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# NON PHARMACOLOGICAL TREATMENTS FOR BREAST ENGORGEMENT: A SYSTEMATIC REVIEW

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### ABSTRACT

**Background:** Mothers often suffer breast engorgement at the beginning of postpartum, and one of the causes is early breastfeeding cessation. Management of breast engorgement should be done well to support the success of exclusive breastfeeding. This study aimed to review and identify the non-pharmacological treatments that have potential effects on reduced breast engorgement

**Methods:** This was a systematic review prepared according to the standard guidelines of the Joanna Briggs Institute (JBI). Article search used electronically. The two databases used were the PubMed and Cochrane library. English-language articles, and full text using the keywords of "treatment breast engorgement" OR "lactating" OR "cabbage compress". The inclusion criteria were the studies with Randomized controlled trial (RCT) published from 2009 to 2019, the respondents were postpartum mothers who breastfed their babies, and intervention was non-pharmacological action research and not a medical action.

**Results:** Out of 5,927 articles resulted from the literature search, there were 5 articles that met the inclusion criteria and included in this systematic review with a total number of 882 participants. The treatment used in dealing with breast engorgement varied, such as 2 studies used cold cabbage leaf and the remaining studies used these non-pharmacological treatments, respectively: hot herbal compresses, cold hollyhock herbal compress, the intervention of Gua sha. All the results of the study stated that the intervention was effective in reducing breast pain and engorgement.

**Conclusions:** Herbal compresses, leaf compresses hollyhock, cabbage compresses and Gua sha therapy can be used to treat breast engorgement during lactation, but more rigorous follow-up studies are needed to see which interventions are most effective using larger samples.

**Keywords:** Breast engorgement, breastfeeding, a non-pharmacological, systematic review

### INTRODUCTION

Breast milk is the best nutrient that contains various nutrients needed in the process of growth and development of babies [1, 2]. Recommendations for exclusive breastfeeding have proven its benefits, but exclusive breastfeeding is still very low. The prevalence of exclusive breastfeeding at 48 hours is 18.8% and falls gradually to 5.0% in the sixth month in Cyprus between April 2014 and June 2015. [3]. Indonesia's health profile in 2017 reported exclusive breastfeeding in 2016 was only 29.5% and 35.7% in 2017. The low level of exclusive breastfeeding was due to various problems faced by mothers during lactating. The research result Strong (2011) showed that were 56.4% of the mother breastfeeding their babies and 23% of them reported breastfeeding pain during the first year. The main reasons for pain were caused by mastitis (67.5%), candida (32.4%), engorgement (18.0%), nipple pain (8.1%), and blocked ducts (4.5%) [4]. The nipples of blisters are caused by poor breastfeeding techniques, breast engorgement, in maternity wards that are not accredited by the Infant Friendly Hospital Initiative,

cesarean section, use of milk bottles and maternal education level [5]. one of the causes of mothers stopping breastfeeding early is breast engorgement. [6].

Mothers often suffered breast engorgement at the beginning of postpartum, and this is one of the causes of early breastfeeding cessation [6–10]. The production of breast milk is still low on the first day until the second day because the alveoli are still filled with colostrum, but a lot of production occurred on the fifth day [10]. On the fifth day, a lot of transitional milk production fills the lactiferous duct which may still be filled with colostrum [8]. This will cause the transition milk cannot come out because it is blocked by colostrum so that the alveolar engorgement occurs and the lactiferous duct is blocked which eventually causes the breast engorgement. Engorgement causes hard breasts, pain, overall redness and increases body temperature [11]. Breast engorgement generally occurs in the first week after giving birth. The condition of the breast engorgement if not treated properly will lead to more serious conditions such as breast infections, mastitis, and early weaning [8, 9] even decreasing milk production even though the baby is routinely breastfed or breast milk is released by pumping. Breast engorgement caused to stopped early breastfeeding, discomfort to the mother and baby. It also causes pain lasting less than 3 days to 7 days and can disappear up to 30 days. This pain is very tormenting postpartum women, even some mothers say pain can be more painful than labor pain [8]. Management breast engorgement must be done well to support the success of exclusive breastfeeding.

The effectiveness of gel containing progesterone for breast engorgement was tested by Alekseev (2017) in Rusia. The study of 23 breastfeeding mothers, a gel containing progesterone, is applied to the skin of the breast. engorgement are measured after 20 minutes. The results showed that progesterone gel did not reduce engorgement [12]. Other problems such as nipple blisters and swelling were not giving therapy only by encouraging continuous breastfeeding. Symptoms of breast pain and swelling are allowed to improve slowly over time [13].

There is insufficient evidence from trials to recommend the widespread implementation of a particular treatment for breast engorgement. Systematic reviews of research on treating breast engorgement during lactating have been reviewed by Mangesi & Doeswell (2010), Mangesi (2016) [9, 14]. The study found that there is no strong evidence to recommend the best treatment for breast engorgement but rather recommend non-pharmacological treatment such as hot/cold packs, cabbage leaves because it is considered safer and more efficient [9, 14]. Therefore, it is important to conduct a systematic review of research studies in the past 10 years to identify effective non-pharmacological treatments for breast engorgement during lactating.

## **METHODS**

This systematic review was prepared according to the standard guidelines of the Joanna Briggs Institute (JBI). Article search used electronically. The two databases used PubMed and Cochrane library. Articles in English, full text, using the keyword "treatment of breast engorgement OR lactating OR cabbage compress". Filter by setting restrictions on the year of articles from 2009-2019 and study type of randomized control trial (RCT). The reason for limiting the year is to see the latest developments in research in the past 10 years. The last search was on February 20th.

The inclusion criteria are RCT study that tested the effectiveness of breast engorgement during lactating, published in 2009 and maximal in 2019. Articles in English text, respondents are postpartum mothers who breastfeed their babies. Interventions were given in research on non-pharmacological actions. The results of the study measured pain in breast engorgement or breast enlargement. Selecting articles by looking at the title, then read the information in the abstract, if not clear, then the article is read in full text, if it meets the inclusion criteria, it will be included in this literature review.

## **DATA EXTRACTION MANAGEMENT**

Extraction was carried out in each study using an experimental research extraction tool format from the Joanna Briggs Institute (JBI). The data collected consisted of the author's name, year of publication, journal name, the record number, type of research, place, population, sample size, intervention, results, Author's Conclusions (attachment 1).

## **BIAS RISK ASSESSMENT A STUDY**

Two as a review independently assesses the risk of bias for each study using the Critical Assessment Checklist for the Randomized Control Trial of the Joanna Briggs Institute. Regarding the assessed questions, there are 13 questions (attachment 2). There is no difference of opinion.

## **DATA ANALYSIS**

Data analysis was carried out in a narrative manner because the measurement results varied so it was not possible to proceed to the meta-analysis.

## **RESULTS**

Article search used electronically. The two databases used PubMed and Cochrane library through the keywords "treatment breast engorgement OR lactating OR cabbage compress". Filtering by limiting the year of articles from 2009-2019 and the type study RCT, obtained 5,927 articles. After that, duplication checks were carried out, resulting in 3,624 articles. Screening was done based on the availability of text, English-language texts, relevant titles obtained 14 articles, but after screening according to inclusion criteria, there were 9 articles that were not suitable, namely 2 articles research methods Quasi-experiment, 2 articles were systematic reviews, 2 articles used pharmacological interventions / medical, 2 articles of research subjects other than engorgement also included cases of mastitis and plugged duct, and 1 article output from research focused on evaluating relationships engorgement with the luteal period of the menstrual cycle, so that the final results contained 5 articles that met the inclusion criteria and it was subsequently included systematically. The literature search scheme is shown in chart 1.

Five articles that met the inclusion criteria were included in this systematic review. Five studies were in five different countries namely Thailand [15], Singapore [16], Iran [17], Korea [18], Taiwan [19]. The total number of participants of 882 people with descriptions of 3 articles was assessed using a small sample of less than 100 [17–19], 1 article contained a sample of 228 people [16], and 1 article using a sample of 500 people [15]. The non-pharmacological treatment used in dealing with breast engorgement in this literature varies, there are 2 articles use cold cabbage leaf intervention, 1 article uses a hot herbal compress intervention, 1 article uses the intervention of herbal compress hollyhock cold, and 1 article uses the intervention of gua sha. All the results of the study stated that the intervention group was more effective in reducing breast pain and engorgement, but 4 articles that the authors recommended needed further research (table 1).

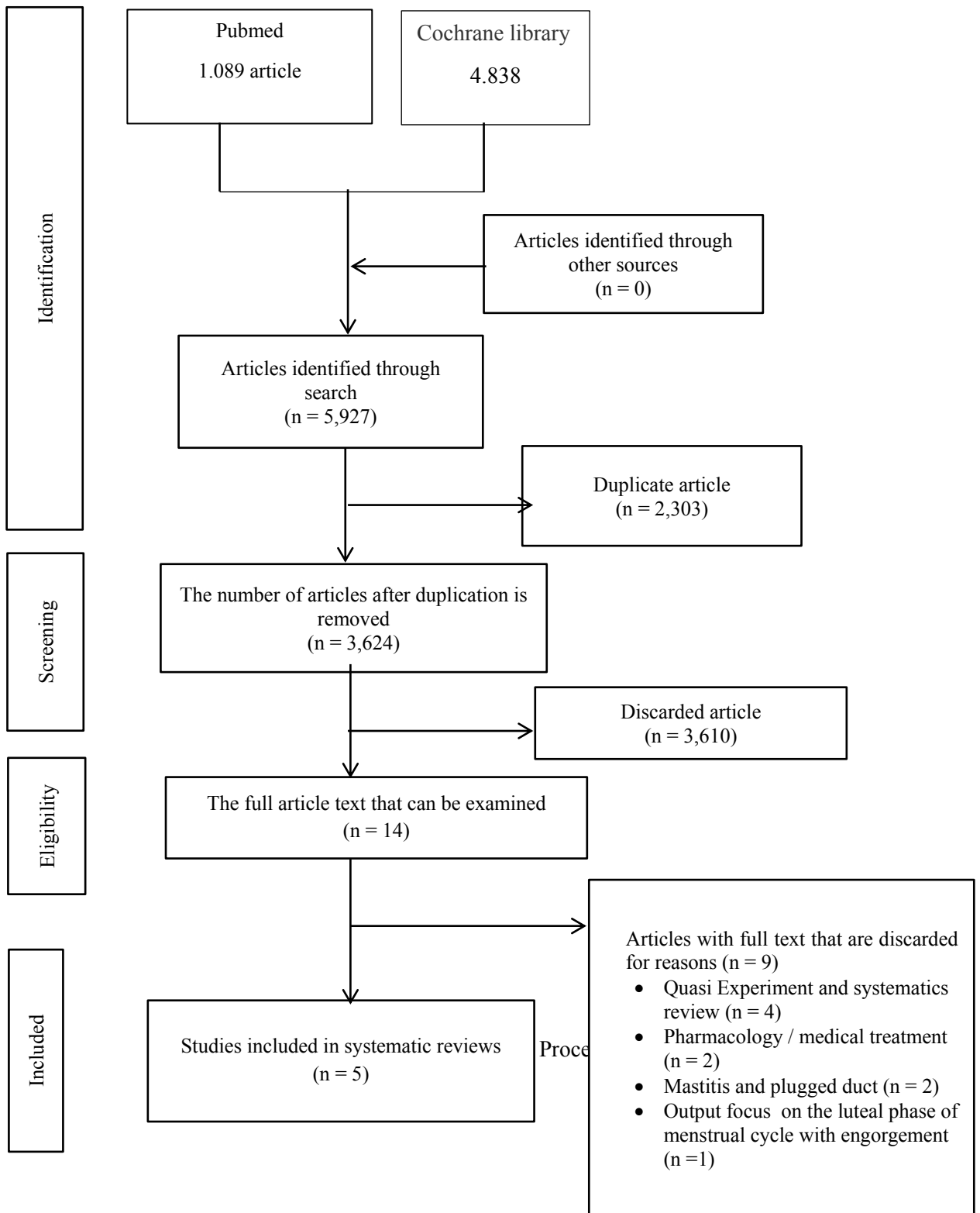




Table 1. Characteristics of Study Which Included

Authors / year / Journal	Setting	Population / sample	Intervention	Results	Instruments	Author's Conclusions	author's recommendation
Ketsuwan et al (2018) [15] Breastfeeding Medicine	Medical center Princess Chakri Sirindhorn, Thailand	500 maternal post-partum experience engorgement boobs 250 respondents intervention group 250 respondents control	group hot herbal intervention group Hot ball compress control group (placebo)	Pain scores before and after intervention there were significant differences (p <0.001)  Herbal side effects there were 2 cases (0.8%) experiencing skin irritation, but can be self-relieved within 24 hours without the need for treatment	Pain is assessed with a visual scale analog (VAS)  Engorgement is assessed using a Robson score grade 1-4	Herbal compresses are more effective in reducing breast engorgement pain than hot compresses	Further research is needed by the method which can measure long-term effects and able to explore the factors associated with the effectiveness of herbal compresses in overcoming cases of breast engorgement.
Khosravan et al (2017) [17] Journal of Evidence-Based Complementary & Alternative Medicine	Abolfazl Hospital in Kashmar, Iran	40mothers 1-15 who had breast engorgement 20 respondents intervention group 20 respondents control group	Group intervention hot and cold compresses combined compress herbal hollyhock  Control groups pans and cold treatments without herbs	there were significant differences between to the two groups, the average breast engorgement value was lower in the intervention group than the control group at all measurement time points (p <0.001).  There was a significant relationship between the engorgement severity score and the measurement time (p <0.001)	Pain using a score of 0-10  Breast loss (list of reddish values) score 0-4  Breast tension 0-5 (touch)  Breast severity summation of the total score (it erythema + 1/2 tension + 1/2 breast pain)	Herbal compresses from Hollyhock powder combined with routine care can overcome breast engorgement during lactating	



<p>Wong et al (2017) [16] International Journal of Nursing Studies</p>	<p>A private maternal and children's hospital in Singapore.</p>	<p>228 postpartum mothers with breast engorgement Inclusion criteria and sample calculations are clear. The sample randomized user beam 6 by a biostatistics expert, the envelope is opaque and closed. 76 respondents Group 1 76 respondents Group 2 76 respondents Group 3</p>	<p>group 1 cold cabbage leaf combination routine care group 2 application of cold gel ointment combination group routine care 3 routine care</p>	<p>Cold cabbage leaves help reduce pain, the hardness of breast engorgement at all temporary measurement points cold gel only decreases pain at all points but not for breast hardness. The majority of mothers were satisfied in the intervention group of cold cabbage leaves. There was no difference in the duration of breastfeeding between the three groups.</p>	<p>Pain is measured by the Numeric Rating Scale (NRS) Breast enlargement is measured by a descriptive score scale 0-10 Body temperature is measured by a thermometer Long breastfeeding with a QM-DB questionnaire</p>	<p>Cold cabbage leaves and cold gel packs can be used to deal with breast engorgement, but more recommended cabbage leaves</p>	<p>are needed Further studies are needed to study chemicals contained in cabbage leaves which can increase the effectiveness in reducing breast engorgement during lactating</p>
<p>Lim et al (2015) [18] Int J Exp Med</p>	<p>Obstetrics Department E Hospital in Korea</p>	<p>Clinics60 primiparous mothers with cesarean birth who want to breastfeed their babies. 20 Grub Respondents 1 20 Grub Respondents 2 20 Grub Respondents 3</p>	<p>Group 1: get Early Breast Care + cabbage compresses (CCE-BC) Group 2: Early breast care (EBC) Group 3: General breast care (GNBC)</p>	<p>breast pain and breast hardness, good in the CCEB and EBC groups showed lower pain levels than the GNBC group, where the CCEB group was lower than the other groups. Core body temperature and skin body temperature showed no difference between the three groups.</p>	<p>Violence is measured by durometer Pain is measured by a visual analog scale (VAS) Temperature with a thermometer</p>	<p>Early breast care compresses may be effective in reducing breast pain and hardness</p>	<p>care combination of cabbage effectiveness of early treatment of cabbage compress combinations needs to be examined again with a more rigorous method</p>



<p>Chiu et al (2010) [19] The Journal of Nursing Research</p>	<p>Medical Center in Central Taiwan</p>	<p>54 Post Partum with breast engorgement 27 intervention groups 27 control</p>	<p>the group Intervention group was given treatment with Gua-Sha at ST 16, ST 18, SP 17 and CV 17  The control group received massage and hot compress treatment.</p>	<p>Measurements were carried out 5 minutes &amp; 30 minutes post intervention  There were no differences in the symptoms of engorgement before the intervention, There were significant differences in the interaction between groups and the time for engorgement, pain, and discomfort Measurement at 5 minutes after the intervention had a greater decrease. The group that received the Gua-Sha intervention experienced greater improvement than the group that received the hot massage and compress intervention.</p>	<p>PH ASI with BTB Paper  Pain, engorgement, discomfort subjective score 0-10 visual analogue scale (VAS)  Breast temperature and Body temperature (Thermal Infra Red</p>	<p>Gua-Sha Intervention effective in overcoming breast engorgement Future research is recommended to evaluate the effects of caveola on oxytocin and prolactin levels.</p>
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## DISCUSSION

Mothers often suffered breast engorgement at the beginning of postpartum, and this is one of the causes of early breastfeeding cessation [6–10]. The condition of the breast engorgement if not treated properly will cause more serious conditions such as breast infections, mastitis, and early weaning [8, 9] even decreasing milk production even though the baby is routinely breastfed or breast milk with pumping. In addition to stopping early breastfeeding, it also causes discomfort for the mother and his baby. It causes pain lasting less than 3 days to 7 days, and can disappear for up to 30 days. This pain is very tormenting postpartum women, even some mothers say pain can be more painful than labor pain [8].

Treatment breast engorgement must be done well to support the success of exclusive breastfeeding. Some treatments that have been studied are effective in overcoming the problem of breast engorgement during breastfeeding, namely the intervention of herbal compresses [15], hollyhock herbal [17], cabbage leaves [16, 18, 20, 21] and gua sha [19] but in several studies found that acupuncture interventions were not statistically effective in treating breast engorgement during lactating [22, 23]. Giving a gel containing progesterone cannot eliminate breast engorgement [12].

### *Cold cabbage leaf compresses*

Cabbage (*Brassica oleracea* L. var. *Capitata*) is a type of vegetable that easily available throughout the world. It has been shown to contain phytochemicals with antioxidant and anti-inflammatory potential [24]. Studies on human breast cells with cabbage juice can increase the expression of AhR and can decrease nontumorigenic MCF10A cells [25]. This cabbage which contains anti-inflammatory substances were used as a basic principle of intervention in using cabbage compresses to overcome breast engorgement during lactating.

The results of the literature review on the effectiveness of cabbage leaf compress in overcoming breast engorgement are still different [26]. Differences in the results of this study occur because of the different methods and risks of bias. Cold cabbage compresses and cold gels have the same effectiveness, but mothers are more satisfied with cabbage compresses [16]. The other studies with early breast care the combination of cold cabbage compresses showed no difference from the control group [18], while a study conducted by Arora, Manju & Vatsia in 2008 showed that hot and cold compresses compared cold cabbage leaf compresses were equally effective in reducing breast swelling but cold and hot compresses are more effective in reducing pain [27].

The study Wong et al (2017) [16] tested the effectiveness of cold cabbage leaf compresses compared to gel packs for 228 mothers with breast engorgement. Group 1 received regular treatment and cold cabbage leaf compresses were given for 2 hours and rested 30 minutes before giving the second cold cabbage leaf compress. The second group received regular treatment and the breast was given a cold gel for 2 hours with a rest period of 30 minutes before applying to the second time. Results obtained Cold cabbage leaves and cold gel packages can be used to treat breast engorgement, but cold cabbage leaves are more recommended because more mothers are satisfied with cold cabbage leaves to compress. However, this study poses a risk of bias because data collection was carried out by officers who were aware of the distribution of interventions and 27 respondents conducted their own intervention at home and measured the outcome variables themselves [16].

The study Lim et al (2015) [18] interfering with cabbage compresses was given to mothers who had first given birth with a type of cesarean delivery before breast engorgement occurred. Research conducted to see the effectiveness of early breast care combined with cabbage compresses. Early treatment is done before breastfeeding the baby where the mother is encouraged to massage the breast with her own hands for 10 minutes with a frequency of 3 times a day. The results obtained there were no significant differences between the early treatment of a combination of cabbage compresses, early breast care, and general breast care. The results of this study still have a risk of bias because the researchers themselves assessed and the subjects in this study received standard analgesic drugs after



the surgery. Therefore, the authors in this study recommend further research is needed using more rigorous methods [18].

According to the process of breast swelling where breast milk cannot come out because it is inhibited by colostrum resulting in alveolar swelling and blockage of the lactiferous tract [11], early treatment interventions with breast massage should be effective in preventing and overcoming breast swelling pain. The effectiveness of breast massage has been shown to reduce pain and engorgement in cases of breast engorgement and milk dams [28, 29]. The Breastfeeding Community in Russia uses a combination of hand expression techniques to massage the breast around the areola before breastfeeding to help encourage milk removal in reducing breast engorgement [29]. Massage can help reduce engorgement and soften breasts so that the baby is easily able to suck the areola and nipple area [28–30].

### ***Herbal Compresses***

Treatment breast engorgement during breastfeeding using herbal compresses, there are 2 systematic studies found here [15, 17]. Herbal used in the study are believed to be herbs that contain anti-inflammatory ingredients. Rhizome Zingiber cassumunar Roxb one herbal that is used to reduce pain and engorgement of the breast during lactation [15]. The rhizome is Zingiber cassumunar Roxb proven to reduce pain and engorgement because it contains anti-inflammatory substances [31, 32] and analgesics [32].

The Study Ketsuwan et al (2018) [15] gave herbal compress interventions to 500 respondents divided into two groups: herbal compresses and placebo herbs. The body mass index was covariant. The herbal were obtained from the pharmacy department which contained dry ingredients which included the rhizome Z.cassumunar Roxb (90.5 g), rhizome C.Longa L (18.2 g), staple leaves and leaf sheath Cymbopogon citratus (18.2 g), leaves Acacia concinna (18.2 g), Tamarindus indica L leaves (54.3 g), Citrus Hystrix DC skin (36.2 g), Blumea balsamifera DC leaves (5.4 g), salt (3, 6 g) and camphor (5.4 g). The herbal ball is heated for 20 minutes then the herbal ball is wrapped in a towel which is then compressed to both breasts by touching and lifting again, the touch time is about 10 seconds, repeated over 20 minutes. If the herbal ball starts to cool, then the herbal ball is replaced with an herbal ball that is still hot. While the control group received treatment under the same conditions but using a hot compress ball made from a towel packed similar to an herbal ball. The results of the study found that herbal compresses were more effective in reducing breast engorgement pain compared to hot compresses. Herbal side effects reported there were 2 cases (0.8%) experiencing skin irritation, but can disappear on their own within 24 hours without needing treatment. The author recommends conducting further research to see long-term effects [15].

Another study by Khosravan et al (2017) [17] with the intervention of cold compresses made from herbs was hollyhock given to 40 postpartum mothers day 1-15 who had breast engorgement, which was divided into two groups namely the control group receiving breast care with hot compresses during 2 minutes before breastfeeding, 30 minutes later the mother breastfeeding the baby while the mother massage the breast from the top down to the nipple, after breastfeeding followed by cold compress for 15-20 minutes. The intervention group received care just like the control group, but 10-15 then after cold compresses, compresses continued using her powder hollyhock 6-8 cold applied to both breasts for 10 minutes. The results found that herbal compresses from powder hollyhock combined with routine care can overcome breast engorgement. But this research has a high risk of bias because the respondents who intervened were the respondents themselves [17].

Treatment of breast engorgement is done with hot and cold compresses. Hot compresses have the effect of widening the blood vessels so that the blood vessels in the breast widen which eventually can expel milk expenditure. This study, hot compresses were given before the mother breastfed her baby so that the milk removal process was expected to be smooth. Cold compresses are given after the mother has

finished breastfeeding her baby because cold compresses provide vasoconstrictive effects on blood vessels so they can reduce pain and reduce engorgement [30].

### **Gua sha**

Gua sha is an action rubbing the surface of the skin and muscles of the outer body tissue. Gua sha usually uses tools to scratch like coins or spoons. The use of equipment gua sha still needs attention about safety guidelines in tool sterilization and damage to skin tissue [33]. The prevalence of using gua sha is high in the general population of Hong Kong to overcome respiratory problems and reduce pain [34] and overcome premenopausal syndrome [35]. Gua-sha can extend the end of blood vessels, improve blood circulation, and metabolism in the body and can relax breast muscles so that pain is reduced [19]. Gently touching area of the breast areola can stimulate sinful nerves which are forwarded to the hypothalamus and instruct the posterior gland to secrete the hormone oxytocin, which in turn oxytocin contracts the breast muscle to exclude milk

The study Chiu et al (2010) [19] for 54 postpartum mothers who had breast engorgement, which was divided into 2 groups. The intervention group was given treatment with Gua-Sha by scraping the ST 16 point, ST 18, SP 17 down on the nipple, then moving to scratch the CV 17. This action was carried out for 2 minutes  $\pm$  0.5 minutes, repeated up to 7 times in two stages between breastfeeding time. The control group received massage and hot compress treatments. The breasts are compressed with a small towel soaked in hot water ( $T = 43\text{ }^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ) for 20 minutes, followed by a message to four fingers without thumbs with the technique of spiral movement towards the nipples. The results found that intervention Gua Sha's effective in overcoming breast engorgement, but the results had a risk of bias because all interventions were carried out by the researchers themselves and all participants knew which groups they would be grouped into. The authors of the study recommend that further research need to see the effect of caves on oxytocin and prolactin levels [19].

### **CONCLUSION**

Herbal compresses, leaf compresses hollyhock, cabbage compresses and gua sha can be used to reduced breast engorgement during lactating, but there is no strong evidence to recomend which methode is most effective because all studies still have a high rist of bias, more rigorous follow-up studies are needed to see which interventions are most effective

### **CONFLICTS OF INTEREST**

There is no conflict of interest in the writing of this systematic review.

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