



(REVIEW ARTICLE)



## Educational actions regarding breastfeeding for parents with newborns who required hospitalization at birth: Systematic review

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### Abstract

**Background:** The benefits related to breastfeeding are widely discussed in the scientific literature, with recommendations established by the main national and international organizations. Although all the benefits are clearly published, and most women in the world initiate breastfeeding, the continuation of this practice is impacted by factors on multiple levels, which, over time, interfere with the decisions and behaviors of women who decide to breastfeed. It is necessary to analyze the impact of educational actions on breastfeeding-related outcomes in children who required specialized care so that care practices can also favor better outcomes for this population. The objective of this systematic review was to describe the breastfeeding educational actions directed to parents of newborns who required specialized care at birth as well as to verify the effectiveness of these actions on breastfeeding duration, discharge and long-term follow-up.

**Methods:** Information was collected from scientific articles located in the databases: NCBI, VHL, Scopus and Embase. Active searches in the references of selected articles and in gray literature through the CAPES/MEC journals portal and the Brazilian Digital Library of Theses and Dissertations were also performed. Articles that showed as the main or secondary outcome the impact of educational interventions or guidelines related to breastfeeding on the parents of newborns who needed hospitalization at birth, with results assessed in the short term and (or) long term, were selected. The risk of bias assessment was performed using the Cochrane Collaboration Tool. Data analysis was performed in a narrative way.

**Results:** A total of 163 articles were identified in the databases, of which only 8 met the inclusion criteria, 6 articles were selected in the active search and 14 were included in the gray literature.

**Conclusion:** The educational interventions optimized mothers' knowledge and the practice of breastfeeding for newborns who needed hospitalization after birth and also increased their rate at discharge and at 3-, 6-, and 12-month follow-ups.

**Practical implications:** Reinforce the importance of care aimed at breastfeeding through educational measures, providing individualized monitoring of the mother and child and facing difficulties during the process.

**Systematic review registration:** PROSPERO CRD42021230230

**Keywords:** Hospitalization; Breastfeeding; Health Education; Family

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## 1. Introduction

The benefits related to breastfeeding are widely discussed in the scientific literature, with recommendations established by the main national and international organizations. According to the World Health Organization, breastfeeding is considered a keystone not only for child development but also for maternal health, being recommended, since 2001, exclusively until the newborn is six months old<sup>1,2</sup>.

Improvements in data related to breastfeeding contribute to achieving goals related to health, food safety, education, equity, development and environment, and meet the Sustainable Development goals, thus demonstrating the role of breastfeeding in contributing to a healthier and more sustainable world<sup>3</sup>. Although all the benefits are clearly published, and most women in the world initiate breastfeeding, the continuation of this practice is impacted by factors on multiple levels, which, over time, interfere with the decisions and behaviors of women who decide to breastfeed<sup>4,5</sup>.

Worldwide analyses of the main indicators related to breastfeeding show that, although 80% of newborns receive breast milk, approximately half of them initiate the practice within the first hour of life. In most countries in the world, the rates of exclusive breastfeeding are well below 50%, being that, in poorer countries, there is a later initiation, with low rates of exclusively breastfed infants, while, in higher-income countries, the biggest challenge is related to the short duration of breastfeeding<sup>4</sup>.

In Brazil, the preliminary results of the National Survey on Infant Food and Nutrition show percentages related to breastfeeding indicators that draw attention in comparison to global data, for being higher, being the prevalence of 60% for exclusive breastfeeding in children under 4 months, 45.7% in children under 6 months, and 53.1% and 60.9% for continued breastfeeding at 12 months and in children under 24 months, respectively<sup>6</sup>.

Hospitalization is one of the factors that hinder the practice of breastfeeding, and the population of premature and low-birth-weight newborns is the most affected by prolonged hospital stays. In this context, mothers face biological, physical and psychosocial difficulties. Nevertheless, even under the most difficult conditions, when relevant interventions are adequately provided to these mothers, breastfeeding practices are responsive and can improve rapidly<sup>7</sup>.

Educational actions are always present among the main recommendations related to the promotion of breastfeeding, both in healthy newborns and among those who required hospitalization, from early care to the follow-up of the mother and baby binomial<sup>2,8,9</sup>. Some studies introduce reports from mothers who had their children admitted to neonatal intensive care units, which show a negative impact on their actions to breastfeed due to inaccurate information offered by health professionals, and it is essential that such professionals are available to support them and aware of the attitudes that facilitate breastfeeding<sup>10,11</sup>.

It is necessary to analyze the impact of educational actions on breastfeeding-related outcomes in children who required specialized care so that care practices can also favor better outcomes for this population.

The objective of this systematic review was to describe the breastfeeding educational actions directed to parents of newborns who required specialized care at birth as well as to verify the effectiveness of these actions on breastfeeding duration, discharge and long-term follow-up.

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## 2. Methods

This is a systematic review, developed according to the items recommended by the systematic review guidelines (PRISMA)<sup>12</sup> and registered in the PROSPERO Platform under the registration CRD42021230230.

### 2.1. Search Protocol

The articles that made up this systematic review were identified through electronic and manual search. Initially, a search was conducted in Cochrane, using the Medical Subject Headings “Breast feeding” and “Breastfeeding” alone, and then through the search strategy Breastfeeding AND Support, in order to locate other systematic reviews, and no similar review was identified until the last update of the search.

Electronically, the search was performed in the NCBI, VHL, Scopus and Embase databases. Manually, it was operated by actively searching the references of the articles that were selected at the end. The gray literature was investigated by searching the CAPES/MEC journals portal and the Brazilian Digital Library of Theses and Dissertations (BDTD).

There was no restriction on language or year of publication. The keywords used to compose the search strategy were identified through the English terms available in the Medical Subject Headings, in combination with the Boolean operator "AND": "hospitalization" AND "Breast Feeding" AND "Health Education". The last search update was performed in February 2022.

## **2.2. Inclusion and exclusion criteria**

In the study analysis, two examiners individually assessed, through the title and abstract, whether the articles selected in the electronic search should be included, according to the inclusion and exclusion criteria. In order to resolve possible disagreements, a third reviewer was defined to decide whether or not to include the article in question.

It included intervention studies that showed as primary or secondary outcome the impact of breastfeeding-related educational interventions or orientations to parents of newborns who required additional medical care and hospitalization at birth, with outcomes assessed in the short term (still during hospitalization and at discharge) and (or) in the long term (after discharge).

The interventions considered were those carried out through contact with an individual or groups of health professionals or not, who were trained to apply orientations complementary to the standard care offered by the maternity hospital. They could include health professionals as the focus of the orientations in the protocol, but, mandatorily, the parents (mother, father or both) should be among the people to whom the orientations were being directed.

The intervention directed to parents could be offered in groups or individually; performed in person or by telephone; and it could have the frequency of just one contact, or regular or continuous contact over several months. Studies could offer the intervention prenatally, during hospitalization, and (or) postnatally.

Articles characterized as editorials, case reports or case series were excluded, as well as other reviews, systematic or otherwise, used only to consult the references and identify potential new primary articles.

## **2.3. Data Extraction**

The information extracted from the analyzed references was recorded, including the following information: name of the first author, year of publication, method, profile of the studied population, type of promoted educational intervention, time of analysis of results (in months) and main results.

The primary outcome of the review in question was the time in breastfeeding, exclusive or not, at discharge and (or) at follow-up after discharge. The secondary outcomes were: length of hospital stay, mother's knowledge regarding breastfeeding, occurrence of necrotizing enterocolitis and late sepsis.

The countries where the included studies were conducted had their economic classification according to the World Bank's classification of countries by income (<https://data.worldbank.org/>, accessed January 04, 2021).

In addition, the data necessary to assess the risk of bias for each clinical trial selected for this review were extracted and analyzed using the Cochrane Collaboration Tool, which takes into account methods of random sequence generation, allocation concealment, blinding of participants and professionals, blinding of outcome assessors, incomplete outcomes, selective outcome reporting and other sources of bias<sup>13</sup>.

## **2.4. Data Analysis**

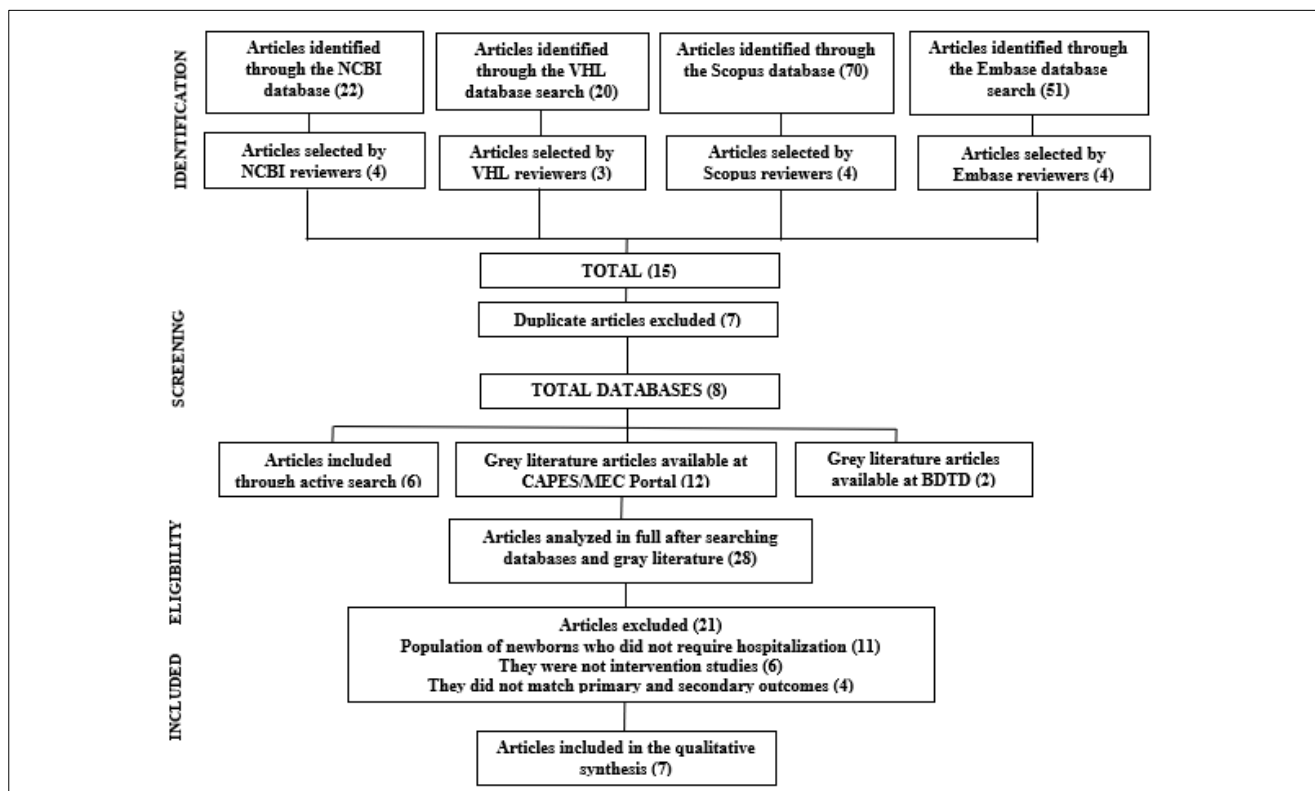
The obtained data were synthesized and analyzed in a narrative way, because, due to the methodological differences among the studies, a meta-analysis was not considered.

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## **3. Results**

At first, from the electronic search in the databases, a total of 163 studies were identified. Of these, 15 initially met the inclusion criteria, which, after removal of duplicate articles, totaled 8 articles. After conducting an active search in the references of the selected studies, as well as in the systematic reviews identified in the initial electronic search, and gray literature search, a total of 28 articles were read in full. After excluding 11 studies because they did not include the population of newborns requiring specialized care, 6 because they were not intervention studies and 4 because they

did not analyze the primary and secondary outcomes of this review, a total of 7 papers were included for qualitative assessment of the information (Figure 1).



NCBI – National Center for Biotechnology Information; VHL – Virtual Health Library; CAPES/MEC - Coordination for the Improvement of Higher Education Personnel/Ministry of Education (as per its Portuguese acronym); BDTD – Brazilian Digital Library of Theses and Dissertations (Education (as per its Portuguese acronym))

**Figure 1** Flow of study analysis phases for inclusion in the systematic review

### 3.1. Study Characteristics

The characteristics of the included studies, sorted by year of publication, are summarized in Table 1.

**Table 1** Characteristics of the included studies and main results

Author (year)	Method	Participants	Intervention	Results
Pinelli J (2001) <sup>15</sup>	Randomized clinical trial, with longitudinal follow-up, 2 groups, single site, n = 64 couples each group.	It was conducted in the tertiary neonatal intensive care unit of a referral university hospital in Ontario, Canada.  Inclusion criteria: newborns with birth weight less than 1,500 g (ABW), admitted within the first 72 hours after birth, and fed on breast milk by parental choice.  Exclusion criteria: multiple births; infants with severe congenital, surgical, or chromosomal	Intervention: (1) watching a video about breastfeeding preterm newborns; (2) individual counseling by the lactation researcher consultant, who is not a member of hospital staff; (3) weekly personal hospital contact; and (4) contact after discharge, frequent during the infant's first year or until breastfeeding is discontinued.  Control: standard support during the neonatal intensive care unit stay, which included regular contact with hospital staff. No specialized	Primary: duration of breastfeeding up to 1 year of age.  The mean duration of breastfeeding was 26.1 weeks (SD = 20.8; median, 17.4) in the intervention group and 24.0 weeks (SD = 20.5; median, 17.4) in the control group (not statistically significant). Long-term breastfeeding counseling of parents of very low birth weight infants in this study did not demonstrate a significant difference in breastfeeding duration.

		<p>abnormalities; parents who did not speak English.</p> <p>Fathers, as well as mothers, were included in this study because of the recognized importance of partners as a key support for successful breastfeeding.</p>	<p>breastfeeding care was available to parents in the hospital at the time of the study, and only a limited number of staff had any formal breastfeeding education.</p> <p>Both groups were followed-up through follow-up visits at discharge, and at 3, 6, and 12 months of age.</p>	
Merewood A (2006) <sup>14</sup>	<p>Randomized clinical trial, 2 groups, single site, n = 108 mother-infant pairs, 53 in the intervention group and 55 in the control group.</p>	<p>It was conducted in a neonatal intensive care unit in Massachusetts, Boston.</p> <p>Inclusion criteria: mothers of healthy premature newborns (no congenital anomalies and no life-threatening condition in the immediate postpartum period) between 26 and 37 weeks of gestational age; English or Spanish speaking; have an indication for breastfeeding and choose to do so.</p> <p>Exclusion criteria: women unable to breastfeed due to illness or birth complications. Newborns with gestational age less than 26 weeks.</p>	<p>Intervention: peer support, through a breastfeeding counselor, with contact made up to 72 hours after delivery. The counselors were not health professionals. Mother follow-up occurred weekly for 6 weeks, with emphasis on individual face-to-face contact lasting 30 minutes; after discharge, contact was by telephone.</p> <p>Control: standard treatment, within the recommendations of the Baby Friendly Hospital.</p> <p>Both groups were followed-up at 2, 4, 8, and 12 weeks after birth for feeding verification.</p>	<p>Primary: duration of breastfeeding up to 12 weeks postpartum.</p> <p>At 12 weeks, women with peer counseling were 181% more likely to provide any amount of breast milk than those without peer counselors (odds ratio, 2.81 [95% confidence interval, 1.11-7.14]; P = .03).</p>
Santoro Júnior W (2007) <sup>16</sup>	<p>Randomized clinical trial, 2 groups, single site, n = 36 children per group.</p>	<p>It was conducted at Clinical Hospital of the Faculty of Medicine of Ribeirão Preto, São Paulo, Brazil.</p> <p>Inclusion criteria: newborns weighing less than 1,500g, single twins.</p> <p>Exclusion criteria: severe neurological problems and (or) facial malformations that hindered sucking at the breast, digestive tract malformations, hospitalization longer than 4 months, HIV+</p>	<p>Intervention: Follow-up by health professionals, started since prenatal care. At discharge, information was reinforced regarding the maintenance of production and, if necessary, when facing difficulties, the mother could perform extra support consumption. These participants also received the routine conducts.</p> <p>Control: standard follow-up, which includes mother and baby contact already in the delivery room, visits to the intensive care unit promoted according to the availability of the nursing team, orientation regarding</p>	<p>Primary: rates of breastfeeding in the first 6 months after hospital discharge.</p> <p>The median duration of breastfeeding was 54 days for the control group and 91 days for the intervention group. The latter group had statistically significant better breastfeeding rates throughout the study period (p &lt; 0.001).</p>

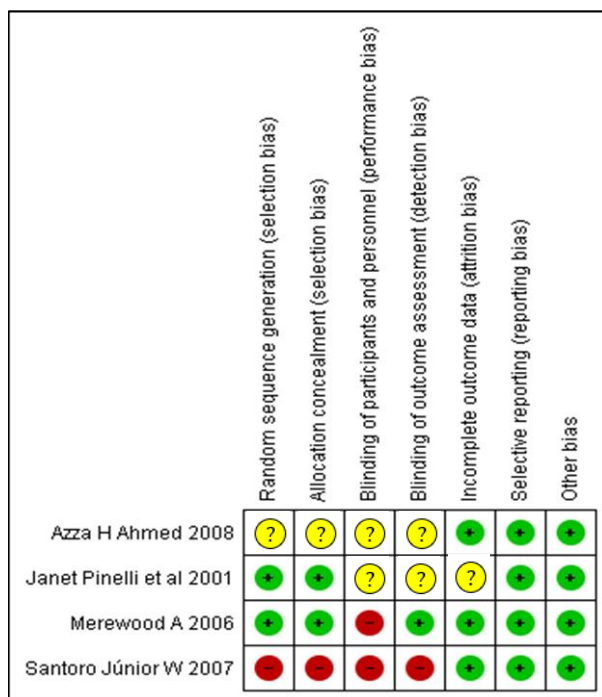
		mother and death, multiple twins.	milking techniques and increased milk production. Early initiation of milking, encouraged every 2 to 4 hours. Unlimited access to the newborn by the mother, even after discharge.  The two groups were followed-up on a monthly basis until 6 months after hospital discharge or until weaning was verified.	
Ahmed AH (2008) <sup>17</sup>	Randomized clinical trial, 2 groups, conducted in three hospital units, n = 60 mother-infant pairs, 30 control group and 30 intervention group.	It was conducted in the intensive care unit of three government and university hospitals in Cairo, Egypt.  Inclusion criteria: mothers of premature newborns with gestational age less than 37 weeks, who were able and willing to breastfeed.  Exclusion criteria: not reported.	Intervention: psychological support after birth, theoretical and practical orientation about breastfeeding and its importance, and training for massage and milking.  Control: routine care.	Primary: knowledge and practice of breastfeeding until 3 months of age.  In the post-test, the knowledge in both groups improved, but in the intervention group it showed a statistically significant improvement (p = 0.011). More than 50% of the mothers in the intervention group started milking and expressing milk on the second day after birth, compared to 10% in the control group, statistically significant results (p < .000). 80% of the newborns in the intervention group were discharged on exclusive breastfeeding, compared to 40% in the control group. At the end of the second month, 66.7% were exclusive breastfeeding in the intervention group, compared to 30% in the control group, evolving to an even greater difference at the end of the third month, when 40% were exclusive breastfeeding in the intervention group, and only 13% in the control group.
Lee HC (2012) <sup>18</sup>	Intervention study, multiple sites, focused on care changes, 11 intensive care units considered intervention and 88 units that did not participate in	It was conducted in units in California, United States.  Inclusion criteria: hospital units that adhered to a 12-month quality improvement program. Followed newborns had a birth	Intervention: the activities proposed by health professionals. Among the actions: providing education and advocacy for breast milk supply, establishing and maintaining conditions for the supply of breast milk to the newborn, and	Primary: percentage of very low birth weight newborns who, at hospital discharge, received any breast milk.  Breast milk feeding rates in the first period of analysis were significantly higher in the control units (64.2%,

	the changes were considered control.	weight of 401 to 1500g, or 22 to 29 weeks gestational age. Exclusion criteria: not reported.	establishing comprehensive and consistent nutritional monitoring. Educational interventions were targeted at health care providers, mothers, and family members.  Control: units that did not adhere to the improvement program.  Three comparison periods were considered: initial phase, 12 months (2008-2009), project implementation phase, 12 months (2009-2010), and the sustainability phase, 6 months (2010-2011).	SD 47.9%) compared with the units that were to receive the interventions (54.6%, SD 49.8%). In the units that received the improvement program, after the intervention, the percentage of newborns discharged from the hospital with breast milk increased (mean 61.7%, SD 48.7%; p = .005) and remained in the sustainability phase (mean 64.0%, SD 48.1%; p = .003). In the control group, there was no change in percentages in the same implementation period, but there was an increase in the sustainability period to 67.7%.
Bixby C (2016) <sup>19</sup>	A before-and-after, single-site, single-group intervention study.	Neonatal intensive care unit, California, United States.  Inclusion criteria: staff conducted initiatives that promoted lactation throughout the unit and hospital, but efforts would focus on very low birth weight (< 1,500g) newborns.  Exclusion criteria: not reported.	Intervention: To identify barriers to lactation, identify the most effective practices to improve lactation rates, optimize available resources for breastfeeding practice, and improve staff and family education.  The staff training initially consisted of a mandatory online training, followed by a practical training in the unit. The actions for mothers and families consisted of individual bedside information given by the unit and milk bank professionals, as well as videos and printed materials.  Data were analyzed in an initial period, when the unit did not receive the interventions (2011), after the institution of the interventions (2013), and in a second moment, in 2015.	Primary: availability of breast milk at discharge for very low birth weight (< 1,500g) newborns.  Breast milk availability at the initiation of the project was 58.7% and increased to 80% in 2013, a change maintained in 2015.
Parker MG (2019) <sup>20</sup>	Before-and-after type intervention study, multiple sites, single group, n = 9 units, 1,670 newborns.	Birth centers, Massachusetts, United States.  Inclusion criteria: very low birth weight newborns (birth weight less than 1,500g) or gestational age less than 30 weeks.	The interventions were focused on increasing the structure to favor milking (number of breast pumps, chairs for skin-to-skin contact, among others), updating the practice guidelines related to breastfeeding support,	Primary: Breastfeeding or exclusive breastfeeding within 24 hours before hospital discharge or transfer.  There was no change at discharge or transfer in the number of mother's

		Exclusion criteria: newborns who died, those who were ineligible to receive breast milk, mothers who were ineligible for breast milk supply.	<p>increasing staff awareness through training and printed and visual materials in the unit. Interventions for mothers included prenatal consultations with education on the topic, early initiation of milking (manual or electric) within six hours after birth, and encouragement of skin-to-skin contact.</p> <p>The collection was performed every 1 or 2 weeks during hospitalization and 24 before discharge or transfer to another unit.</p>	breastfeeding or exclusive breastfeeding.
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The seven studies were published between 2001 and 2019, most of them more than five years old, conducted with participants living in five countries, with the United States being the most frequent location of the studies. One study was conducted in a lower-middle income country (Arab Republic of Egypt, Ahmed AH 2008), one study was conducted in an upper-middle-income country (Brazil, Santoro Junior W 2007) and five studies were conducted in high-income countries (Canada, Pinelli J 2001; United States, Merewood A, 2006, Lee HC 2012, Bixby C 2016, Parker MG 2019).

Among the studies, four were randomized controlled trials and three were intervention studies, which applied modifications in hospital care and assessed the results, comparing the periods before and after the changes. In all studies, the target population was very low birth weight newborns and premature newborns, with gestational age ranging from 26 to 37 weeks.



Source: Author. Sorted alphabetically

**Figure 2** Risk of bias summary: analysis of the authors’ judgments about each risk of bias item for each study

The research protocols among the studies were varied: most of them have different factions within the same protocol. Only one study assessed the effect of individualized orientations as the only intervention in the protocol (Merewood A,



2006). Two studies used information transmitted by video (Pinelli J, 2001; Bixby C, 2016) and three directed the educational interventions also to the health care team, not only to the parents (Lee HC, 2012; Bixby C, 2016; Parker MG, 2019), precisely the works that directed the interventions to changes in the care routine. In most studies, health care providers were responsible for conducting breastfeeding counseling. In only one study (Merewood A, 2016), the counselors were women with breastfeeding experience from the local community. Two studies used a breastfeeding recall or diary (Merewood A, 2016; Ahmed AH, 2008) as a strategy to avoid recall bias and three studies included the father and (or) family among the members who received breastfeeding-related orientations (Pinelli J, 2001; Lee HC, 2012; Bixby C, 2016), but none assessed outcomes related to these members.

In none of the studies, the intervention protocol comprised a single intervention. Only two studies conducted orientation from prenatal care (Santoro Junior W, 2007; Parker MG, 2019); only one maintained follow-up and orientation after discharge by means of telephone (Pinelli J, 2001); one study continued follow-up after discharge, through outpatient visits (Santoro Junior W, 2007); four studies followed-up after discharge to assess outcomes, two of them until the twelfth month after discharge (Pinelli J, 2001; Merewood A, 2016), one until six months after discharge (Santoro Junior W, 2007) and one until three months after discharge (Ahmed AH, 2008).

The results of the bias analysis are shown in Figure 2.

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#### 4. Discussion

This systematic review gathered the evidence related to breastfeeding education for parents of newborns who required hospitalization after birth, including seven studies, most of them conducted in high-income countries, but also studies conducted in lower-middle-income and upper-middle-income countries.

These locations highlight the worldwide interest and that of countries with different characteristics in supporting breastfeeding in hospitalized newborns, since the described benefits of breast milk are even more applicable to this population. Considering premature newborns, the patients with the highest frequency of research in this area, the risks associated with formula feeding include higher frequency of necrotizing enterocolitis and delay in brain and cognitive maturation, where the development of successful strategies to increase breastfeeding-related indicators in this population is of paramount importance<sup>14</sup>.

It is worth underlining that the development of breastfeeding promotion strategies should consider the specificities of each service, inserting them in the social context of the country where it is located. Although breastfeeding in high-income countries has a higher initiation rate, it is shorter in duration than in countries with lower incomes. Even so, the latter, in general, have a rate of only 37% of children under 6 months of age being exclusively breastfed<sup>4</sup>.

Most preterm births and very low birth weight newborns take place in low-income countries. Programs with actions that favor breastfeeding and seek an earlier initiation, as well as higher continuation rates, are justified, since these women are the ones who will have difficulties<sup>21</sup>.

High-income countries experience higher rates of initiation. This context was highlighted by Pinelli J. et al. who were unable to point out significant differences in their results when comparing the group receiving individualized orientations and the control group<sup>15</sup>. Among the justifications provided by the authors, one can find the favorable socioeconomic status of the study population and the high motivation to breastfeed, which already had high breastfeeding initiation rates and wide availability of resources to support breastfeeding in both groups<sup>4</sup>.

Breastfeeding represents an important contribution to public health, both in high-income and low-income countries. In light of the foregoing, recognizing and seeking solutions to the possible barriers that prevent the initiation and consolidation of this practice should be priority actions of any society<sup>22</sup>. Among mothers of preterm newborns, the known barriers are inadequate production of breast milk, difficulties experienced during breastfeeding, maternal obesity, maternal age, lack of partner support, presence of other children at home, lower education level, in addition to responsibilities related to professional life and lack of breastfeeding education in the hospital, the latter being the scope of this review<sup>23,24</sup>.

Recognizing that breastfeeding education in the hospital environment plays an essential role in promoting better outcomes is not a contemporary concept, as this is evident in the studies selected for this review, of which the oldest is dated 2001<sup>15</sup>. In 1998, Bolam, A. et al.<sup>25</sup>, when investigating the effects of a postnatal educational program on healthy newborns, already stated that, in practice, breastfeeding education opportunities are not prioritized by health care providers because they have high demands during maternity care.

It is desirable to verify the local demands to design specific educational programs. Programs that include prenatal care, with the objective of favoring early initiation, addressing contents related to the importance and benefits of breastfeeding, milking techniques, and also support and assistance to all the fears and doubts that may arise when facing such an unexpected hospitalization<sup>16,20</sup>.

The educational interventions used in the studies of this review showed different programs. Only two of them initiated the educational actions in the prenatal period<sup>16,20</sup>, one of them being directed to changes in care routines at the research site<sup>20</sup>. Only two studies carried out intervention after discharge in their protocol. In the study by Pinelli, J. et al.<sup>15</sup>, there was an intervention after discharge by means of telephone. Even considering that difficulties related to expressing milk and establishing breastfeeding still during hospitalization are more addressed, and that actions addressing problems of breastfeeding maintenance after discharge should receive more attention, the authors were unable to show differences in breastfeeding rates after discharge with a program that included intervention only at this stage. In turn, the study by Santoro Júnior and Martinez<sup>16</sup> showed positive results in breastfeeding indicators in the intervention group, with follow-up after discharge through monthly outpatient consultations until the child is six months old. However, due to other factors that differentiate the protocols, it is not possible to define whether the differences between the results are linked to the approach format after hospital discharge.

Most of the evidence provided suggests that interventions aimed at parents' knowledge, especially the mother, improve the provision of any breast milk at hospital discharge, as well as the practice of exclusive breast milk, also increasing the time of provision after hospital discharge<sup>19,20</sup>.

Three studies included, in addition to the mother, the participation of the father and family, but only one of them specifically detailed the outcomes related to the assessed parents<sup>15</sup>. In this study, both the mother in relation to the father and the opposite, both reported breastfeeding as "very important" for his/her partner, having a similar opinion regarding the time the newborn should be breastfed – in this case, eight months, the time to return to work. The father was also not cited as a reason to stop breastfeeding at any time, either among the mothers who received the orientation in the intervention group or in the control group<sup>15</sup>.

In the healthy newborn population, there is extensive evidence suggesting that individualized, face-to-face intervention is associated with a greater effect for adoption of exclusive breastfeeding than any telephone support alone, or both<sup>26</sup>. In newborns requiring hospitalization, only four studies used individualized support among their strategies. Also in the healthy newborn population, this format showed significant differences in both favoring exclusive breastfeeding and any breast milk supply<sup>14-17</sup>.

In most protocols, the orientations were provided by health professionals, the research team, or the newborn care team. Only in the study by Merewood, A. et al.<sup>14</sup>, mothers with breastfeeding experience provided the orientations, showing satisfactory results at 12 weeks postpartum. Women who received individualized orientations were more likely to provide any amount of breast milk (181%) compared to those who did not. This difference was even greater in the subgroup analysis of African American newborns, reaching 249%.

Only one study assessed mothers' knowledge after the application of the educational intervention compared to the control group, with significant improvement in mothers' knowledge about breastfeeding in both groups, but statistically significant in the intervention group. In this group, the intervention was restricted to the period after birth and during hospitalization, but, even so, this result reinforces the potential of this type of intervention to produce greater knowledge. This is one of the barriers cited as a cause of negative outcomes<sup>17</sup>.

Two studies assessed necrotizing enterocolitis rates as a secondary outcome. The two protocols were related to the assessment of improvements in care routines of units, and no differences were observed between the groups. There was a similar result for length of stay, also assessed in these studies, and no impact of the interventions on reducing the length of stay of newborns was shown<sup>18,20</sup>.

Although the population of the studies included in this review were similar – premature and (or) very low birth weight newborns – the different types of protocols conducted, as well as the different analyzed outcomes, bring the importance that the findings found are interpreted with caution. In addition, it is prudent to assume the possibility that not all existing trials were included in this systematic review, although the search was carefully conducted.

When analyzing the risk of bias of the studies, the non-description or absence of blinding is an important factor to be taken into consideration. Only one study of the four included clinical trials mentioned blinding of the researcher who

collected the results in the stages after the intervention was applied<sup>14</sup>. Nevertheless, when analyzing the type of intervention proposed, complete blinding of participants and research staff is unlikely.

In this context, it is essential that, in addition to research with high methodological power are carried out, specific outcomes are tested and controlled, which aim to define more objective answers and which provide the definition of an intervention program that will improve outcomes related to breastfeeding in newborns who need hospital admission.

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## 5. Conclusion

Most of the evidence identified by this review, five studies out of a total of seven, demonstrated that educational interventions improve the indicators related to breastfeeding practice in newborns who required hospital admission after birth. There was an increase in the rates of breastfeeding and exclusive breastfeeding at hospital discharge and at 3-, 6-, and 12-month follow-ups, as well as in the duration in days of breastfeeding and mothers' knowledge about the topic. Only two studies did not show differences between the studied groups, with the variability between the protocols, the type of conduct, the approach, the frequency and the time of the intervention as major unfavorable factors to justify the difference between the results.

### *Practice Implications*

Care related to breastfeeding has been the focus of several studies regarding the positive results of breast milk on the health of newborns and children. Among the care offered in this theme, health education is an accessible approach with positive responses in the population of healthy mothers and newborns. The identification through this systematic review that supporting the mother with information related to the management of breastfeeding promotes better outcomes also in the population of newborns who required hospitalization after birth will provide reflections and scientific basis for the adoption of more accessible measures for their low cost and proven result.

### *Abbreviations*

NCBI: National Center for Biotechnology Information;  
VHL: Virtual Health Library;  
CAPES/MEC: Coordination for the Improvement of Higher Education Personnel/Ministry of Education;  
PROSPERO: International Prospective Register of Systematic Reviews;  
BDTD – Brazilian Digital Library of Theses and Dissertations (Education (as per its Portuguese acronym));  
PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-analyses.

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## Compliance with ethical standards

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### *Availability of data and materials*

All data generated during this study are included in this article.

### *Disclosure of conflict of interest*

The authors declare that they have no conflicts of interest.

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### *Authors' contributions*

All authors participated in the preparation of the article and read and approved the final version.

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