

## Early direct skin-to-skin contact between mother and newborn in promoting breastfeeding: A literature review

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### Abstract

**Introduction:** Direct skin-to-skin contact (SSC) between a mother and her newborn creates an optimal environment for neonatal adaptation to extrauterine life. Infants who have SSC with their mothers appear to exhibit a more effective breastfeeding pattern.

**Objective:** The aim of this international literature review is to explore the effectiveness of immediate SSC between mother and newborn in the early postpartum hours in promoting breastfeeding.

**Method:** A systematic review of international literature was conducted using the PubMed database with the following keywords: breastfeeding, skin-to-skin contact, newborn, mother, breast-feeding success, and breast-feeding duration. Included studies were required to evaluate the effectiveness of immediate SSC between mother and newborn in promoting breastfeeding. Additionally, studies had to be randomized clinical trials published from 01/01/2010 to 31/8/2020 and written in English.

**Results:** A total of 6 studies were included in the review. The review of these studies indicated that direct skin-to-skin contact between mother and newborn enhances the self-efficacy of maternal breastfeeding, significantly increases the success of initial breastfeeding, and promotes the continuation of exclusive breastfeeding. It was also found to extend the duration of the first breastfeeding session and reduce the time to the initiation of the first feeding.

**Conclusions:** Direct skin-to-skin contact between mother and newborn is an easily accessible method to enhance the self-efficacy of maternal breastfeeding. The high effectiveness of breastfeeding prolongs the duration of exclusive breastfeeding. Healthcare providers should encourage immediate skin-to-skin contact between mother and newborn as a method to increase breastfeeding self-efficacy.

**Keywords:** Skin-to -skin contact; Breastfeeding; Healthcare providers; Systematic review

### 1. Introduction

Maternal breastfeeding plays a critical role in the health and survival of infants. Maternal breast milk enhances the nutritional status of young children, reduces morbidity and mortality, and when initiated early, can reduce neonatal mortality by a quarter [1].

The immediate postpartum period (first 2 hours) is a sensitive time for both mothers and newborns. Mothers actively engage and respond with particular enthusiasm to their babies. On the other hand, newborns transition from the

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intrauterine to extrauterine life, encountering their parents, primarily their mothers, for the first time [2]. The first 2 hours after birth, where infants respond more to tactile and thermal cues and scents from their mothers, are defined as the optimal time to initiate breastfeeding behavior, such as suckling [1].

The World Health Organization (WHO), UNICEF, and the American Academy of Pediatrics recommend immediate skin-to-skin contact (SSC) between newborns and their mothers during the first 2 hours after birth. SSC is defined as placing the naked newborn immediately after birth, whether it is a vaginal delivery or a cesarean section, on the mother's bare abdomen or chest. In this way, the newborn autonomously develops self-regulation mechanisms and predetermined innate biological behaviors, approaching the breast either by crawling from the stomach or searching for the nipple, to initiate breastfeeding on their own [2].

SSC creates an optimal environment for newborns to adapt to extrauterine life. In addition to providing warmth, it facilitates attachment to the breast and improves latch-on. Infants who have SSC with their mothers appear to have a more effective sucking pattern [1].

The purpose of this international literature review is to explore the effectiveness of immediate skin-to-skin contact (SSC) between mother and newborn in promoting breastfeeding in the first hours after childbirth.

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## 2. Material and methods

To search for relevant studies for this review, the PICOST process was followed, where P represents the population, I the intervention, C the comparison, O the outcome, S the study design, and T the timeframe. Specifically, the selection and exclusion criteria for articles included in this review were as follows:

- Population: Studies should focus on pregnant women and their newborns. Childbirth could be either normal or through cesarean section. Studies related to pathological conditions in pregnant women or newborns were excluded.
- Intervention: Studies should examine the application of immediate skin-to-skin contact (SSC) in the first hours after childbirth.
- Comparison: There should be a control group where standard postnatal care is provided.
- Outcome: The studied outcomes included the percentage of exclusive breastfeeding and the duration of breastfeeding.
- Study Design: Only randomized clinical trials were included in this review. Non-randomized clinical trials, secondary studies (reviews, meta-analyses), case studies, and qualitative studies were excluded.
- Timeframe: Studies published from 01/01/2010 to 31/09/2020 were considered, and they should be written in the English language.

A systematic review of the international literature was conducted using the PubMed database from July to August 2020. The following keywords were used for the study search: breastfeeding, skin-to-skin contact, newborn, mother, breastfeeding success, and breast-feeding duration.

The review was conducted in accordance with the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses - PRISMA" guidelines. Titles of articles were first screened, and those with titles not aligned with the review's purpose were excluded. Subsequently, abstracts of the remaining studies were read, and those that did not meet the inclusion criteria were excluded. The remaining studies were then sought as full texts, and any that did not provide necessary information related to the topic and purpose of the review were excluded.

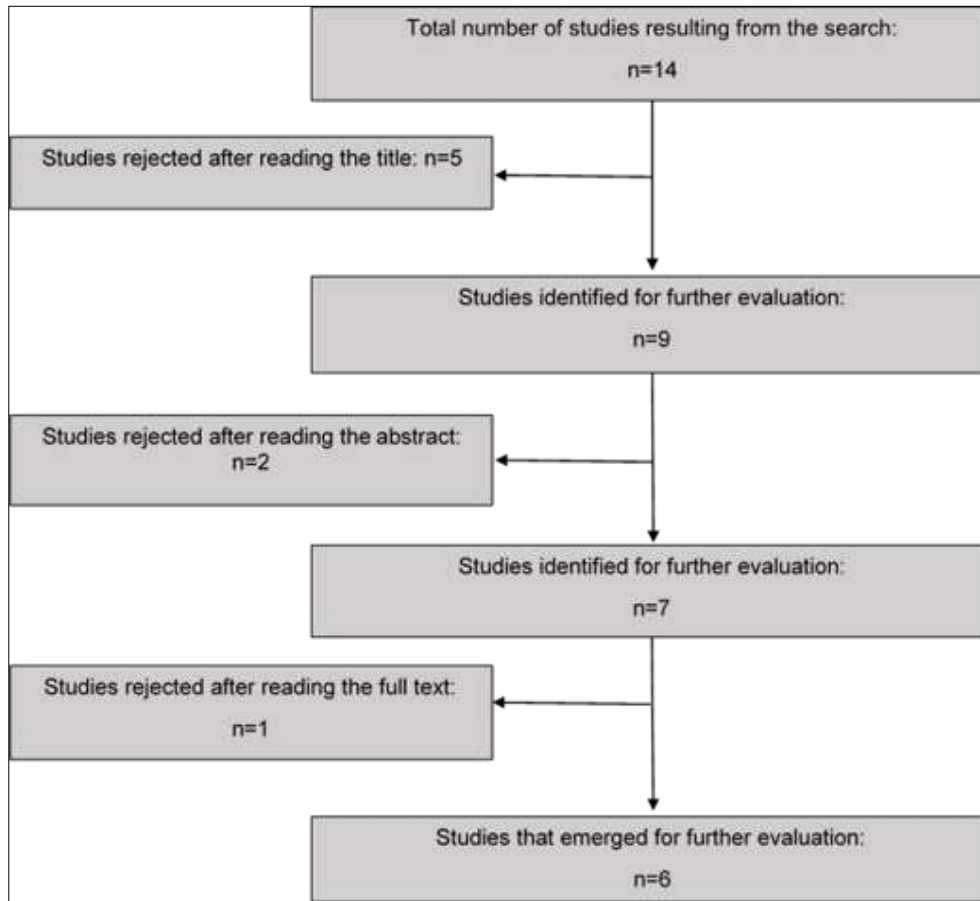
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## 3. Results

From the electronic search of the international literature, a total of 255 studies were identified. Among these, 13 articles were removed as duplicates, 209 were excluded after reading the title, 11 were excluded after reading the abstract, and 5 were excluded after a full-text review. Additionally, 2 articles were added from the reference lists of the remaining articles. Ultimately, 9 studies were included in this review (Figure 1).

Mahmood et al. (2011, Pakistan) evaluated the effect of early skin-to-skin contact (SSC) between mothers and infants on breastfeeding behavior. Mothers and infants were randomized into two groups: the SSC group (n=92) and the control group receiving routine care (n=91). Successful breastfeeding was assessed using the IBFAT tool. Additionally, the time of first feeding, time to effective breastfeeding, maternal satisfaction with care, and the level of exclusive breastfeeding

up to one month of age were recorded. The first breastfeeding was 26.25% more successful in the SSC group (58.8% in the SSC group compared to 32.5% in the control group,  $p=0.001$ ). In the SSC group, the mean time to the initiation of the first breastfeeding was 61.6 minutes shorter than in the control group (40.62 vs. 101.88,  $p<0.001$ ). The mean time to achieve effective breastfeeding was 207 minutes earlier in the SSC group (149.69 vs. 357.50,  $p<0.001$ ). Maternal satisfaction in the SSC group was significantly higher compared to the control group (56% vs. 6.2%). Similarly, 53.8% of mothers in the SSC group expressed a preference for similar care in the future, compared to 5% in the control group. In the SSC group, 85.3% of infants were exclusively breastfeeding at one month, compared to 65.7% in the control group ( $p=0.025$ ). Early skin-to-skin contact between the mother and the infant significantly increased the success of the first breastfeeding and the continuation of exclusive breastfeeding up to one month of age. It also reduced the time to the initiation of the first feeding and the time after effective breastfeeding [3].



**Figure 1** Flowchart of Studies

Thukral et al. (2012, India) examined whether early SSC improves maternal breastfeeding behavior and rates of exclusive breastfeeding in term infants at 48 hours of age. Term infants born by normal delivery were randomized at birth into either early SSC ( $n=20$ ) or conventional care (control group,  $n=21$ ). SSC was continued for at least 2 hours after birth. Subsequently, a breastfeeding session of infants was recorded on video at approximately 48 hours of life. The primary outcome, infant breastfeeding behavior at 48 hours of life, was assessed using the modified Breast-Feeding Assessment Tool (BAT, a score consisting of the readiness of the infant to feed, suck, root, and attach, each item scored from 0 to 3) by three independent observers. Secondary outcomes were rates of exclusive breastfeeding at 48 hours and 6 weeks. Regarding the study results, there was no significant difference in BAT scores between the groups (median score, 8 vs. 9,  $p=0.6$ ). The rates of exclusive breastfeeding at 48 hours and at 6 weeks were significantly higher in the early SSC group compared to the control group [at 48 hours: 95.0% vs. 38.1%, RR (95% CI): 2.5 (1.4-4.3); at 6 weeks: 90% vs. 28.6%, RR (95% CI): 3.2 (1.6-6.3)]. Early SSC did not improve breastfeeding behavior but significantly improved rates of exclusive breastfeeding in newborns [4].

Srivastava et al. (2014, India) assessed the impact of very early skin-to-skin contact (SSC) between infants and mothers on breastfeeding success. The study included a sample of 240 mothers and newborns who were randomized into two groups: the very early SSC group ( $n=122$ ) and the control group receiving routine care ( $n=118$ ). The main outcomes

studied were breastfeeding effectiveness, assessed using the modified Infant Breastfeeding Assessment Tool (IBFAT), breastfeeding status at 6 weeks, maternal satisfaction, thermal regulation, infant weight, and morbidity. The study found that SSC contributed to better breastfeeding effectiveness as measured by the IBFAT score ( $P < 0.0001$ ). Additionally, in the SSC group, more infants received exclusive breastfeeding at the first follow-up visit ( $P = 0.002$ ) and at 6 weeks ( $P < 0.0001$ ). SSC led to higher levels of maternal satisfaction, better thermal regulation immediately after birth, less weight loss at discharge and the first follow-up (all  $P < 0.0001$ ), and reduced morbidity compared to the control group ( $P = 0.006$ ). Therefore, very early SSC appears to be an effective intervention that improves infant breastfeeding ability, maternal satisfaction, breastfeeding rates, temperature control, and weight patterns [5].

Aghdas et al. (2014, Iran) investigated the impact of immediate skin-to-skin contact (SSC) between mothers and infants on the self-efficacy of maternal breastfeeding. The study was conducted at the Omolbanin Maternity Hospital, a large tertiary hospital in Mashhad, Iran. The study included 92 primiparous mothers aged 18-35 years who were planning to have a normal delivery and intended to breastfeed their babies. The women were randomly assigned to two groups, either the experimental group ( $n=47$ ), which received immediate skin-to-skin contact after delivery, or the control group, which received routine care ( $n=45$ ). The primary outcomes studied were maternal breastfeeding self-efficacy 28 days postpartum, assessed using the Infant Breast Feeding Assessment Tool (IBFAT), successful initiation of breastfeeding, and the mean time to initiate the first breastfeeding. In the SSC group, the mean IBFAT score for breastfeeding self-efficacy was  $53.42 (\pm 8.57)$ , significantly higher compared to the control group, where the mean score was  $49.85 (\pm 5.50)$  ( $p=0.0003$ ). The rate of successful initiation of breastfeeding was 56.6% in the SSC group compared to 35.6% in the control group ( $p = 0.02$ ). The time to initiate the first breastfeeding was  $21.98 (\pm 9.10)$  minutes in the SSC group, while in the control group, it was significantly longer [ $66.55 (\pm 20.76)$ , ( $p < 0.001$ )] [6].

Mörelus et al. (2015, Sweden) examined the effects of almost continuous skin-to-skin contact (SSC) between mothers and preterm infants on breastfeeding. The study included 37 families with late preterm infants (32-35 weeks gestational age) who were randomized to receive either almost continuous SSC or standard care. Almost continuous SSC was defined as starting from birth and continuing for nearly 24 hours a day, with parents alternating until discharge from the hospital. All infants ( $n = 18$ ) in the SSC group partially or exclusively breastfed at hospital discharge, while the corresponding percentage in the group of infants receiving standard care was 84.2% ( $p>0.05$ ). Additionally, more infants in the SSC group were partially or exclusively breastfeeding at one (94.4% vs. 73.7%,  $p>0.05$ ) and four months (76.5% vs. 53.3%,  $p>0.05$ ) after birth [7].

Sharma et al. (2016, India) evaluated the effectiveness of early skin-to-skin contact on the exclusive breastfeeding rate at 6 weeks of age among infants born by vaginal delivery. Full-term newborns born by vaginal delivery without the need for resuscitation were randomly assigned at birth to either the SSC group ( $n = 100$ ) or the control group ( $n = 100$ ). Immediately after umbilical cord clamping, infants in the SSC group were placed on the mother's bare chest, while infants in the control group were placed under a radiant warmer for a period of 45 minutes, with mothers undergoing third-stage labor management and episiotomy repair. Maternal pain during episiotomy repair was recorded using a numeric pain scale. The main outcome assessed in the study was the rate of exclusive breastfeeding at 6 weeks after birth. The study found that the percentage of newborns exclusively breastfeeding at the age of 6 weeks in the SSC group was significantly higher than that in the control group (72% vs. 57.6%,  $p = 0.04$ , relative risk: 1.3, 95% confidence interval: 1.0 - 1.6). Additionally, the pain score during episiotomy repair among mothers in the SSC group was significantly lower than that in the control group ( $4.74 \pm 0.85$  vs.  $5.34 \pm 0.81$ ,  $p < 0.01$ ). Early skin-to-skin contact significantly improved the rate of exclusive breastfeeding at 6 weeks of age among newborns. An important additional effect was the reduction in pain intensity experienced by mothers in the SSC group during episiotomy repair [1].

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#### 4. Discussion

The aim of the present study was to explore the effectiveness of immediate skin-to-skin contact (SSC) between mother and newborn in the first hours after delivery in promoting breastfeeding. Six randomized clinical trials were included in the review, with five of them focusing on immediate contact right after delivery [1,3-6], while one study addressed the application of immediate contact from delivery until discharge from the maternity unit [7].

The review of these studies revealed that immediate skin-to-skin contact between the mother and the newborn is an easy and accessible method to enhance the self-effectiveness of maternal breastfeeding. The high effectiveness of breastfeeding prolongs the duration of exclusive breastfeeding. Specifically, Mahmood et al. (2011) demonstrated that early skin-to-skin contact significantly increased the success of the first breastfeeding and the continuation of exclusive breastfeeding up to one month. It also reduced the time to initiate the first feed and the time after effective breastfeeding [3]. On the other hand, in the study by Thukral et al. (2012), although there was no improvement in breastfeeding behavior, a significant increase in the rates of exclusive breastfeeding among newborns was observed [4]. Similarly, in

the study by Srivastava et al. (2014), it was found that very early SSC is an effective intervention that improves the infant's breastfeeding ability, maternal satisfaction, breastfeeding rates, and temperature control and weight patterns [5]. Similar findings are supported by Aghdas et al. (2014), where the experimental group showed significantly better self-effectiveness of breastfeeding, higher rates of successful initiation of breastfeeding, and longer duration of the first breastfeeding [6]. Finally, in Sharma's study (2016), it was found that early SSC significantly improved the rate of breastfeeding exclusivity at 6 weeks of age among newborns [1].

Immediate skin-to-skin contact (SSC) between the mother and the newborn appears to be associated with increased self-effectiveness of breastfeeding. This is supported by the fact that immediately after birth, the sympathetic-adrenergic system of the newborn is stimulated. This leads to a rapid and profound increase in the levels of catecholamines and other stress hormones, a vital phenomenon for the survival of the newborn [5]. The increase in catecholamine levels is secondary to the compression of the fetal head and intermittent hypoxia during uterine contractions. The newborn is quite active for a few hours after birth, to some extent due to the massive increase in catecholamine levels and also attributed to the activation of the locus ceruleus. After approximately 2 hours following birth, newborns tend to sleep, possibly due to the effect of reduced circulating catecholamine levels. Later, it may be challenging for them to wake up for up to 3-4 hours [8]. Therefore, the first 2 hours after birth are the optimal time to initiate breastfeeding, when the newborn is awake and more sensitive to tactile, thermal, and olfactory cues from their mothers. It has been demonstrated that high levels of circulating catecholamines affect the olfactory bulbs in a newborn, making them hypersensitive to the smells from their mothers' breasts. This early and unique phenomenon of olfactory recognition may be involved in the initial stages of the mother-infant attachment process, which is possibly facilitated by the high release of norepinephrine and stimulation of the locus coeruleus at birth [9]. Newborn infants, if allowed continuous contact with their mothers' abdomen, could find their way to the maternal breast and start breastfeeding effectively within an average of 50 minutes [10].

The present review has some limitations. Firstly, articles were searched in a single database, and studies published in English from 2010 onwards were included. Another limitation of the review is the heterogeneity of the studies in terms of their design and the populations studied. Additionally, the quality of the articles was not assessed, and the selection of studies based on title, abstract, and full text was conducted by a single person. Finally, the studies reflect the level of knowledge among healthcare professionals in low to middle-income countries, as no studies were found in developed countries. In developed countries, intervention studies aimed at further improving the knowledge levels of healthcare professionals are primarily conducted, but these were not included in the review due to the selection criteria for articles.

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## 5. Conclusion

Immediate skin-to-skin contact (SSC) between the mother and the newborn is an easy and readily available method for enhancing the self-effectiveness of breastfeeding. The high effectiveness of breastfeeding prolongs the duration of exclusive breastfeeding.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

The authors have no relevant financial or non-financial interests to disclose.

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