release of oxytocin, a hormone that not only promotes breastfeeding by stimulating the baby's sucking reflex, but also promotes uterine contractions, helping to regulate blood loss after delivery. For example, newborns who experienced SSC gained weight more effectively in the first few days of life, suggesting that this technique may contribute to faster recovery and better growth.

On the other hand, the implementation of measures such as SSC and *rooming-in* in hospitals accredited by the Baby-Friendly Hospital Initiative (BFHI) can significantly improve EBF rates. Immediate mother-child contact after birth has been associated with an increased likelihood of newborns being exclusively breastfed at discharge, suggesting that these practices facilitate the baby's adaptation to breastfeeding (6). This contact stimulates hormone production, which not only favors the maternal bonding, but also enhances the sucking reflex of the newborn, which is crucial for the successful initiation of breastfeeding. In addition to these arguments, SSC not only benefits BF, but it is also essential for the newborn's immunological health. During the pandemic, mother-child separation, especially in cases of COVID-19, was associated with an increased risk of nosocomial infections in neonates. Breast milk, even from infected mothers, contains immunoglobulin A (IgA) and other antibodies that may provide additional protection to the baby, suggesting that keeping the mother and child together can be an effective strategy to strengthen the newborn's immune response (7, 8).

Establishment of early breastfeeding

First hour

SSC in the first 60 minutes after birth is considered an essential protective factor for the maintenance of EBF during the following six months. Research conducted by the Hospital Belén de Trujillo highlights that breast milk not only protects against infections, allergies and asthma—common conditions in newborns—but also ensures adequate nutrition and proper development (9). In addition, the mother experiences a strengthening of the emotional bond with her baby, which helps reduce postpartum complications, especially those related to psychosocial disorders. The results of this study indicated that newborns who experienced SSC with their mother for one hour after birth were significantly more likely to continue being breastfed thanks to the reinforcement of the mother-child bond, increased maternal confidence and greater parental involvement during the postpartum period.

However, although SSC is promoted during the first hour of the newborn's life, factors that hinder the continuity of EBF persist, such as low milk

production, the mother's early return to work, and lack of adequate infrastructure, such as breastfeeding rooms (10). In other words, the lack of breastfeeding rooms and its relationship with the interruption of this practice highlights the need to strengthen postnatal counseling and promote milk self-expression, which would facilitate the implementation of more effective strategies to ensure its continuity. Studies confirm the findings on the influence of SSC, along with other hospital-related factors, on breastfeeding success, especially during the third month of life, as it emerges as the most critical period for EBF weaning (2).

Promotion of rooting and sucking reflex

Stimulation of the rooting and sucking reflex in newborns are innate responses essential for the successful establishment of breastfeeding. During SSC and *rooming-in*, the activation of these reflexes is favored, facilitating the newborn's latch onto the nipple and the initiation of effective sucking (11). The rooting reflex allows the baby to turn their head and open their mouth upon contact with the mother's skin, while the sucking reflex is crucial for milk intake. These interactions are especially relevant in the context of neonatal care, as early breastfeeding initiation may reduce the risk of complications such as hypoglycemia and jaundice (12). In addition, a study has shown that babies who are breastfed immediately after birth are less likely to be hospitalized for health problems related to feeding. Therefore, promoting close contact and early breastfeeding not only supports newborn's nutrition, but also strengthens the emotional bond between mother and baby, which is essential for long-term psychological and emotional development.

These innate responses are fundamental not only for feeding, but also for regulating the newborn's nervous system. Stimulation of rooting and sucking reflexes during SSC can help soothe the baby, reducing stress and anxiety (13). This active sucking process, being associated with the release of hormones such as oxytocin in the mother, also contributes to lowering cortisol levels in the newborn, promoting a state of calmness and well-being. The positive relationship between the humanization of perinatal care and the women's satisfaction during the childbirth process is another key aspect to strengthen the bond that influences the development of the baby's reflexes (14). The implementation of woman-centered practices, such as SSC and early initiation of breastfeeding, not only improves clinical outcomes, but also contributes significantly to the perception of quality of care received. At the same time, the humanization of care can be a determining factor in encouraging women's participation in their own childbirth process, which can influence their emotional and psychological well-being (15). This aspect is crucial, since a positive childbirth experience can have long-term repercussions on mothers' mental health and their relationship with the newborn. Direct contact with the mother provides a series of tactile, olfactory and thermal stimuli that favor the maturation of neural connections involved in these reflexes (16). This sensory stimulation helps the baby develop better coordination between sucking, swallowing and breathing—key processes for safe and effective feeding. In addition, SSC allows the baby to perceive the smell of the mother and her milk, which reinforces their innate rooting response toward the nipple, facilitating rapid learning to locate and latch onto the breast. This familiarization with smell and touch during such contact is fundamental for establishing effective sucking patterns, promoting successful breastfeeding from the first hours of life (17).

Increase in milk production

During the first two hours after childbirth, the newborn experiences a state known as the "sensitive period". This phenomenon results from a hormonal surge that occurs during labor. During this time, the baby is extremely receptive to environmental stimuli. For this reason, placing the baby in a prone position on the mother's bare chest allows the baby to recognize his surroundings through the sense of smell. This close contact is essential for the newborn's adaptation process to his or her new environment outside the womb. Guided by their innate reflexes, babies begin searching for the nipple, resulting in the first intake of breast milk during the initial hours after birth—an act that is fundamental for their its nutrition and development. Between two and three hours after birth, the newborn enters a period of drowsiness, where the likelihood of the baby actively demanding the breast or seeking to feed decreases significantly, to almost zero. Therefore, taking advantage of this initial time when the baby is more awake and alert can be crucial for establishing successful breastfeeding and strengthening the emotional bond between mother and child (18).

Among the various benefits of implementing SSC, numerous studies have shown greater success in immediate breastfeeding after birth, which favors colonization of the newborn's skin, better glycemic control, better temperature control, and stabilization of

heart function. This practice, along with breastfeeding during the first hours, demonstrates advantages not only for the baby, but also for the mother, reducing the risk of hemorrhage, infections and neonatal death (19). It has been strongly shown that SSC promotes early initiation of breastfeeding and leads to exclusive breastfeeding. This type of interaction helps reduce the baby's crying, which is a positive aspect, as decreasing crying improves physiological and psychological adaptation (20). A descriptive research study conducted in Spain indicates that, regarding SSC, this technique proves to be effective in establishing breastfeeding after patient discharge (21). However, despite the recognized importance of contact, a statistical study revealed that there was no significant relationship between several factors that might initially seem linked to breastfeeding. In that study, it was clarified that SSC, although considered beneficial, does not significantly influence breastfeeding in quantitative terms. This suggests that, while physical contact plays an important role in the breastfeeding process, other elements may also be decisive in its success (22).

Reduction of formula supplementation

Babies are highly susceptible during the early stages of life and, because of their faster growth compared to other stages, it is crucial to provide them with enough energy, protein and other nutrients to ensure good future health. In this way, BF is considered the most ideal nutritional method at this stage and maximizes its effects during the first six months after birth (23). During the first two years, the child is in a critical and fundamental period for development, in which feeding practices become immensely important. Within these practices, BF plays an essential and significant role, as it not only provides infants with the nutrients necessary for healthy growth, but also promotes comprehensive development in various areas, such as emotional and cognitive health. Subsequently, it is suggested to initiate a complementary feeding process that extends up to two years, thus ensuring that the child receives all the necessary nutrients for proper development and that his/her nutritional needs are effectively met as he/she grows (24).

An observational study concluded that inadequate complementary feeding during childhood has a significant impact on the child's future body composition. Infants who were fed with formula milk with a high protein proportion and insufficient fat content were highly likely to develop overweight and obesity as they grew. This occurs because protein overfeeding in infants can lead to accelerated growth, resulting in increase in obesity risk factors (25). Breastfeeding has multiple benefits, including the immunological protection it provides to the baby. This type of feeding not only helps to strengthen the child's immune system, but also significantly promotes a proper development of the jaw and teeth, which are essential aspects of the infant's nutritional formation. On the other hand, breastfeeding can be an important ally in the process of weight loss for mothers, as women accumulate fat during pregnancy that, when used during breastfeeding, provides a significant portion of the energy needed to feed their children. This use of energy reserves can result in a gradual weight reduction, which also contributes to the overall well-being of the mother (26).

In the group of breastfed babies and born through vaginal delivery, we find a significant presence of bifidobacteria, which are essential for digestive health. Moreover, breast milk not only provides bifidobacteria, but also includes beneficial bacteria such as *Bifidobacterium*, *Lactobacillus* and *Staphylococcus*, which are naturally present in breast milk. This bacterial composition favors intestinal colonization of bifidobacteria thanks to the abundance of oligosaccharides human milk. On the other hand, formula-fed infants experience a more accelerated maturation process of their intestinal microbiota in relation to breastfed babies. However, this formula-feeding approach is associated with a lower abundance of bifidobacteria, which may pose a considerable long-term health risk. This reduction in the presence of bifidobacteria can lead to impaired production of short-chain fatty acids, which are essential for preserving intestinal integrity. These alterations can have significant consequences, increasing the risk of the child developing various immune-related diseases such as allergic conditions, autoimmune disorders, and a variety of chronic diseases that can be both digestive and extra digestive (27).

Emotional benefits for mother and child

Promotion of secure attachment

The newborn has an exploratory system based on his physical and social senses, fearlessly examining everything within his reach, but still has no direct relationship with anyone. Therefore, during the first six months of life, the newborn easily establishes a relationship with people outside their immediate environment through an affiliative system that allows them to show interest and, at the same time, establish a bond with them. From birth, a sensory phase begins,

manifested through the baby's interaction with the mother, such as eye contact, SSC when the mother touches, caresses or talks to the baby, provoking responsive movements in the newborn. During natural feeding, also known as breastfeeding, a unique and enriching connection between the newborn and the mother is fostered (28).

The bond is the "strongest emotional link that we humans establish with our peers." In addition, a reliable attachment relationship will be the foundation for the future development of a healthy personality. Therefore, promoting secure attachment from the first hours after birth will lay the groundwork for the future development of a healthy adult (29). For the mother, a bond is formed long before holding the baby in her arms and, right after childbirth, a sensory period emerges to initiate the mother-infant bonding process.

The results obtained, in comparison with artificial breastfeeding, show that the BF demonstrated an increase in bonding after the first interactions. Greater emotional attachment was observed in 24-month-old children who were breastfed for more than the first trimester of life, compared to those who were breastfed for less than 3 months (30). Attachment theory helps to understand the essence and emergence of emotional relationships, linking these bonds to social cognition; that is, the baby's development, in a dynamic and inelastic way, fosters their understanding of their social environment. This is reflected in the baby's role as an active participant in building their world rather than merely being a recipient of social elements (31). Emotional attachment is an intergenerational characteristic transmitted from parents to children, although its expression may vary due to individual and contextual factors. Reflective function and maternal sensitivity play a fundamental role in the development of infant attachment, which may differ from that of an adult. During the nine months of pregnancy, the expectant mother undergoes a particular stage of personal transformation, characterized by new sensory experiences, fantasies, fears and desires, triggering a process of reevaluation and redefinition of her identity and mental framework (32).

Confidence in breastfeeding

Recent research has shown that breastfeeding women are responsible for breastfeeding, highlighting their positive anecdotes of breastfeeding. However, they often overlook their desires, needs and insecurities when it comes to newborn care (33). Self-efficacy refers to the enhancement of the individual's ability to successfully perform certain tasks or behaviors to achieve predictable results, being considered a modifiable factor. Due to the importance of self-efficacy, a self-efficacy scale for breastfeeding was created in Canada, called the Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF). This instrument is used to record the confidence of breastfeeding mothers (34). Maternal age is a determining factor for the continuity and success of breastfeeding.

In this research, as age progressed, the likelihood of having high confidence to practice breastfeeding increased threefold compared to younger first-time mothers. This study shows that women aged thirty-five and older were 21.18 times more likely to achieve higher levels of confidence, while women aged twenty-six to thirty-five were only 12.59 times more likely to obtain positive results on the BSES19 (35). During the immediate postpartum period, it is essential for doctors and nurses to assist the woman during hospitalization and support her when implementing breastfeeding. This will allow them to be supported in their problems, connecting them with childcare services and strengthening their confidence and ability to make breastfeeding a success.

During the univariate and multivariate (adjusted) study, the variables that showed a high degree of confidence were between twenty-six to thirty-five years old, and over thirty-six years old, being married or in a stable union, not having work commitments, prioritizing breastfeeding to start as soon as possible after birth, receiving breastfeeding advice at the Basic Health Unit and using only breast milk production as the sole source of nutrition for the newborn (36). It is essential to promote this confidence through appropriate support and training to encourage successful breastfeeding practices, whose benefits will empower the mother in her role and motivate her to breastfeed her baby during the appropriate period, which would be within the first six months of the baby's life (31).

DISCUSSION

Early SSC, immediately after birth, represents a crucial period for the newborn and the mother, as they remain in direct contact, creating a calm and safe environment. This contact is fundamental in the first hours of life, commonly referred to as the sensitive period, in which the newborn, through a series of innate reflexes, can reach the mother's breast and begin breastfeeding within the first 60 minutes of life, thus influencing breastfeeding (9, 10, 18). SSC not only

supports the newborn's physiological adaptation to the environment, but also promotes brain and motor system organization, improves oxygenation, regulates temperature, and reduces energy expenditure in the newborn (18). This early bonding helps establish a secure emotional connection between mother and child, which is essential for developing a unique relationship, regardless of feeding times. For the mother, contact with her child triggers an increase in oxytocin and beta-endorphins, facilitating uterine contractions and colostrum production. This contact also reduces stress and improves the newborn's responsiveness and protection capacity, so interrupting SSC may lead to adversities for the newborn. Separation after birth generates a stressful situation associated with negative changes in stress regulation, which could slow recovery and weaken the mother-child bond, although this effect is reversible in a supportive and caring environment (12, 18). In cesarean deliveries, SSC presents additional challenges, such as those related to hypothermic organization and training of the medical team, as well as potential limitations within the surgical environment (5, 18). The implementation of multidisciplinary strategies that facilitate this technique in the operating room or in the postpartum resuscitation unit reduces the risk of complications and promotes the mother-child bonding.

To effectively implement SSC between mother and child, it is essential for the healthcare team to be well-organized, trained and equipped with specific resources and protocols. Each professional has clear roles that help initiate EBF from the very first moment. However, there are challenges, such as workload and lack of awareness that may hinder the implementation of SSC. The process is carried out in two stages: a preparatory phase to set up the environment and an implementation phase where the baby is placed in SSC with the mother, promoting well-being and early initiation of BF (20).

It is essential to implement health policies that encourage birth practices that are breastfeeding-friendly. A prominent example is the Baby-Friendly Hospital Initiative (BFHI) in the state of Rio de Janeiro, Brazil, which has demonstrated that hospitals adhering to its guidelines achieve better indicators of BF initiation within the first hour of life (37). In addition, it is important to consider the impact of continuous support and access to educational programs on BF, especially for mothers from lower educational and socioeconomic groups, as this can improve early initiation rates (25, 37).

CONCLUSIONS

Immediate SSC between mother and infant plays a fundamental role in the establishment and maintenance of BF. After an exhaustive study, it was found that this contact promotes the activation of innate reflexes in the newborn, such as rooting and sucking reflexes, which are crucial for a successful initiation of breastfeeding. At the same time, physical closeness stimulates oxytocin production in the mother, not only strengthening the emotional bond, but also facilitating milk flow and uterine contractions, thereby reducing the risk of postpartum hemorrhage. Although limitations have been identified for SSC in contexts such as natural cesarean delivery, this technique proves to be effective, significantly increasing early BF initiation rates and reducing the need for formula supplementation. Furthermore, it strengthens the baby's immune system by facilitating the transfer of antibodies present in breast milk, while complementary practices such as *rooming-in* have been effective in promoting exclusive BF in accredited hospitals.

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