

The Effect of Acupressure, Acupuncture and Massage Techniques on the Symptoms of Breast Engorgement and Increased Breast Milk Volume in Lactating Mothers: A Systematic Review

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Abstract

Background: We aimed to review interventional studies on the effect of acupuncture, acupressure, and massage techniques on the symptoms of breast engorgement and breast milk volume.

Materials and Methods: Systemic search of online databases (Medline, Cochrane, EMBASE, Web of Science, and Scopus), for randomized control trial and non-randomized prospective or retrospective clinical studies which were published up to Nov 2020, were done. No language or time restrictions were considered. Study selection was done by two reviews.

Results: Nine studies were included. In the first study, no significant difference was found in the mean breast milk volume between the two intervention groups (GB21, LI4 and SI1 acupoints), and control group. In the second study, the group receiving acupressure on the SI1, ST17 and CV18 acupoints exhibited a significant increase in the breast milk production. In the third study, the co-administration of affirmation relaxation and acupressure enhanced the breastfeeding self-efficacy ($p = 0.045$), and the breast milk volume ($p = 0.033$). In the fourth study the results revealed a significant difference in the mean breast milk volume in breast acupressure and oxytocin than control groups. In the fifth study, treatment with acupuncture significantly increased exclusive breastfeeding in acupuncture group. In the sixth study, milk production was significantly higher in Tuina therapy compared to the control group. Acupressure and acupuncture were effective on breast milk volume and breast engorgement.

Conclusion: Treatment with acupuncture and acupressure on GB21, LI4 and SI1, ST17 and CV18 acupoints, could improve milk volume. Also, combination of acupressure with relaxation or oxytocin massage could improve breast milk production. Acupressure and acupuncture can decrease breast engorgement and breast pain in lactating mothers, too.

Key Words: Acupuncture, Acupressure, Breast Engorgement, Breastfeeding, Massage.

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1- INTRODUCTION

World health organization (WHO) introduces breastfeeding as one of the cost-effective and valuable methods, and states that breastfeeding meets all of the infant's nutritional needs during the first six months of life, half of the nutritional needs during the second six months of life, and one-third of the nutritional needs in the second year of life. Breastfeeding promotion is one of the goals of WHO (1). Previous studies have proved the breastfeeding benefits for infants and mothers. Breastfeeding reduces incidence of breast and ovarian cancer, type 2 diabetes, heart attack, and metabolic syndrome among mothers. Besides, breastfeeding leads to a reduction in respiratory and gastrointestinal diseases, an increase in IQ and cost reduction (2-4).

There are complex and multifactorial reasons for early cessation of breastfeeding after postpartum. Insufficient breast milk volume is one of the main reasons for breastfeeding cessation, especially in the first month after birth (5). Breastfeeding problems include nipple fissures, breast engorgement, and more serious cases, including mastitis and abscesses are another reason for breastfeeding cessation. Among these, breast engorgement is considered as the most prevalent cause of the breastfeeding cessation (6). Two-thirds of women experience breast engorgement between the third and fifth days postpartum, although some also complain of breast engorgement on the ninth and tenth days postpartum (7).

Excessive swelling of the milk-secreting sacs is accompanied by an enlargement of the milk-secreting cells, which in turn leads to rupture of the milk-secreting sacs, reduced blood flow and reduced milk production, and the breast tissue becomes susceptible to infectious mastitis. Besides, congestion-induced nipple pain and swelling cause maternal irritation, decreased infant sucking power, and a

defective cycle of worsening congestion and breastfeeding cessation (8, 9). Congestion affects one or both breasts from the tip of the nipple to whole entire breast tissue, and reducing the severity of breast congestion is necessary to prevent adverse consequences (10). Severe breast pain is associated with maternal emotional distress, impaired mother-infant bonding, and even an increased risk of postpartum depression. Some studies have shown the experience of severe pain during the first days postpartum with a two-fold increase in depression during the first two months postpartum (11). Since breast engorgement is one of the main causes of mastitis, there is a need to eliminate it using both pharmacological and non-pharmacological treatments in a timely manner. Extremely swollen and painful breasts are prone to rupture of the mammary alveoli, intra-tissue bleeding, decreased milk production, and thus cessation of breastfeeding; therefore, frequently emptying the breasts of milk through proper breastfeeding method plays a very important role in eliminating congestion and preventing subsequent complications (12, 13). Other traditional treatments, including cabbage leaf compresses, massage, acupuncture, and physiotherapy, were effective (13).

There are also various pharmacological and non-pharmacological methods to increase breast milk. Metoclopramide, carbamazepine, and domperidone have been shown to be effective pharmacological methods used to increase breast milk supply and that have some complications (14). Establishment of child-friendly hospitals and breastfeeding education for mothers (15), peer education (16), hypnosis (17), and complementary medicine including acupuncture and acupressure (18), are among the non-pharmacological measures taken to increase breast milk supply. Studies of interventions affecting breast engorgement and increasing breast milk supply have

reported that non-pharmacological interventions such as massage and acupressure are effective in relieving pain symptoms, eliminating blocked milk duct, increasing breast milk supply. However, systematic review studies yield insufficient convincing evidence for the use of non-pharmacological therapies (19). The aim of the present study was to review interventional studies on the effect of acupuncture, acupressure, and massage techniques on the symptoms of breast engorgement and increased breast milk volume.

2- MATERIALS AND METHODS

2-1. Search strategy

In this systematic review, all randomized control trials and non-randomized prospective or retrospective clinical studies evaluating the effect of acupressure, acupuncture and massage techniques on the symptoms of breast engorgement and increased breast milk volume in lactating mothers were searched on the electronic databases of Scopus, EMBASE, Cochrane Central Register of Controlled Trials, Web of Science and Medline (via PubMed). No language or time restrictions were considered. Searches were performed till Nov 2020 with combination keywords of: (Massage OR Acupressure) AND (Breast engorgement OR Lactating OR Breastfeeding). Two independent researchers performed the search process and a supervisor judged any disagreement in this regard.

2-2. Selection process

Two reviewers independently searched relevant studies, abstracts of the studies were screened for identification of eligible studies, full text articles were obtained and

assessed and a final list of included studies was made. Finally, the articles that had all the inclusion criteria were included in the systematic review (**Figure.1**). We also searched manually their used relevant references to detect more studies. Any disagreement was judged by a third party.

2-3. Included studies

Randomized controlled trials (RCT), clinical studies both randomized and nonrandomized either retrospective or prospective, and review articles. Due to small sample size and higher risk of bias, pilot, preliminary and case report studies were not included in systematic review. Also, no language or time restrictions were considered.

2-4. Data collection process

Data collected from the selected studies included: author, year, study design, study population, intervention applied, and main findings (**Table.1**). Data were independently collected by two reviewers. For accuracy any discrepancies were solved by a third reviewer.

2-5. Risk of bias in individual studies

Risk of bias assessment was done following the Jadad scale (20). The assessment was done by two reviewers independently and in duplication and any discrepancies were resolved by a third reviewer (**Table.2**).

2-6. Synthesis of results

Due to the differences in the included studies, study designs, lack of control groups in some studies, sample size, type of intervention used, duration of treatment, duration of follow-up, meta-analysis was not conducted.

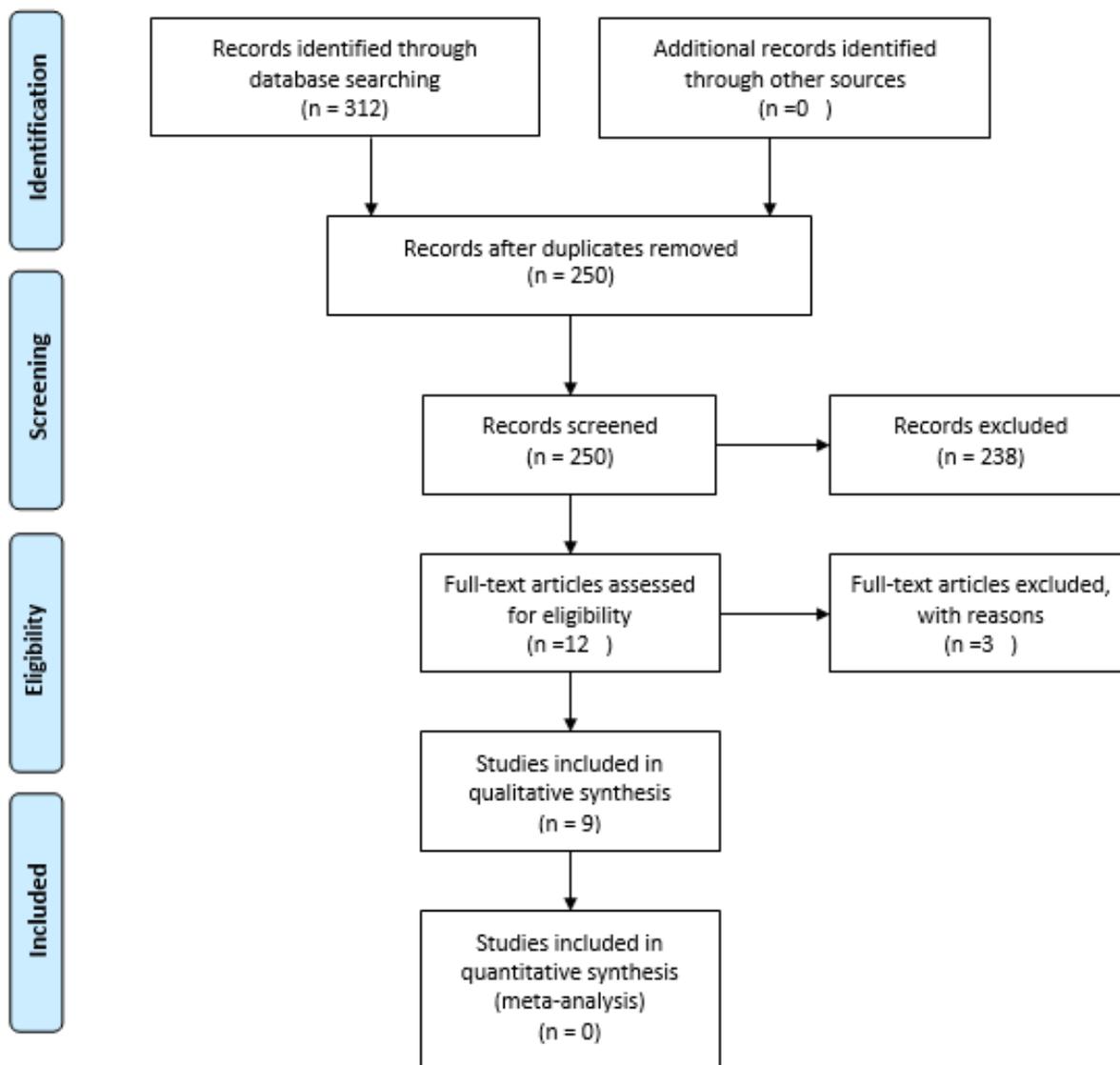


Fig.1: PRISMA Flowchart.

Table-1: General characteristics of included studies.

Author, Country, Year, Reference	Length of study	Age	Intervention group	Control group
Chiu et al., Taiwan 2010, (28)	25 min	Intervention group: 32.5 control: 28.8	The Gua-Sha protocol, n=27	Hot packs and massage, n=27
Kvist et al., Sweden, 2007, (30)	2.7 days	31	Intervention, group 1: acupuncture using needles – HT 3, GB 21, and SP 6, advice as necessary regarding interval and duration of breastfeeds, emptying of breasts by manual expression, pump or warm shower, application of unrefined cotton wool, n=70 Intervention, group 2: acupuncture using needles – HT (heart) 3 and GB (gall bladder) 21, advice as necessary regarding interval and duration of breastfeeds, emptying of breasts by manual expression, pump or warm shower, application of unrefined cotton wool, n=70	Emptying of breasts by manual expression, pump or warm shower, application of unrefined cotton wool and the use of oxytocin spray, n=70
Kamali et al., Iran, 2013, (26)	2 days	Acupressure group, n=26, intermittent compress group, n=25.2	Acupressure group, n=35 Intermittent compress group, n=35	-
Esfahani et al., Iran, 2015, (18)	12 days	Intervention group, n=24.5, control group, n=24.2	Acupressure, Acupoints: SII, LI4, and GB21, n=30	Routine education, n=30
Arumsari et al., Indonesia, 2018, (21)	6 days	Intervention group: 24.2, control group: 21.7	Acupressure and affirmation relaxation Acupoints: ST15, ST16, ST18, ST36, SP6, SP18, CV17, SII, LI14, n=12	Health education, n=12
Lu et al., China, 2019, (25)	2 days	Intervention group: 28.7, control group: 28.7	Tuina massage, n=40	Standard medical care, n=40
Sulymbona, Indonesia, 2020, (22)	3 weeks	28.1±0.317	Acupressure, Acupoints: CV18, ST17, SII, n=35	n=35
Parwati et al., Indonesia, 2017, (23)	-	20.5	Breast acupressure and oxytocin massage, n=13	n=13
Neri et al., Italy, 2009, (24)	3 weeks	Intervention group: 34.9± 4.3, control group: 33.9±4.5	Acupressure, Acupoints: SI 1, CV 17, SP 6, ST 36, BL 20, LR 3, PC 6	n=45

Table-2: The quality assessment of included studies.

Author, year, Reference	Randomization			Blinding			Report of dropping out
	Mention randomization	Appropriate Method	Inappropriate Method	Mention blinding	Appropriate method	Inappropriate method	
Chiu et al., 2010 (28)	*	*		*	-	*	*
Kvist et al., 2007 (30)	*	*		-			*
Kamali et al., 2013 (26)	*	*		-			*
Esfahani et al., 2015 (18)	*	*		*	*		*
Arumsari et al., 2018 (21)	*	*		-			*
Lu et al., 2019 (25)	*	*		-			*
Sulybona et al., 2020, (22)	*		*	*		*	*
Parwati et al., 2017 (23)	-			-			-
Neri et al., 2009, (24)	*	*		-			*

3- RESULTS

Finally, 9 studies were included. General characteristics of included studies are shown in **Table.2**.

3-1. Effect of acupressure on breast milk volume

In the first study, the current randomized clinical trial was conducted on the breastfeeding mothers (n=60) suffering from hypogalactia, who met all study inclusion criteria. The intervention group not only underwent the routine educational programs, but also received the bilateral acupressure for 12 consecutive days applied on the GB21, LI4 and SI1 acupoints in three sessions per week and 2-5 times in each session. Only the routine education was administered for the control

group. According to the independent t-test results, no significant difference was found in the mean milk volume between the two groups ($P = 0.543$). The mean breast milk volumes at the baseline and at post-intervention 2 and 4 weeks were reported to be 10.5 ± 8.3 , 33 ± 13.44 ml and 36.2 ± 12.8 in the acupressure group as well as 9.5 ± 7.7 , 17.7 ± 9.4 ml and 18 ± 9.5 in the control group, respectively (18). In the second study, the primiparous mothers (n=24) were allocated in two groups. In conclusion, the co-administration of affirmation relaxation and acupressure enhanced the breastfeeding self-efficacy ($p = 0.045$), and the breast milk volume ($p = 0.033$) in the postpartum primiparous mothers during multiple Independent Midwifery Practice in Malang. The

proposed approach seems to be a promising non-pharmacological therapy for postpartum mothers, which can be trained for the postpartum mothers to perform by themselves (21). In the third study, Sulymbona et al. studied two groups of 35 postpartum mothers, intervention and control, for the acupressure. The intervention group (received acupressure on the SI1, ST17 and CV18 acupoints) exhibited a significant increase in the breast milk production, but the control group (received no acupressure) had an insignificant increase in breast milk volume. They concluded that the breast milk volume can be increased in postpartum mothers by applying the acupressure for three weeks, three times a week (22). In the fourth study, Parwati et al. investigated the effect of breast acupressure and oxytocin, the results of which revealed a significance difference ($P < 0.05$) in the mean breast milk volume between the intervention (received breast acupressure and oxytocin massage), and control groups (282.31 ± 15.35 vs. 218.08 ± 36.62 , respectively) (23). In the fifth study, Neri et al.'s treatment with acupuncture significantly increased exclusive breastfeeding in acupuncture group than the control group in the (100% vs. 60%; $p < 0.03$ at 3 weeks post-enrollment), (24). Lu et al.'s milk production was significantly higher in Tuina therapy compared to the control group, as much as 13-fold and 10-fold of that in the control group on the third and fourth postpartum days (25).

3-2. Acupressure

In a study, Kamali Moradzade et al. (26) reported a significant decrease in the mean breast hyperemia score during the interventions in the successive days in the acupressure and compress groups ($P < 0.001$). There was a significant mean difference in the hyperemia intensity score before and after the interventions ($P < 0.001$) in the right breast of the

acupressure and compress groups (5.94 ± 2.48 vs. 8.53 ± 2.48 , respectively) and in the left breast of the acupressure and compress groups (5.5 ± 2.3 vs. 7.79 ± 3.95 , respectively) (26).

3-3. Acupuncture

Kvist et al., examined 205 mothers with 210 cases of breast inflammatory symptoms during breastfeeding. Patients were divided into three groups; the first group received routine required care and oxytocin spray prescribed by midwife (Group 1, without acupuncture), the second group received routine required care and acupuncture at two acupuncture points (HT (heart) 3 and GB (gallbladder) 21 (Group 2), and third group received routine required care and acupuncture at HT3, GB21 and SP6 (Group 3). Severity index (SI) was calculated by summing the scores of erythema, breast tension and pain, total scores ranged from 0 (as the least severe) to 19 (as the most severe).

There was no significant difference in the number of days required between treatment groups. In addition, there was no significant difference in the mean SI scores on contact days 3 and 4 between groups 1 and two groups 2 and 3 (27). In a randomized controlled trial by Chiu et al., postpartum women ($n = 54$) at a level III medical teaching hospital were examined by the Gua-Sha protocol at acupoint positions of ST16, ST18, SP17 and CV17, each of which was slightly scraped seven times in two cycles. Hot packs and massage were administered in the control group for 20 minutes suggested by an obstetrical technique textbook. There was a significant difference in discomfort levels, pain levels, breast engorgement, breast temperature and body temperature at time points of 5 and 30 minutes between the two groups ($P < 0.001$). Generalized estimating equation analysis demonstrated that all variables, except for the body temperature, remained significant ($P < 0.001$) to improve engorgement

symptoms in the experimental group when comparing with the control group, respectively (28).

4- DISCUSSION

Breast engorgement is a painful condition that affects many women in the early postpartum period. This disorder can be followed by early weaning, nipple fissures, mastitis, and abscess formation. Different congestion treatments have been studied in various studies, however, there has been little evidence of an effective treatment so far (29). The aim of the present review study was to review interventional studies on the effect of acupuncture, acupressure, and massage techniques on the symptoms of breast engorgement and increased breast milk volume among lactating mothers. In a study of the effect of acupuncture intervention on breastfeeding mothers with symptoms of breast pain and inflammation, Kvist et al., did not report a statistically significant difference between the groups undergoing acupuncture intervention and breastfeeding care interventions with the control group.

However, the control group had more severe symptoms of mastitis than the intervention group. Findings of this study, if the acupuncture technique is acceptable with correction of breastfeeding position, kangaroo mother care, and other breastfeeding advice, showed the superiority of this method over the pharmacological method such as nasal oxytocin as a suitable and non-invasive technique. In this study, the acupuncture group had less abscesses, fever, and fewer symptoms on the fourth and fifth days postpartum than the control group (27). In another study of the effect of breastfeeding care intervention such as frequent breast emptying in relieving breast inflammation and pain during the first days postpartum, Kvist et al., also did not report a significant difference between the acupuncture

intervention and the control group (30). However, acupuncture has been more effective in improving the severity of mastitis than oxytocin-based treatment. This study also demonstrated the importance of the effect of breastfeeding care interventions such as frequent breast emptying in relieving breast inflammation and pain during the first days postpartum (30). Cho et al. (2014) showed a positive effect of breastfeeding education and counseling on reducing breast discomfort and size, reducing the breast milk sodium level. The findings of this study revealed an improvement in mothers' performance in reducing breastfeeding problems, including breast engorgement (31). Chiu et al. (2010) showed a significant positive effect of massage therapy (Gua-Sha) in improving the symptoms of breast engorgement and reducing breast temperature compared to the control group. This technique improves blood circulation by inducing superficial skin stimulation. Moreover, the Gua-sha technique reduces pain by relaxing muscles and has been considered as an adjuvant mastitis therapy (28).

Kamali Moradzade et al. (2013) compared compression and acupressure methods in improving the symptoms of breast engorgement. Although both methods had a significant effect in this clinical trial, compression had a greater effect in reducing congestion severity (stretch, redness, and breast pain) (10). Dehghani et al. (2017) showed a significant positive effect of Oketani breast massage in reducing breast engorgement as compared to routine care. In this study, compression intervention was also reported to be effective in reducing breast engorgement, but Oketani massage was more effective. Improving the blood and lymph flow of the breast tissue and stimulating the milk flow reflex are among the massage effects. Massage has reduced the severity of breast congestion by increasing softening,

elasticity of breast pectoralis, and increasing connective tissue space. Cesarean delivery also exacerbates congestion symptoms, which should be considered as an effective factor (7). Previous studies yielded different results regarding the effect of acupuncture and acupressure on the symptoms of breast engorgement. Perhaps one of the reasons for the different results is the frequency of uses because continuation of the intervention leads to further reduction of the symptoms of breast congestion, following the creation of stronger therapeutic effects induced by the stimulation of more points. On the other hand, the different results may also be due to differences in sample size, different points, method of training, experience and skill of the operator, frequency of breastfeeding that can affect acupuncture and acupressure-based therapy (30, 32).

Acupuncture means inserting a needle into specific parts of the body for treatment purposes. According to the principles of acupuncture, a disease occurs due to an energy imbalance, and the needle is inserted in certain parts of the body in order to correct the imbalance. Acupuncture points are located on special canals called meridians. According to acupuncture, needle-based stimulation of some points along the body skin leads to improved blood circulation, increased energy, and removal of obstruction (33).

These points are not necessarily close to the injured limb. One of the most important acupuncture points for the treatment of breast disorders is Jian Jing (Gall21), which is located at the highest point on the shoulder, between the shoulder and the acromion protrusions (10). Also, AH10, CO18, CO13, CO12, and CO4 points have been identified as effective points for increasing breast milk supply (34). Stimulated points along the meridian affect the function of the surrounding tissues. As a result, the

secretion of nitric oxide (NO), and cyclic guanosine monophosphate (cGMP) help to improve physical function by suppressing blood clotting molecules. Applying constant pressure improves blood circulation in the area, activates the parasympathetic system, and reduces neuromuscular stimuli (35). The results of acupuncture and acupressure studies showed that these methods can increase the breast milk volume in mothers. Reducing maternal anxiety and fatigue is one of the factors increasing breast milk. Acupuncture and acupressure reduce anxiety and fatigue by reducing heart rate and lowering cortisol levels by regulating brain function and circulatory system (36). Elevated maternal anxiety and stress levels lead to an impairment in oxytocin secretion, which plays an important role in milk secretion. Incomplete emptying of the breast leads to a decreased breast milk production (37, 38). Maternal stress also seems to affect other hormones involved in milk production, including prolactin (39).

Anita et al., showed an increase in prolactin production followed by massaging the pressure points (LU1, CV17). They also showed that ST 36 massage was effective in breast milk flow. The findings of this study indicate that breast milk production can be accelerated if this acupressure is performed properly (40). Many studies have demonstrated the positive effect of acupuncture and acupressure on improving sleep quality (41, 42). Mothers experience postpartum sleep changes and increased levels of fatigue due to nocturnal feeding in infants. Mothers cannot get enough sleep during this period, which may interfere with the milk production and energy needed during breastfeeding (43). It is obvious that improving the sleep status of breastfeeding mothers, following the acupuncture and acupressure interventions, has a favorable effect on increasing breast milk volume. Emphasizing the importance of

breastfeeding for maternal and infant health, WHO has always recommended that all infants be exclusively breastfed for the first six months of life; thereafter, they should be given nutritious complementary foods and continue breastfeeding up to the age of two years. However, women breastfeed their babies for 24 months in less than 3% of cases. One of the most common factors associated with early cessation of breastfeeding is the presence of breast problems during breastfeeding period and insufficient breast milk supply (32). Therefore, the importance and necessity of treating breast disorders and ways to increase breast milk supply in breastfeeding mothers is felt more than ever. On the other hand, it is not recommended to use pharmacological methods during breastfeeding period due to their effect on milk, consumption restrictions, and side effects (7). Considering the side effects of drugs, medical science is looking for the simplest, easiest, and most effective treatments. Considering their ease of use, low cost, and no side effects, acupressure and acupuncture can be a good alternative for the treatment of breastfeeding-related breast disorders and also increase the breast milk volume.

5- CONCLUSION

Treatment with acupuncture and acupressure on GB21, LI4 and SI1, ST17 and CV18 acupoints, could improve milk volume. Also, combination of acupressure and affirmation relaxations or co-administration of acupressure and oxytocin massage could improve breast milk production. Acupressure and acupuncture can decrease breast engorgement and breast pain this method might be applied as a non-pharmacological method for breast engorgement and breastfeeding problem in postpartum mothers. Health providers should be professional in this method and suggest it to mothers suffering postpartum

breast engorgement and breastfeeding problem.

6- CONFLICT OF INTEREST: None.

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