Revista CEFAC

eISSN 1982-0216

DOI: 10.1590/1982-0216/202527210923 | Rev. CEFAC. 2025;27(2):e10923

Review articles

Breastfeeding difficulties after breast augmentation: A scoping review

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ABSTRACT

Purpose: to identify and describe difficulties observed in breastfeeding in women who underwent breast augmentation surgery.

Methods: a scoping review, with the guiding question: «What are the possible difficulties in breastfeeding observed in women who have undergone breast augmentation, as described in the literature?». The search strategy was carried out with combinations of descriptors for searching the Lilacs, SciELO, Cochrane CENTRAL, BIREME, Pubmed, ADOLEC, BDENF, MedCarib, and gray literature databases, October 12, 2023 being the date of the last search. Complete articles, without restrictions on language and publication time, observational design, and that analyzed women with a history of breast augmentation and possible difficulties in breastfeeding, were included.

Literature Review: seven research articles were included with studies identifying the following as possible difficulties in breastfeeding in women undergoing breast augmentation surgery: the presence of breast engorgement, mastitis, pain, nipple lesions, and changes in lactation and sensitivity involved in breastfeeding.

Conclusion: it is expected that the results presented in this scoping review will stimulate the development of more robust evidence on the relationship between these findings.

Keywords: Breastfeeding; Breast Implant; Mammoplasty; Mother-Child Relations; Lactation

This study was conducted at the Federal University of Health Sciences of Porto Alegre, Porto Alegre, RS, Brazil.

Financial support: Nothing to declare

Conflict of interests: Nonexistent

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Received on October 17, 2023
Received in a revised form on December 15, 2023
Accepted on October 18, 2024

INTRODUCTION

The World Health Organization (WHO) recommends exclusive breastfeeding (EBF) for the first six months of life and supplementary breastfeeding for the first two years of life, which has become a global public health measure that has been adopted to this day[1,2]. Among the numerous benefits of EBF for newborns, there is a reduction in the risk of allergies[3], infant mortality[4], diarrhea[2], and respiratory infections[5]. It also reduces the risk of obesity[6], has a positive effect on intelligence[7], and promotes adequate craniofacial development[8]. Furthermore, it also has benefits for the mother, such as reducing postpartum hemorrhage[9], reducing the risk of hypertension[9], diabetes[6], and the chances of a new pregnancy[10]. It protects against breast[11] and ovarian[12] cancer and promotes an emotional bond between mother and baby[13].

The prevalence of EBF in children under six months of age in Brazil increased from 2.9% to 45.7% between 1986 and 2020[14]. However, there is a low percentage of EBF in the Brazilian population. It is believed that a substantial percentage is associated with low adherence to EBF due to situations resulting from low milk production, difficulty in adjustment, lack of knowledge and maternal insecurity, breast complications, family interference, return to work, lack of resilience, and unpreparedness of health professionals, an indication of supplementation with formula [15-17] and the use of pacifiers[18].

In parallel, Brazil ranks second in the world ranking of countries that perform cosmetic surgical procedures. Data from 2020 from the International Society of Aesthetic Plastic Surgery (ISAPS) show approximately 10.1 million surgical procedures worldwide. Of these, 1.6 million were breast augmentation surgeries, and 57.3% were in women between 19 and 34 years old[19].

Breast augmentation can cause damage to the milk ducts, glandular tissue, or breast innervation, and the implant, in turn, exerts pressure on the breast tissue[20]. Anatomical complications include capsular retraction with hardening of the breast, rupture of the implant, chronic pain and discomfort, and changes in the sensitivity of the nipple-areola complex[21-23]. Given the increasing number of breast augmentation surgeries and the fact that this may be associated with difficulties in EBF[19-23], it is important that studies exist that demonstrate the possible changes resulting from this surgical procedure. Thus, there must be means to guide specific clinical practice aimed at reducing the weaning rate in women with a surgical history and allowing women to be aware of the risks and benefits before deciding to undergo surgery.

A systematic review concluded that women with breast implants were less likely to breastfeed their babies exclusively compared to women without breast implants[20]. Another review confirmed that women with breast implants are less likely to establish breastfeeding, especially EBF[24]. However, existing studies did not verify aspects related to the difficulties encountered in breastfeeding as a result of the surgical procedure.

Therefore, this review aimed at identifying and describing the difficulties in breastfeeding observed in women who underwent breast augmentation surgery, as highlighted in the literature.

METHODS

Research strategy

This scoping review was conducted based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews guidelines[25,26]. The acronym PCC was used to construct the research question, considering "P" as women who breastfeed or have breastfed, "C" as having undergone breast augmentation surgery, and "C" as possible difficulties in breastfeeding, resulting in the guiding question for this review: What are the possible difficulties in breastfeeding observed in women who have undergone breast augmentation as described in the literature?

Data searches included articles published in the electronic databases Latin American and Caribbean Health Sciences Literature (Lilacs), Scientific Electronic Library Online (SciELO), The Cochrane Central Register of Controlled Trials (Cochrane CENTRAL), Embase, Virtual Health Library (BIREME), PubMed (accessed via MEDLINE), ADOLEC, BDENF (Nursing Database), MedCarib and articles found in the gray literature and in the references of the selected articles, as described in Table 1.

Table 1. Search strategy

Date of last consultation	Platform	Strategy	HITS
12/10/2023	Embase	“breastfeeding” OR "lactation" OR "breast feeding" OR “colostrum” OR "weaning" AND "breast reconstruction" OR “breast augmentation” AND 'article'/it	172
12/10/2023	Pubmed	“breastfeeding” [MeSH Terms] OR "lactation" [MeSH Terms] OR "breast feeding" [MeSH Terms] OR “colostrum” [MeSH Terms] OR "weaning" [MeSH Terms] AND "mammaplasty" [MeSH Terms] OR "breast implants" [MeSH Terms] OR "breast implantation" [MeSH Terms]	125
12/10/2023	BIREME	(Breast Feeding) OR (colostrum) OR (weaning) AND (Mammaplasty) OR (surgery plastic) OR (Reconstructive Surgical Procedures) OR (Breast Implants) OR (Breast Implantation)	416
12/10/2023	LILACS (BVS)	(Breast Feeding) OR (colostrum) OR (weaning) AND (Mammaplasty) OR (surgery plastic) OR (Reconstructive Surgical Procedures) OR (Breast Implants) OR (Breast Implantation)	24
12/10/2023	SciELO	(Breast Feeding) OR (colostrum) OR (weaning) AND (Mammaplasty) OR (surgery plastic) OR (Reconstructive Surgical Procedures) OR (Breast Implants) OR (Breast Implantation)	12
12/10/2023	Cochrane CENTRAL	(Breast Feeding) OR (colostrum) OR (weaning) AND (Mammaplasty) OR (surgery plastic) OR (Reconstructive Surgical Procedures) OR (Breast Implants) OR (Breast Implantation)	3
12/10/2023	ADOLEC (BVS)	(Breast Feeding) OR (colostrum) OR (weaning) AND (Mammaplasty) OR (surgery plastic) OR (reconstructive surgery) OR (Breast Implants) OR (Breast Implantation)	0
12/10/2023	BDENF (BVS)	(Breast Feeding) OR (colostrum) OR (weaning) AND (Mammaplasty) OR (surgery plastic) OR (Reconstructive Surgical Procedures) OR (Breast Implants) OR (Breast Implantation)	8
12/10/2023	MedCarib (BVS)	(Breast Feeding) OR (colostrum) OR (weaning) AND (Mammaplasty) OR (surgery plastic) OR (Reconstructive Surgical Procedures) OR (Breast Implants) OR (Breast Implantation)	0
12/10/2023	Gray literature	(Breast Feeding) OR (colostrum) OR (weaning) AND (Mammaplasty) OR (surgery plastic) OR (Reconstructive Surgical Procedures) OR (Breast Implants) OR (Breast Implantation)	0

The selection of descriptors used in the construction of the search strategy was carried out by consulting the Medical Subject Headings (MeSH), Health Sciences Descriptors (DeCS), and Embase Subject headings (Emtree) related to the population and exposure.

Selection criteria

Of the references found, articles available in full, with a cross-sectional and cohort design, published in any language, without restrictions on the period of publication, and that studied women with a previous history of breast augmentation, whether or not they had difficulties in breastfeeding, were considered eligible. Articles that cited the relationship between breast augmentation surgery and breastfeeding as a secondary objective were also included. Literature reviews, case series, and articles that addressed breast reduction surgery, mastopexy surgery, mammoplasty surgical procedures, diseases or infections resulting from surgery, previous history of syndromes or cancer, hormonal changes, use of contraceptives during lactation, transplant surgeries, and articles that addressed breastfeeding and infant development were excluded.

Data analysis

The articles identified from the initial search strategies were independently assessed by two reviewers (RRP and LBS) using the Mendeley reference manager, to determine the eligibility for inclusion of the studies, discriminating the studies as «excluded», «included» and «doubtful». In situations where the reviewers did not determine whether the article was included based on the title and abstract, the article was included to be read in full. And, in cases of disagreement during the selection process, they were resolved independently by a third person (RSR).

Data extraction from the included studies was performed in a standardized manner, from records in a Microsoft Excel® spreadsheet, performed independently by two reviewers (RRP and LBS), and subsequent consensual analysis for greater accuracy in the data collected. Data analysis was performed quantitatively and qualitatively after concept training, performed by the reviewers. A data extraction form was developed, as provided in the study project, with the following information: authors and year of publication, study design, sample age, surgery time, type of incision, implant material and volume, number of pregnancies, type and duration of breastfeeding and nipple type, as shown in Chart 1.

Chart 1. Data extraction

Authors and year	Sample	Design	Sample age	Surgery period	Prosthesis implantation site	Incision type	Implant volume (average)	Implant material	Number of pregnancies
Marcacine et al., 2018[27]	Women with breast augmentation, primiparous, between 12 and 72 hours postpartum, who were breastfeeding.	Prospective cohort	Average age of 33 years	74.8% of them had undergone surgery up to 10 years ago	Submuscular and subcutaneous	Inframammary and periareolar	267 ml	-	Primiparous
Lund et al., 2016[28]	Women (n=4927) aged 18 years or older who underwent surgical implantation through the inframammary or periareolar incision.	Prospective cohort	Median age of 36 years	-	Submuscular, subglandular, and subcutaneous	Inframammary and Periareolar	-	Silicone	Primiparous and Multiparous
Ram et al., 2021[29]	Women (n = 6,099) who breastfed with a history of breast augmentation and women (n = 12,198) without a surgical history.	Observational	Average of 33.4 years in the case group and 34.8 years in the control group	-	-	-	-	-	Primiparous and Multiparous
Wang et al., 2012[30]	Women (n=58) who received polyacrylamide hydrogel injections for breast augmentation and who developed infection during breastfeeding	Observational	Average age of 31 years	Average of 4.1 years	-	-	-	Polyacrylamide hydrogel	-
Jewell et al., 2018[31]	Women (n = 4,679) aged over 22 years who attempted to breastfeed after undergoing augmentation surgery using silicone or saline implants.	Observational	Average of 27.9 years in the silicone group and 27.1 years in the saline group	Average of 3.6 years in GSi and 3.8 years in GS.	Submuscular and subglandular	Inframammary, Periareolar, Mastopexial and Transaxillary	-	Silicone and Saline	Primiparous and Multiparous
Cruz N, Korchin L, 2010[32]	Women (n=105) who underwent breast augmentation surgery with saline implants and breastfed after surgery.	Retrospective cohort	Average age of 23 years	-	Submuscular	Inframammary and Periareolar	300 ml	Saline	-
Hurst N, 1996[33]	Women (n = 42) aged between 22 and 39 years who have undergone breast augmentation surgery and who are breastfeeding.	Retrospective cohort	Average of 30.8 years	-	-	Inframammary and Periareolar	-	-	Primiparous and Multiparous

LITERATURE REVIEW

A total of 758 studies were found. After removing 51 duplicates, 707 were screened by reading the titles and abstracts. Subsequently, 60 articles were selected and read in full to verify whether the study was eligible according to the criteria established in this review. Thus, the final sample consisted of seven articles, as shown in Figure 1.

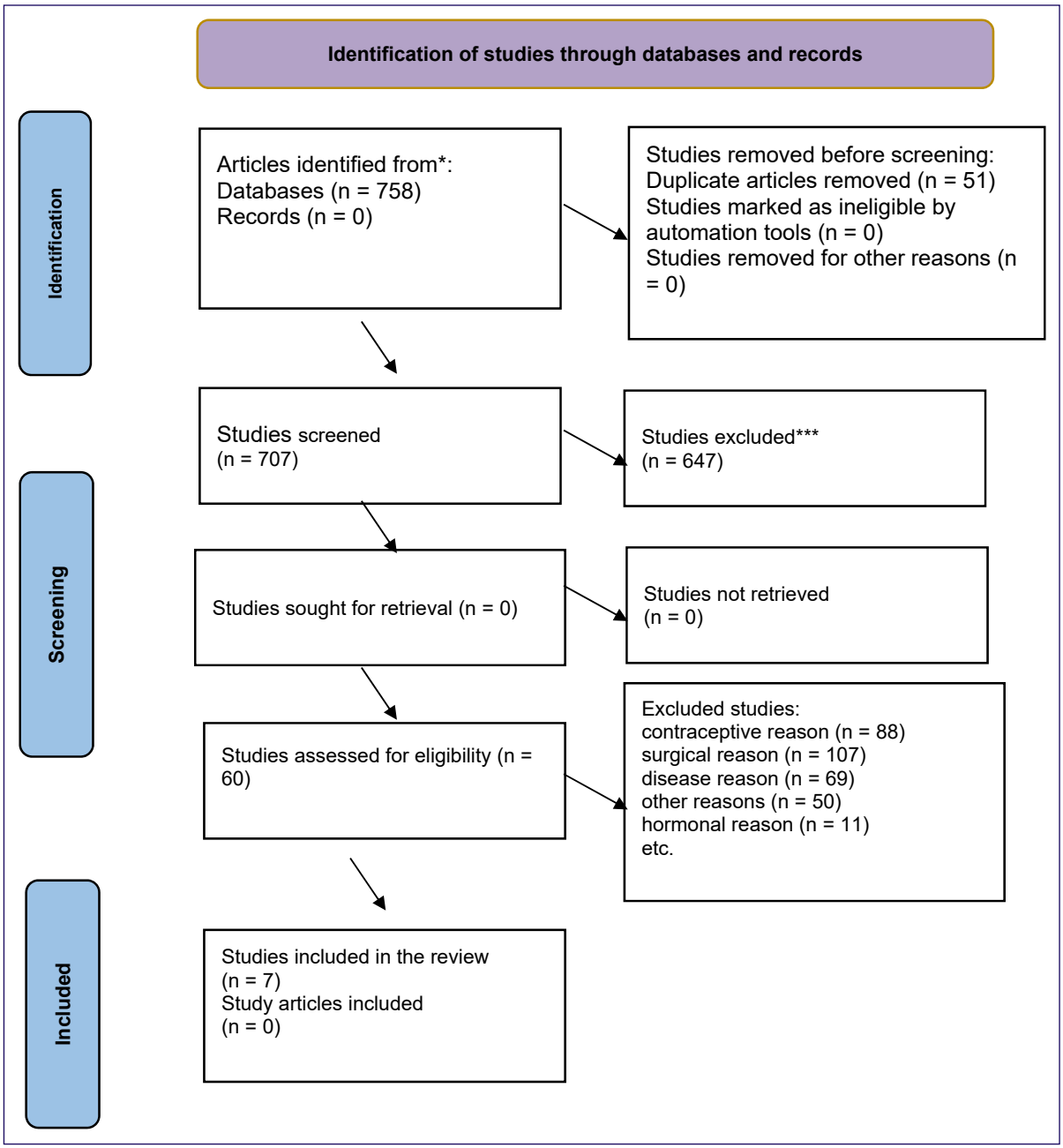

Figure 1. Study selection flowchart

Of these studies, the year of publication ranged from 1996 to 2021, with four (57.1%) from the last five years[27-29,31]. The majority (n=5) were carried out in the American continent[27,28,30,31,33] and the predominant language was English[28-33]. Regarding the design of the selected studies, it was found that four (57.1%) were cohort[27,28,32,33] and three (42.85%) were cross-sectional[29-31].

The included studies sought to analyze the associations between the surgical characteristics of breast

augmentation with different implant materials and aspects related to breastfeeding. Regarding the characteristics of the study sample, the average minimum age was 23 and the maximum was 38 years, and the majority were white women, with a normal body mass index (BMI), multiparous, with higher education, and married. Only two (28.57%) of the studies provided information on childbirth and newborn data[27,33].

Inframammary[27,28,31-33] and periareolar[27,28,31-33] incisions were the most frequent, followed by mastopexial[31] and transaxillary[31] incisions. Regarding the implantation site, a higher occurrence of submuscular implantations[27,28,31,32] was found, followed by subglandular[28,31] and subcutaneous[27,28]. The intervals between breastfeeding and the surgical procedure were described in periods of less than ten years, except for one study that followed for more than ten years[27]. Information on the implant volume was reported in two (33.33%) studies, with averages close to 300 ml[27,32]. In one study, the use of polyacrylamide hydrogel injection[30] was observed, and in the others, the use of silicone[28,31] and saline[31,32].

Regarding the main outcome analyzed in this review, the presence of breast engorgement[27], mastitis[28,29,31], pain[27,31], nipple lesions[27], insufficient[28,31-33] or excessive[31] lactation, change in nipple sensitivity[28,32] or skin sensitivity[28] was observed (Chart 2).

Chart 2. Summary of data regarding methodological characteristics and their results

Authors and year	Objective	Sample	Results	Conclusion
Marcacine et al., 2018[27]	To analyze the association between the surgical characteristics of breast augmentation and variables related to breastfeeding.	Women with breast augmentation, primiparous, between 12 and 72 hours postpartum, who were breastfeeding.	More frequent use of oral galactagogues by postpartum women with prepectoral implants, and of oxytocin spray by those with implants up to 270 ml. Higher pain scores among women with prepectoral implants. Around the 30th day postpartum, the presence of nipple lesions and pain were more frequent in those with mammoplasty performed less than ten years ago.	The presence and highest pain score, the occurrence of injury and the use of oral and nasal galactagogues were associated with the implantation site, the size of the prosthesis, and the time elapsed since surgery.
Lund et al., 2016[28]	To assess the risk of changes in nipple and skin sensitivity and lactation problems in women who have received implants. To determine whether there are differences based on the incision site.	Women (n=4,927) aged 18 years or older who underwent surgical implantation through the inframammary or periareolar incision.	In the inframammary cohort, the risk of nipple sensitivity changes was 0.3% at week 4 and month 6, and 0.4% at one year. The risk of skin sensitivity changes was 0.0% at week 4, 0.1% at month 6, and 0.1% at all subsequent time points. No nipple or skin changes occurred in the periareolar cohort. The incidence of lactation problems was similar to that reported in postpartum women who did not have breast implants.	The risk of changes in nipple or skin sensitivity and lactation problems was considered low.
Ram et al., 2021[29]	To examine possible associations between breast implants and postpartum lactational mastitis.	Women (n=6,099) who breastfed with a history of breast augmentation and women (n=12,198) without a surgical history.	Women with breast implants were significantly more likely to be diagnosed with postpartum mastitis than mothers without breast implants.	Breast enlargement is associated with a higher risk of postpartum lactational mastitis within 6 months.

Authors and year	Objective	Sample	Results	Conclusion
Wang et al., 2012[30]	Provide evidence for the treatment of complications after breast augmentation surgery.	Women (n=58) who received polyacrylamide hydrogel injections for breast augmentation and who developed an infection during breastfeeding.	Women who received polyacrylamide hydrogel injections had abnormal breast enlargement and severe symptoms that led to surgical removal of the galactocele or intraprostatic collection of sterile pus, resulting in deformity.	Polyacrylamide hydrogel injection is not recommended for breast augmentation, especially in women who tend to breastfeed. Polyacrylamide hydrogel injections can cause serious consequences resulting in tissue atrophy and breast resection if handled improperly.
Jewell et al., 2018[31]	To compare lactation outcomes in women enrolled in the Breast Implant Follow-up Study who gave birth after undergoing primary augmentation with Natrelle round silicone implants or saline implants.	Women (n = 4,679) aged over 22 years who attempted to breastfeed after undergoing augmentation surgery using silicone or saline implants.	The most common complication was insufficient milk production. Complications (mastitis, insufficient milk production, excessive milk production, excessive pain, nipple inversion, or other problems with their breasts) occurred at similar rates in each group when assessed by incision type, implant size and location, and age.	In the group of women who gave birth after breast augmentation with either Natrelle silicone implants or saline implants, most were able to breastfeed without complications. Lactation complications were comparable between the silicone and saline cohorts, and the incidence was comparable to reports in the general population of breastfeeding women.
Cruz N, Korchin L, 2010[32]	To evaluate breastfeeding after breast augmentation with saline implants.	Women (n=105) who underwent breast augmentation surgery with saline implants and breastfed after surgery.	No significant difference in breastfeeding experience was found between the periareolar and inframammary approaches. Loss of nipple sensation after breast augmentation was reported by 2% of the periareolar and inframammary subgroups.	There was no difference in the rate of successful breastfeeding (breastfeeding for 2 weeks or more) regardless of whether the periareolar or inframammary approach was used.
Hurst N, 1996[33]	To compare the lactation results of women with and without augmented breasts.	Women (n=42) aged between 22 and 39 years who have undergone breast augmentation surgery and who are breastfeeding.	A higher incidence of lactation insufficiency was found in women with implants. The periareolar approach was significantly associated with lactation insufficiency.	The presence of the implant, as well as the periareolar approach, was more associated with lactation insufficiency.

According to the articles analyzed, there is a tendency for women with breast augmentation to have greater difficulties in breastfeeding when compared to women without surgery, regardless of the type of incision and implant material. The difficulties described refer to the presence of breast engorgement[27], mastitis[28,29,31], pain[27,31], nipple lesions[27], insufficient[28,31-33] or excessive[31] lactation, change in nipple sensitivity[28,32,] or skin sensitivity[28]. However, it is worth noting that these difficulties can also be identified in women without nipple implants, showing the importance of an adequate assessment and management of breastfeeding[29].

In the current study, it was observed that the prevalence of EBF in the first month of life of babies from women with implants is lower when compared to the prevalence of EBF of those without implants[12,34].

In cases of breast engorgement and mastitis, there is a possibility of an increase in breast volume beyond normal due to the location of the implant, causing discomfort to the lactating mother and incorrect latch[35]. Engorgement and pain may also be associated with possible obstruction and injury to the ducts during the surgical procedure since damage to this structure prevents milk from flowing from the glandular tissue to the nipple[35]. Nipple injuries may be caused by several

factors, such as changes in sensitivity and difficulties for the baby to latch onto the nipple-areola complex[35], which may or may not be directly related to breast augmentation.

Regarding insufficient lactation, the literature describes a higher occurrence among women with breast augmentation who underwent periareolar[33] and inframammary[28] approaches more frequently. This is justified by the fact that the incisions result in disturbance of afferent neurons and loss of cutaneous sensation in the nipple, as a consequence of postoperative sensory changes in the breast[28,33]. The change in sensitivity can compromise milk production since stimulation of the nerve endings of the mammary papilla is necessary during sucking so that somatic sensory impulses are produced and conducted to the hypothalamus. There, the hormone oxytocin is released, which is responsible for milk ejection[35]. Also to avoid complications in milk production, the use of polyacrylamide hydrogel (PH) injection is not recommended due to the risk of infection, tissue atrophy, and breast resection, which can make production impossible due to the lack of healthy glandular tissue[30]. On the other hand, excessive lactation does not necessarily mean an increase in milk production, but a possible compression of the ducts by the prosthesis, causing the ejection of a greater volume of milk that can lead to discomfort and choking in the baby[36].

There was no consensus in the literature regarding the size of the prosthesis that poses a risk of interfering with lactation in women who have implants. This is because each woman has her anatomical characteristics. It was only shown that the prosthesis should not exceed the diameter of the parenchymal base of the breast, considering both aesthetic issues and changes in lactation that may be caused by compression of the mammary glands and decreased breast elasticity. The findings of this review demonstrate that the literature does not yet indicate direct impacts on the baby, only indirect ones, as described throughout the discussion.

It is known that society imposes standards that directly affect the lives of thousands of people[37]. Aesthetics are important and necessary to increase self-esteem, however, health should also be considered a priority. Therefore, the right to reflect on the possible consequences of undergoing breast augmentation surgery must be respected, without interference from third parties[37]. To this end, information must be provided clearly and completely by health professionals so that their patients are aware of the possible impact on breastfeeding when they decide to undergo breast augmentation surgery if they wish to breastfeed.

The importance of the speech-language pathologist within the multidisciplinary team that works to promote maternal and child health is highlighted. The professional's objective is to guide, clarify, and encourage the continuity of lactation from prenatal care, postpartum care, and childcare[38]. Emphasis is needed on breastfeeding with a view on healthy communication, specifically, craniofacial growth and development, at the skeletal, muscular, and functional levels, as well as language acquisition and development[38].

Although the quality of the studies found was not analyzed[27-33] using a pre-established and validated instrument, a full and critical reading of the studies reveals methodological and clinical heterogeneity, as well as a low level of evidence. Future probabilistic, longitudinal studies with greater methodological rigor, detailed description of the sample (mother and baby), and that control possible confounding factors are essential for understanding this phenomenon. This is an emerging theme that lacks scientific evidence, given the complexity of breastfeeding, as well as the guarantee of ethical care and the well-being of women.

The main limitation of this study is the scarcity of research addressing the relationship between breastfeeding difficulties and breast augmentation surgery, which made it impossible to conduct a systematic review and meta-analysis. The results showed that, despite its relevance, the subject is explored as a secondary outcome, in an incipient and inconsistent manner in the literature. In addition, the lack of standardization between the articles' methodology made it impossible to analyze the quality of the data. However, this scoping review is a pioneer in the area, revealing that breast augmentation is a contributing cause of breastfeeding difficulties. When present, it increases the likelihood of complications.

CONCLUSION

The studies identified the presence of breast engorgement, mastitis, pain, nipple lesions, and changes in lactation and sensitivity involved in breastfeeding as possible difficulties in breastfeeding for women undergoing breast augmentation surgery. The main variables related to the study outcome were presented as risk factors. The results presented in this scoping review are expected to stimulate the development of more robust evidence on the relationship between these findings. The aim is to raise awareness

among women of childbearing age who intend to undergo breast augmentation surgery about the possible interferences in breastfeeding if they wish to become pregnant.

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Authors' contributions:

RRP: Conceptualization; Data curation; Data analysis; Research; Methodology; Project administration; Development; Validation; Visualization; Writing - Original draft; Writing - Review & editing.

RSR, MCBB: Data curation; Data analysis; Research; Methodology; Project administration; Development; Supervision; Data validation; Writing - Review & editing.

LBS: Conceptualization; Data curation; Data analysis; Research; Methodology; Development; Validation; Visualization; Writing - Original draft.

Data sharing statement:

All individual participant data will be made available (including data dictionaries), as well as the study protocol, statistical analysis plan and clinical trial report. They will be made available immediately upon publication and without an end date to anyone who wishes to access the data for any purpose.