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Management of Breast and Nipple Problems in Breastfeeding: Systematic Review

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ABSTRACT

Introduction: Problems in the breasts and nipple are commonly faced by mothers which affects breastfeeding process. Appropriate and suitable intervention for breast and nipple problems that occur is one of the competencies both health workers and mothers must know **Objective:** To identify and explain breast and nipple problems that occur in breastfeeding mothers. 6 electronic databases were used; Science Direct, ProQuest, Springer Link, Taylor & Francis Online, Clinical Key Nursing, and Google Scholar. **Results:** There were 12 articles (sample 1,980) with breast and nipple problems in breastfeeding mothers there are breast engorgement (65%), breast pain (52.5%), plugged milk ducts (45.9%), nipple pain (15.5%), mastitis (10.5%), cracks and lesions on the nipple (9.7%), inverted nipple (4.2%), and breast abscess (0.6%). Five Steps Systematic Therapy (FSST) intervention can overcome breast pain, breast engorgement, mastitis, plugged milk ducts. Low-Level Laser Therapy can treat pain, cracks and nipple lesions. Reverse pressure softening technique can treat breast engorgement. Therapeutic breast massage can treat breast pain, breast engorgement, plugged milk ducts. Integrated Breast Massage can treat plugged milk ducts. Hoffman exercise and inverted syringe can correct inverted. Ultrasound-guided percutaneous catheters and hydrostatic pressure irrigation can treat breast abscesses. Lanolin, breast milk, aloe vera and olive oil were effective in treating pain, cracks and nipple lesions; Cold cabbage can treat breast pain and breast swelling. **Conclusion:** Breast and nipple problems in breastfeeding mothers can be addressed with all interventions.

Introduction

Breastfeeding is the best method of providing nutrition for infants and has health benefits for mothers and infant growth and development [1]. World Health Organization (WHO) recommends exclusive breastfeeding for the first six months until the age of 2 years [2] which may reduce the risk of atopic dermatitis, and gastroenteritis, and tend to have a higher IQ [3]. Apart from that, the increase in infants' weight and height is more optimal compared to babies who are given formula milk [4]. On the other hand, the benefits of breastfeeding for mothers are known to reduce the risk of various types of cancer (breast cancer and ovarian cancer), cardiometabolic (DM Type II), and cardiovascular diseases, and mothers can avoid post-partum depression [3].

Currently, the advantages and benefits of breast milk compared to formula milk are widely known, but the level of exclusive breastfeeding slightly decreasing yearly. According to the Indonesian Nutrition Status Survey (SSGI) (2021), the percentage of infants aged 0-5 months following exclusive breastfeeding is around 52.1%, and the rate of exclusive breastfeeding stagnates in 2022 [5]. In line with the results of Basic Health Research (RISKESDAS), it was found that the rate of exclusive breastfeeding fell from 64.5% in 2019 to 52.5% in 2021[6].

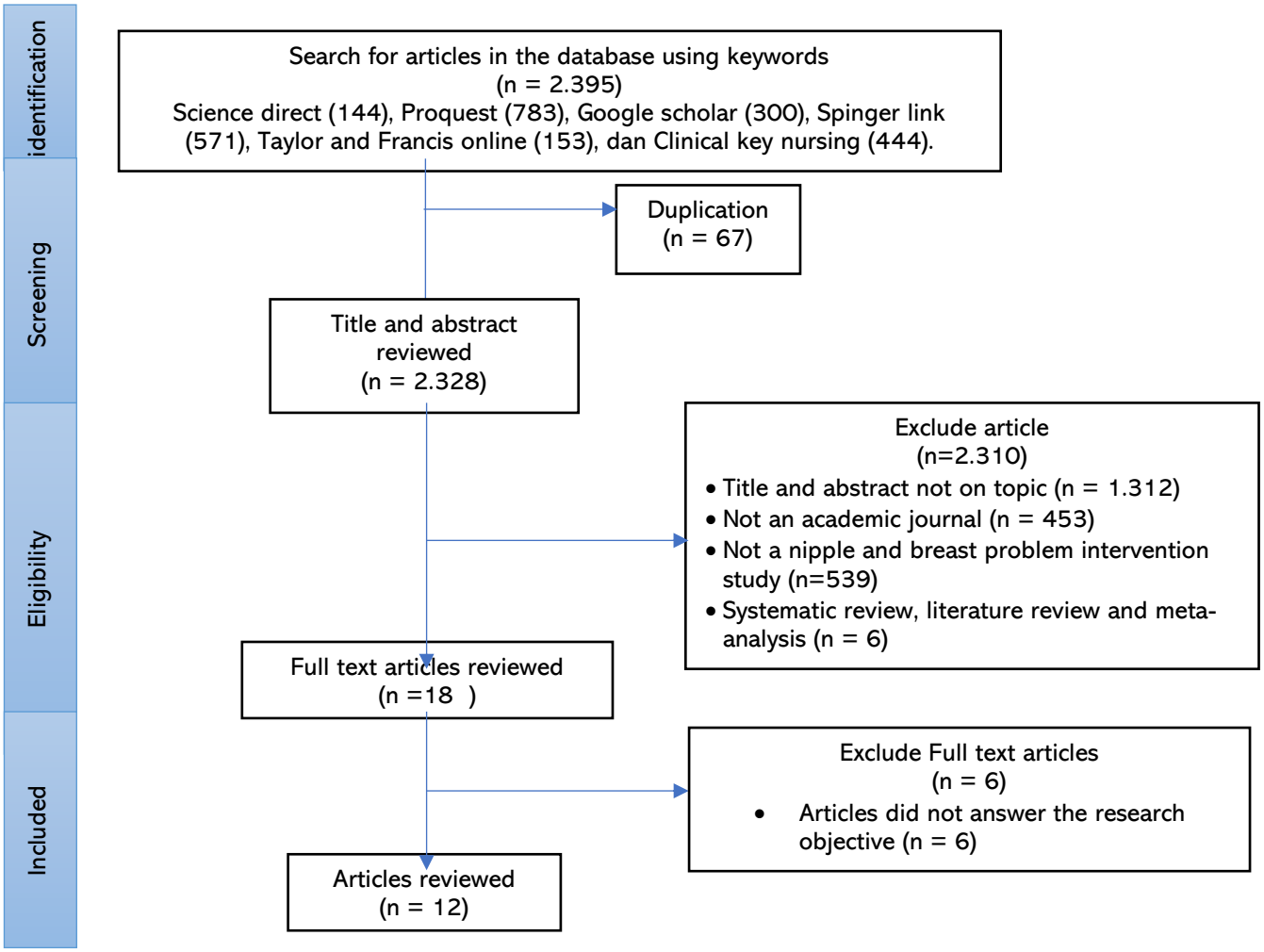
Most mothers are unable to provide optimal breastfeeding due to breast and nipple problems. Several studies reported that breast and nipple problems include breast engorgement, mastitis, breast abscess, nipple pain, flat nipples, inverted nipples, cracked nipples, and large or small nipple sizes [7-9]. These problems ultimately lead mothers to early cessation of breastfeeding, either temporarily or permanently [10].

Preventive measures for problems experienced by breastfeeding mothers, particularly in the breasts and nipples are a must, and appropriate interventions must also be developed [1]. Breastfeeding mothers need to be informed about prevent breast and nipple problems during breastfeeding. Apart from that, they also need support from health workers to deal with problems that may arise during breastfeeding. Therefore, health workers should know what common problems breastfeeding mothers experience and what to do if these problems occur [11]. There was some research discussed about the breast and nipple problems, however, there were no explanations about the problems and the interventions that can treat the faced problems. The objective of the review was to identify, explain, and manage the breast and nipple problems that occur in breastfeeding mothers.

Materials and Method

This study used a systematic review approach using 6 electronic databases there were Science Direct, ProQuest, Google Scholar, Springer Link, Taylor and Francis Online, and Clinical Key Nursing. The keywords used are Nipple AND breast problem AND breastfeeding AND intervention, Mastitis AND breastfeeding AND intervention OR treatment, and Breast engorgement AND breastfeeding AND intervention. The inclusion criteria are full text, using English, academic journal, publication year 2013-2023. Articles that were systematic reviews, literature reviews, and meta-analyses were excluded from this study. Article review carried out from October 5 - 22, 2023.

This study uses the PRISMA guideline approach which is used to guide authors in identifying articles that are relevant to the objectives. Article searches use keywords that have been adjusted to Medical Subject Headings (MeSH) to filter articles using predetermined keywords. Articles consisting of case-control, Randomized Controlled Trial (RCT), cohort, and case report studies that have been conducted and published in English, discussing breast and nipple problems that occur in breastfeeding mothers and the interventions used are included in this study. Details of article selection are explained in Figure 1. Finally, 12 articles were included in the study after selection.



Picture. 1 Article Selection Process (PRISMA Guideline)

Table 1 Coding of research included in the systematic review

No	Author, country, year of publication	Objective	Design & Samples	Intervention	Results	Conclusion
1.	**Author:** Yuzhi Yao, Tianzhu Long, Yuhong Pan, Yin Li, Ling Wu, Benjie Fu, Hongmin Ma [12] **Country:** China **Publish Year:** 2021	Describe the clinical response to five-step systematic therapy (FSST) in the management of plugged milk ducts and mastitis.	**Design** Retrospective **Sample** 922 breastfeeding mothers consisting of 714 mothers with plugged milk ducts and 208 mothers with mastitis.	**Intervention** FSST actions consist of: Laser therapy, pumping breast milk using an electric pump, breast massage, cold compresses, patient education **Laser therapy** The patient is in a sitting position, the entire breast skin will be illuminated by the SUNDOM-300 IB/233 LCD-type semiconductor laser therapy unit. The procedure is carried out with a power of 1200 milliwatts, an irradiation area of 8800 mm2, and a distance of 10-15 cm. The nipple/areola is covered with gauze during exposure. **Electric Breast Pump** A Medela Swing medical breast pump (Medela AG, Switzerland) was used to pump both breasts simultaneously. Pumping is continued for 10-15 minutes. **Breast Massage** Breast massage is performed on both breasts starting from the contralateral breast. The nipple is massaged for 30 seconds. Aerola and breast area are performed for 15 minutes each. **Cold compress** Gauze soaked in 33% magnesium sulfate solution is applied to both breasts for 10-15 minutes. **Health education** Patients are given individual breastfeeding guidance based on existing problems.	**Results** The pain scale for all pre-FSST groups (2-5) decreased after post-FSST (1-3). ($p<0.001$), The degree of swelling in all Pre-FSST groups (3-5) decreased after post-FSST 1-3. ($p<0.001$), The treatment effectiveness rate (frequencies 1 and 2) was 97.5% in the plugged ducts group, while in the Mastitis group, it was 88.9%.	FSST can relieve pain, reduce breast swelling, and reduce the length of induration (hardening of the skin due to inflammation), as well as for plugged milk ducts or mastitis to varying degrees.
2.	**Author:** Mounika M, Kalabarathi S, Padmapriya D [13] **Country:** Chennai, India.	to determine the effectiveness of the reverse pressure softening technique	**Design** True experimental Pretest posttest control group design **Sample**	**Intervention** Reverse pressure softening technique This is done by applying pressure to the base of the nipple around the areola for 10 minutes. The intervention was carried out in 2 sessions, namely morning and evening for approximately 3 days.	Breast Engorgement mean score was 4.47 ± 1.53 and the average post test score was 3.23 ± 1.17. The mean difference score was 1.24. The calculated paired 't' test value was t = 6.495 which	Reverse pressure softening technique proven effective in

	Year Published: 2022	on the level of breast engorgement in postpartum mothers	60 postpartum mothers on days 3-5 with breast engorgement, and no nipple problems (inverted/retracted, cracked, and pain). Intervention group: 30 mothers. control group: 30 mothers	On day 3, participants were assessed for the level of breast engorgement.	was found to be statistically significant at the p = 0.0 001 level.	reducing breast swelling in the postpartum mothers.
3.	**Author:** Nutchanat Munsittikul, Supannee Tantaobharse, Pitiporn Siripattanapipong, Punnanee Wutthigate, Sopapan Ngerncham and Buranee Yangthara [14]. **Country:** Thailand **Year Published:** 2022	to compare resolution time, mass size reduction, and pain scores after breast massage between Integrated Breast Massage techniques (IBM) and Thailand Traditional Bread Massage (TBM).	**Design** RCT with Single blind **Sample** 84 breastfeeding mothers with plugged milk ducts within 72 hours and had not received any therapy. T BM group: 42 people IBM group 42 people	**Intervention:** TBM consists of 3 steps for 30 minutes IBM consists of 4 steps for 30 minutes.	**Results:** At massage session 1 the median reduction in mass size was significant > in the IBM group compared to the TBM group (30 cm2 IQR: 20– 48] or 100% (IQR: 100–100) of original size vs 10 cm2 [IQR: 10–26] or 89.3% [IQR: 65.9–100.0] of original size, p=0.01). Median reduction in NRS pain score after first breast massage was significant > in the IBM group (8 [IQR: 7–8] or 100% [IQR: 100–100] of baseline score vs. 6 [IQR: 4–7] or 95% [IQR: 75–100], respectively; p=0.01). After the first breast massage, IBM prescribed pain medication 3/42 (7.1%) and TBM 1/42 (2.4%) (p=0.62).	The IBM technique resolves plugged milk ducts significantly more quickly, with less pain, and with a much greater reduction in mass size after the first massage compared to TBM.
4.	**Author:** Anju Philip Thurkkada, MSc; Salini Rajasekharan Nair, BSc; Sara Thomas, BSc; Parvathy Sreelekha, BSc; Soumya Kadakkuzha Sanu, BSc; Parvathy R Chandran, PhD; and Gopinathan Pillai Sreekanth, PhD [15]	To evaluate the effectiveness of Hoffman exercise in breastfeeding postpartum mothers with grade 1 inverted nipples.	**Design** RCT **Sample** 55 participants, were birth mothers who experience inverted nipple grade 1 intervention group: 28 people control group: 27 people.	**Intervention:** On day 1 of the intervention, respondents were trained and taught by researchers to perform the Hoffman technique. On days 2 & 3, respondents carried out the Hoffman technique independently 4 times (morning, afternoon, evening and night). The posttest assessment was conducted 2 hours after the Hoffman technique was performed on day 3.	**Results:** The BBAT score of the intervention group (5.43 & 7.68) pre and post-test was significantly (p<0.001) higher than the control group (4.85 & 6.56). The length of the right breast nipple in the intervention group (0.15 & 0.22) pre and post-test group was significantly (p<0.001) higher than the control group (0.14 & 0.16). The length of the left breast nipple in the intervention group (0.12 & 0.24) pre and post-test group was significantly (p<0.001) higher than the control group (0.14 & 0.17).	Hoffman exercise has been proven effective in treating grade 1 inverted nipples in postpartum mothers who are breastfeeding. The BBAT score and nipple length

	Country: India **Year Published:** 2023					in the intervention group were higher than in the control group.
5.	**Author:** Olivera Perić, MS; Anita Pavičić Bošnjak, MD, PhD; Mirela Mabić, PhD; and Vajdana Tomić, MD, PhD [16] **Country:** Bosnia and Herzegovina **Year Published:** 2022	To compare the effectiveness of using lanolin or breast milk in reducing the intensity of nipple pain and healing nipple damage during the first 10 days postpartum.	**Design** RCT with single blind technique. **Sample** Participants were 206 breastfeeding mothers with nipple pain and damage, Lanolin group: 103 people Breastfeeding group: 103 people	**Intervention: (lasts 7 days or until nipple damage subsides)** Both groups were informed about the correct breastfeeding techniques. group was instructed to apply a few drops of their milk to the nipples and allow it to dry. The Lanolin group applied a thin layer of 100% pure lanolin after breastfed.	**Results** There was no statistically significant difference in pain levels between groups either at 3 days ($\chi 2 = 0.870$; $p = 0.351$) or 7 days after randomization ($\chi 2 = 0.090$; $p = 0.764$) There were no statistically significant differences in nipple condition between groups either at 3 days ($\chi 2 = 7$; 065 $p = 0.128$) or 7 days after randomization ($\chi 2 = 2.947$; $p = 0.567$) There was no significant difference in self-efficacy in breastfeeding between groups (diward p=0.987; day 3 p=0.162; day 7 p=0.617)	Statistically there is no difference in effectiveness between Lanolin and breast milk in treating nipple pain and nipple damage. After 3 days the Lanolin group breastfed more frequently.
6.	**Author:** Derya Kaya Sag! Iık and O € znur Gu € rlek Kısacık [17] **Country:** Turkey **Year Published:** 2020	to determine the effect of olive oil and breast milk on preventing nipple damage and nipple pain as well as the ability to breastfeed in primiparous mothers.	**Design** RCT **Sample** Participants were 120 breastfeeding mothers. Olive oil group: 40 mothers Breast milk group: 40 mothers control group: 40 mothers	**Intervention (performed for 14 days and evaluated on days 3, 7 and 14)** Breastfeeding group: Mothers were asked to clean the nipples and areola with wet cotton wool before breastfeeding, after breastfeeding, 3-4 drops of breast milk were applied to the nipple and surrounding areas and then allowed to dry. **Olive oil group:** Mothers are asked to clean the nipples and areola with wet cotton swab before breastfeeding. After breastfeeding, 3-4 drops of olive oil are applied to the nipples and surrounding areas and then allowed to dry. The olive oil used has an acidity of 0.8%. **Control group:** Mothers are asked to clean the nipples and areola with wet cotton swab before breastfeeding and after breastfeeding	**Results** no significant difference in LATCH scores between groups on days 3 and 7 ($p>0.05$) scores in the olive oil group on all days (3rd, 7th, and 14th days) decreased at a statistically significant level (p 1⁄4 .001). no cracks or bleeding identified on the nipples and areolas in the group using olive oil and breast milk on day 14. (p1⁄4.001)	oil and breast milk were effective in reducing the severity of pain and preventing the formation of cracked nipples compared to the control group

7.	**Author:** Ann M. Witt, MD, IBCLC, Maya Bolman, BA, BSN, IBCLC, Sheila Kredit, and Anne Vanic, MSN, CPNP, IBCLC [18] **Country:** Ohio, USA **Year Published:** 2016	to describe the clinical response of breast massage therapy during lactation (TBML) in the management of swelling breast, duct blockage breast milk, and mastitis	**Design** Cohorts **Sample** A total of 42 breastfeeding mothers who experienced breast swelling, blocked milk ducts and mastitis were in the intervention group. A total of 73 breastfeeding mothers experienced breast swelling in the control group to compare the severity of swelling	**Intervention:** TBML is performed for 12 weeks by trained doctors and lactation consultants who also provide consultations on the basics of breastfeeding and gentle massage techniques. If medical evaluation is indicated, AB administration and breast milk culture are performed and recorded. Mothers suffering from mastitis are given AB and other therapies according to the SOP. Assessment of pain and breastfeeding complications was carried out on day 2, week 2 and week 12.	**Results** Breast and nipple pain decreased significantly after immediate treatment with a mean (SD) reduction of 3.9 (2.4) for breast pain and 2.1 (3) for nipple pain ($P < 0.01$). The severity of swelling before treatment was 5.31 after treatment to 3.48. The mean (SD) swelling severity changed significantly by 1.82 (1.6) grades ($P < 0.01$). Blocked breast milk ducts measuring < 3 cm were 36% and resolved in 57%.	There was a significant reduction in the level of pain, breast engorgement and severity of breast milk duct plugged in mothers who received TBML.
8.	**Author:** Shilpa Umesh Mule, Jyoti A. Salunkhe, Avinash H. Salunkhe, SV Kakade, Vaishali R. Mohite [19] **Country:** India **Year Published:** 2017	To determine the success rate of breastfeeding among mothers Correct inverted nipples using an inverted syringe	**Design** Experiment with two group post-tests only design **Sample** 60 participants were divided into 2 groups: Group 1 pregnant women with normal nipples: 30 mothers Group 2 mothers with inverted nipples: 30 mothers	**Intervention (performed for 4 days).** Group 1 will receive health education about techniques and the importance of breastfeeding Group 2 will receive intervention using an inverted syringe and health education about techniques and the importance of breastfeeding. The intervention is performed before each breastfeeding for 30-60 seconds. Data were collected on days 1 and 4.	**Results** The difference in average infants' weight on day 1 between group - I and group - II was not statistically significant because $t = 0.1578$ (unpaired t test) and $P = 0.8751$. The difference in infants' weight on day 4 between group - I and group - II was not statistically significant with $t=0.3268$ (unpaired t test) and $P=0.7450$. Both groups had a latch score ≥of 7 and successfully breastfed their babies.	Inverted syringe technique is an effective intervention in the correction of inverted nipples.
9.	**Author:** Y u m iko Tateoka [20] **Country:** S h i ga, Japan **Year Published:** 2022	to test whether the aloe vera component or gel in the leaves can be used as a potential medium for treating nipple complications.	**Design** RCT **Sample** 60 mothers who breastfed on day 1 Intervention group: 30 mothers Control group: 30 mothers	**Intervention:** Each mother is subjected to patch test for allergy testing. After the first breastfeeding, aloe vera is applied to the nipple. When breastfeeding, the nipple and aerola were cleaned with clean cotton and pure water. Breasts and nipples were observed 3 times a day (10.00, 13.00 and 16.00) from days 1-5 after the mother gave birth.	**Results** Statistically, there were no significant differences between the intervention and control groups for redness, epidermolysis, edema, or bleeding. However, on days 2 to 5 postpartum, the incidence of redness was higher in the control group. There was a statistically significant difference for	Aloe vera is most effective in treating nipple eschar

					eschar on the last day. research day, namely day 5 after birth (p<0.05).	
10.	**Author:** Zhihui Du, Lei Liu, Xing Qi, Peisen Gao & Shumin Wang [21] **Country:** Beijing, China **Year Published:** 2021	to describe the effectiveness of ultrasound-guided percutaneous catheter placement combined with hydrostatic pressure irrigation in the treatment of acute breast abscesses measuring >5 cm, unilocular, and breastfeeding mothers.	**Design** Case reports **Sample** 12 primiparous mothers who breastfed for 4-6 weeks and experienced breast abscesses	**Intervention:** After anesthesia, under ultrasound guidance, a French pigtail 8 drainage catheter is placed into the abscess cavity, and an additional drainage catheter of the same type is placed directly on the opposite side of the abscess cavity. Warm saline solution is introduced through the catheter with an initial pressure of 100cm H2O and increased to a maximum of 20cm H2O. Approximately 500-800ml of warm saline solution is irrigated through the lesion once daily at the highest rate tolerated by the patient until the flow of saline solution from the lesion appears relatively clear.	**Results** The length of stay in hospital ranges from 5-16 days. No complications or sequelae occurred. The bacterial culture results were all S.aureus. Breast echo results show that the abscess cavity has disappeared and the breast gland tissue is evenly distributed During the 3-month period there was no evidence of recurrence.	Ultrasound-guided percutaneous catheter placement and hydrostatic pressure irrigation is a successful strategy in the treatment of lactational breast abscesses larger than 5 cm.
11.	**Author:** Kelly Pereira Coca, PhD, Karla Oliveira Marcacine, Mo^nica Antar Gamba, PhD,Luciana Corre^a, PhD,Ana Cecılia Corre^a Aranha, PhD,and Ana Cristina Freitas de Vilhena Abra~o, PhD [22] **Country:** Sao Paulo, Brazil **Year Published:** 2016	To investigate the effectiveness of Low-Level Laser Therapy as a treatment for nipple pain due to breastfeeding	**Design** RCT with Triple Blind **Sample** 59 mothers who experienced lesions on the nipples. Intervention group: 30 people Control group: 29 people	**Intervention:** Equipment (Laser Hand WL, MMOptics, S~ao Carlos, Brazil) was used that emits continuous visible red light (660 nanometers) with an InGaAlP semiconductor. Three sessions of laser therapy (InGaAlP laser, 660 nanometers, power 40 milliwatts, energy density 5 Joules per square centimeter for 5 seconds each, total energy 1⁄4 0.6 Joules) were carried out in the nipple area at three different times (0 hours, 24 hours, and 48 hours after diagnosis of nipple lesions)	**Results** There was a decrease in pain at the first radiation by 1.3 (p ¼ .050). At the second exposure, pain decreased by 2 (p 1/4 .016) The third irradiation was not carried out because the sample decreased due to leaving the hospital.	Low-Level Laser Therapy is effective for treating painful nipple lesions in breastfeeding mothers, relieving pain, and extending the duration of exclusive breastfeeding.
12.	**Author:** Boh Boi Wong, Yiong Huak Chan, Mabel Qi He Leow,	To determine the effectiveness of giving cold cabbage leaves	**Design** RCT with pre and post test **Sample**	**Intervention:** **Group 1:** used green cabbage (Brassica Oleracea) with the hard stems removed. Rinse the cabbage with cold water, put it in a zip lock bag then put it in the freezer	**Results** **Painful:** The intervention group with cold cabbage had lower pain scores than groups 2 & 3	Cold cabbage is more effective in relieving pain

Yi Lu, Yap Seng Chong, Serena Siew Lin Koh, Hong-Gu He [23] **Country:** Singapore **Year Published:** 2017	and cold gel packs on pain, hardness and temperature on breast swelling, satisfaction and duration of breastfeeding.	227 breastfeeding mothers, 14 days postpartum who experienced breast swelling. Participants were divided into 3 groups. Group 1: 76 mothers were intervened with cold cabbage Group 2: 75 mothers were intervened with cold gel packs Group 3: 76 mothers were intervened with usual care.	for 15 minutes or refrigerate for 1 hour. 3 strands of cabbage will be placed to cover the entire surface of the breast for 2 hours. There is a 30-minute break before the next breast session is performed. **Group 2:** Use Philips Avent thermal gel pads which are cooled in the freezer for 15 minutes or in the refrigerator for 1 hour. Each session is carried out for 2 hours for 1 breast. There is a 30-minute break before the next session takes place **Group 3:** Mothers receive education, care and counseling from breastfeeding counselors.	(mean difference = 0.53, 95% CI: 0.16-0.9, p = 0.005). **Violence** The intervention group with cold cabbage had a lower hardness score than group 2 (mean difference = 0.35, 95% CI: 0.1 2 - 0.58, p = 0.00 3). **Temperature** p = 0.044 for comparison of cold cabbage leaf and cold gel pack groups, p = 0.041 for comparison of cold cabbage leaves and routine groups **satisfaction level:** very satisfied (14.5%) and satisfied (84.2%). Group 2: very fasting (10.7%) and satisfied (70.7%). Group 3: very satisfied (17.3%), and satisfied (53.3%). **Length of Breastfeeding** There was no significant difference in breastfeeding duration between the three groups at 3 months ($\chi 2 = 1.7$, p = 0.95) and 6 months ($\chi 2 = 5.3$, p = 0.51).	and hardness, as well as reducing the temperature of breast engorgement.

Results and Discussion

Results

The first stage carried out was identifying articles in 6 electronic databases: Science direct (144), ProQuest (783), Google schoolar (300), Spinger link (571), Taylor & Francis online (153), and Clinical key nursing (444). The total number of articles obtained was 2,395 articles. The next step was to check for duplication of the articles obtained and 67 articles, then 2,238 articles were screened for further review. The researchers filtered the articles by reading the detailed titles and abstracts according to the inclusion criteria, then 2,310 articles were excluded because the titles and abstracts did not match the topic, not academic journals, and systematic review articles, literature reviews and meta-analysis. Furthermore, the remaining 18 articles were reviewed in full text and analyzed, and 12 articles were determined that met the requirements for use in this systematic review, meawhile the 6 articles were excluded because they did not answer the research objectives.

All studies [12-23] were published between 2016-2023, conducted in various countries, including three (25%) [13,15,19] conducted in Turkey, two (16.67%) [12,21] in China, one (8.33%) [14] in Thailand, one (8.33%) [16] in Bosnia, one (8.33%) [17] in Turkey, one (8.33%) [18] in USA, one (8.33%) [20] in Japan , one (8.33%) [22] in Brazil and one (8.33%) [23] in Singapore. Most of these studies (n= 7; 75%) [13-17,19,20,22,23] were controlled trials (randomized controlled trials), and the rest were case control studies [12], cohort [18], and case report [21]. Sample sizes in these 12 studies ranged from 12-922 breastfeeding mothers.

Based on the articles in this study, it was found that there are several breast and nipple problems in breastfeeding mothers including breast engorgement (65%), breast pain (52.5%), plugged milk ducts (45.9%), nipple pain (15.5%), mastitis (10.5%), cracks and lesions on the nipple (9.7%), inverted nipple (4.2%), and breast abscess (0.6%).

It was found that the FSST action (Five step systematic therapy) which consists of: Laser therapy, pumping breast milk using an electric pump, breast massage, cold compresses, and patient education can relieve pain ($p<0.001$) , reduce breast engorgement ($p<0.001$) and reduce the length of induration (hardening of the skin due to inflammation) , as well as for plugged breast milk ducts (97.5%) or mastitis (88.9%) to a greater degree varied [12]; Reverse pressure softening technique proven effective in reducing breast engorgement ($p=0.0001$) in postpartum mothers [13]; The IBM (Integrated breast massage) technique is effective in treating plugged milk ducts (100%) significantly faster, with less pain, and with a much greater reduction in mass size after the first massage [14]; Hoffman exercise [15] and Inverted syringe [19] are effective in treating inverted nipple grade 1 (50.9%; 100%) in postpartum mothers who breastfeed; Lanolin (54.2%) and breast milk (48.9%) were effective in treating nipple pain and damage [16]; Olive oil ($p=0.001$) and breast milk (48.9%) were effective in reducing the severity of pain and preventing the formation of cracked nipples [17]; Therapeutic breast massage is effective in reduced the level of pain ($p<0.001$), breast engorgement ($p<0.001$) and the severity of plugged breast milk duct (100%) [18]. Aloe vera is most effective in treating the incidence of eschar (26.7%) on nipples [20]; Ultrasound-guided percutaneous catheters and hydrostatic pressure irrigation are effective in the treatment of breast abscesses (100%) measuring more than 5 cm [21]; Low-Level Laser Therapy is effective for treating cracks ($p=0.05$), painful nipple lesions ($p=0.016$) in breastfeeding mothers, relieving pain ($p=0.050$) , and extending the duration of exclusive breastfeeding [22]; Cold cabbage is effective in eliminating pain ($p=0.005$) and hardness ($p=0.003$), as well as reducing temperature ($p=0.044$) in breast swelling. [23].

Table 2. Interventions used to overcome breast and nipple problems in breastfeeding mothers

Breast and nipple problems	Number of Articles	Number of Respondents and Percentage	Type of intervention effective
Breast pain,	3	1,040 (52.5%)	• FSST (Five step systematic therapy) which consists of: Laser therapy, pumping breast milk using an electric pump, breast massage, cold compresses, and patient education, • Therapeutic breast massage • Cold cabbage
Breast engorgement	4	1,289 (65%)	• FSST (Five step systematic therapy) which consists of: Laser therapy, pumping breast milk using an electric pump, breast massage, cold compresses, and patient education, • Reverse pressure softening technique • Therapeutic breast massage • Cold cabbage
Mastitis	1	208 (10.5%)	• FSST (Five step systematic therapy) which consists of: Laser therapy, pumping breast milk using an electric pump, breast massage, cold compresses, and patient education.
Plugged milk ducts	3	910 (45.9%)	• FSST (Five step systematic therapy) which consists of: Laser therapy, pumping breast milk using an electric pump, breast massage, cold compresses, and patient education • IBM technique (Integrated breast massage) • Therapeutic breast massage
Inverted nipples	2	85 (4.2%)	• Hoffman exercise • Inverted syringe
Nipple pain	3	308 (15.5%)	• Olive oil • breast milk • Lanolin • Low -Level Laser Therapy
Cracked and sore nipples	3	193 (9.7%)	• Lanolin • breast milk • Aloe vera • Low -Level Laser Therapy
A breast abscess	1	12 (0.6%)	Catheter with ultrasound guidance and hydrostatic pressure irrigation

Discussion

Problems with the breasts and nipples generally occur in mothers and will affect the breastfeeding process such as inverted nipples, retracted nipples, breast engorgement, nipple vasospasm, breast milk duct obstruction, and nipple pain [24]. The problems that mothers often arise and complain about during the breastfeeding process are the mother's perception of a lack of breast milk production, nipple pain, breast engorgement, mastitis or breast abscess, and inverted nipples [24-26, 9]. These problems, if not handled immediately, will cause the infants to have difficulty latching properly to the breast and ultimately cause the infants to breastfeed infrequently [27]. In addition, this can also have an impact on the mother who can become stressed and frustrated because the infant has difficulty getting enough breast milk which will eventually result in premature discontinuation of breastfeeding [28].

Breast pain is often experienced by women who breastfeed and is one of the reasons for early cessation of breastfeeding [29]. Interventions that can be carried out for breastfeeding mothers with breast problems include FSST (Five-step systematic therapy) which consists of Laser therapy, pumping breast milk using an electric pump, breast massage, cold compresses, patient education,

therapeutic breast massage, and cold cabbage. Moreover, laser therapy has been proven to be effective in treating pain because it provides analgesia, and anti-inflammatory effects and accelerates tissue healing [30]. Then, Breast Massage and therapeutic breast massage reduce breast pain by emptying the breasts thereby helping reduce breast swelling [31]. Cold cabbage leaves absorb some of the fluid from the glands in the breast area, thereby reducing tissue swelling. The use of cabbage leaves reduces pain and hardness in swollen breasts and makes it easier for mothers to continue breastfeeding longer [32].

Nipple pain is also a problem that often occurs in breastfeeding mothers and ultimately causes premature cessation of breastfeeding [33]. Nipple pain can be treated with Low-level laser Therapy intervention, lanolin, breast milk, and olive oil. Low -Level Laser Therapy provides benefits including reducing pain and reducing inflammation [34]. The use of lanolin, breast milk, and olive oil has the same principle, namely retaining moisture on the applied surface area). Lanolin, breast milk, and olive oil have similar functions to make hair and skin waterproof so they can retain moisture [35]. This moisture will ultimately prevent the formation of new wounds and reduce exposure to the nipple, thereby reducing pain [34].

Breast engorgement in breastfeeding mothers generally occurs due to a sudden increase in breast milk volume, the lymphatic system and blood vessels are not smooth, causing interstitial edema. The intervention for breast engorgement that can be carried out is FSST (Five steps systematic therapy) which consists of laser therapy, breast pumping using an electric pump, Breast Massage, Cold compresses, patient education, Reverse pressure softening technique, Therapeutic breast massage and application of cold cabbage to the breasts. Additionally, the results of the study showed that breast massage performed using the FSST technique, reverse pressure softening technique, and therapeutic breast massage technique helped empty the breasts thereby helping reduce breast engorgement [31]. The reverse pressure technique is also known to stimulate the areolar nerve by increasing the movement of excess interstitial fluid thereby reducing sub-aerolar canal distension [13]. Cabbage leaves contain steroids. This is what provides anti-inflammatory benefits and causes breast engorgement to reduce within 12 hours [32]. Apart from that, cold cabbage leaves have the same effect as a cold compress, namely helping to reduce swelling and relieve pain.

Plugged milk ducts often occur in breastfeeding mothers 2-3 weeks after giving birth. Plugged milk ducts that are not treated properly can cause mastitis and even breast abscesses. Plugged milk ducts can be intervened with FSST, IBM techniques, and therapeutic breast massage. These three interventions have in common, that they use breast massage techniques which can help empty the breasts and push out the milk left behind [31].

Mastitis is inflammation of the breast caused by infection due to blocked breast milk ducts that are not treated properly [36]. Mastitis can be intervened with FSST (Five steps systematic therapy) which consists of Laser therapy, pumping breast milk using an electric pump, Breast Massage, Cold compresses, and patient education where laser therapy is useful for increasing blood circulation, reducing edema and inflammation, and has an analgesic effect. Using an electric pump and breast massage helps empty the breasts and push out any remaining milk. Cold compresses help reduce swelling and relieve pain, while education about the correct breastfeeding position is useful for increasing the duration of breastfeeding so that breast milk production improves [31].

Breast abscess is a complication that occurs as a result of untreated mastitis in breastfeeding mothers [37]. Breast abscesses > 5 cm usually require surgery and drainage to treat them. However, from the results of research conducted by Du et al [21], it turns out that breast abscesses > 5 cm do not need surgery and can be treated with percutaneous catheter intervention guided by ultrasound and hydrostatic pressure irrigation. Research conducted by Colin et al [38] also supports the results of this study that percutaneous catheter intervention with ultrasound guidance and irrigation is effective for treating breast abscesses measuring > 5 cm and increasing exclusive breastfeeding. This intervention is carried out by inserting a French pigtail 8 drainage catheter into the abscess cavity, and an additional drainage catheter of the same type is placed directly on the opposite side of the abscess cavity. Warm saline solution will be irrigated through the lesion once a day at the highest speed tolerated by the patient until the flow of the saline solution from the lesion appears relatively clear to allow the pus contained in the abscess to drain completely and speed up healing [21].

An inverted nipple is a condition where the breast nipple is pulled in or shortened and does not protrude outward [39-41]. Intervention on inverted nipples can be done using the Hoffman exercise technique and inverted syringes. Hoffman exercise is a technique used to help breastfeeding mothers deal with inverted nipples [42] which was developed by Hoffman J. Brook in 1953. This technique is used to release adhesions that usually occur at the base of the nipple [43] by stretching the nipple so that the nipple can move up and out. The Hoffman technique is done by placing two

thumbs on each side of the base of the nipple [39]. This technique has advantages including that it can be done at any time by the mother, does not require costs, is simple, safe, and does not cause pain [42-43]. The inverted syringe technique was first discovered by Nirmala Kesaree, Banapurmath, and Kallinath Shamanur in 1993 [17]. Inverted nipple correction is carried out with the help of a disposable syringe (disposable syringe 10 cm-20 cm) which is cut and used upside down [19]. The main advantage of this technique is that mothers can regulate how much pulling they need so that they can reduce the risk of pain in the nipple [44] and it has been proven to be effective in increasing the length of the nipple [45] because when this is done the nipple will immediately be pulled and protrude forward.

Interventions that can be done are Lanolin, breast milk, aloe vera, and Low -Low-level laser Therapy. Lanoline, breast milk, and aloe vera are known to have a moisturizing effect so they can treat lesions and cracks on the nipples. Lanolin has antimicrobial content [35], breast milk has antibodies, anti-inflammatory, antimicrobial and substances that help epidermal growth [46], aloe vera contains aloin and barbaloin which have the effect of inhibiting the release of histamine and arborescent content has benefits. anti-inflammatory [20]. Because of the content of these substances, Lanolin, breast milk, and aloe vera are effective in treating lesions and cracks on the nipples. Low laser therapy provides the benefit of accelerating the wound healing process and accelerating blood flow to the injured area [34] which ultimately results in optimal healing of lesions and cracks on the nipple.

All in all, this study findings show the breast and nipple problems during breastfeeding also the intervention that treat the problems. However, this study used systematic review that cannot explain on detail the number of effectiveness of each intervention on reducing the breast and nipple problems.

Conclusion

Breast and nipple problems in breastfeeding mothers are common things that often occur during the breastfeeding process. Various problems that occur in the breasts and nipples can be treated using interventions that have been proven to be effective, including a) Breast engorgement can be intervened with FSST; reverse pressure softening technique; therapeutic breast massage and cold cabbage; b) Mastitis can be intervened with FSST; c) Plugged milk ducts can be intervened with FSST, IBM techniques, and therapeutic breast massage; d) Inverted nipples can be intervened with the Hoffman exercise technique and inverted syringe; e) Lesions and cracks on the nipples can be intervened with lanolin, breast milk, aloe vera, and Low-Level Laser Therapy; f) Nipple pain can be intervened with olive oil, breast milk, lanolin and Low -Level Laser Therapy; g) Breast pain can be intervened with FSST, TBM, and cold cabbage; and h) Breast abscesses can be intervened using a percutaneous catheter with ultrasound guidance and hydrostatic pressure irrigation.

Declaration

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