ORIGINAL ARTICLE

# Back Acupressure, Baby Positioning and Latching, and Breast Massage Increase Breast Milk Production: A Controlled Clinical Trial

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## ABSTRACT

**Background and Objective.** Factors that can affect breast milk production include food intake, baby suckling, breast massage, breast anatomy, peace of mind and soul, and rest. Efforts to increase breast milk production can be pharmacological or non-pharmacological therapies. One non-pharmacological method is to use complementary therapy. The aim of this study was to assess the effects of back acupressure, baby attachment position, and breast massage on breast milk production.

**Methods.** This study used a controlled clinical trial design. We recruited 100 breastfeeding mothers, and divided them into two groups of 50 each. In the treatment group, back acupressure, baby attachment position, and breast massage were performed. The control group did not receive any intervention, they only followed the usual breastfeeding practices. Data analysis comparing the pre-test and post-test breast milk production utilized the Wilcoxon Test. The significance level was set at $p < 0.05$.

**Results.** All respondents completed the four-week study period. Back acupressure, baby attachment position, and breast massage significantly increased breast milk production ($p = 0.00$, Wilcoxon Test).

**Conclusion.** The findings of this study demonstrated that back acupressure, correct baby attachment positioning, and breast massage significantly increased breast milk production in breastfeeding mothers. These non-pharmacological therapies show promise in enhancing lactation. Further research should explore the optimal frequency and duration of these interventions to maximize their effectiveness in promoting breast milk production.

*Keywords: acupressure, breast, massage, lactation*

## INTRODUCTION

The World Health Organization (WHO) and The American Academy of Pediatrics (AAP) reiterate their recommendations for exclusive breastfeeding for about six months.[1] The mother continues to breastfeed followed by complementary food of breastfeeding when the baby is 6-12 months old.[1] Breast milk is the food with the best nutritional content according to the baby's needs. The basic capital for forming a quality human being begins in the womb. After the baby is born, it is important to provide exclusive breastfeeding until the child is six months old. Breastfeeding continues until the child is two years old.[2,3]

Breast milk production is influenced by various factors including oxytocin massage and breast care,[4] the physiological principles of breastfeeding and the self-confidence of breastfeeding mothers,[5] foods consumed by mothers such as Moringa leaves,[6] dates, soybeans, oats,[7] maternal psychological

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factors, frequency of breastfeeding and baby attachment,[3,8] breast anatomy (nipple shape),[9,10] and the mother's attitude to breastfeeding.[11] Breast milk production on the first day until the second day is generally still very small. However, on the fifth day, there will be an increase of around 500 ml. In the second week, the increase is around 600-690 ml, and in the third to fifth month, the increase is around 750 ml. Breast milk is produced according to the baby's need for necessary nutrients. If the baby's needs increase, breast milk production will also increase according to the frequency of breastfeeding. The more often the baby breastfeeds, the more milk production occurs. On the other hand, if the baby gets additional food besides breast milk or the frequency of breastfeeding is reduced, then breast milk production also decreases.[12,13]

Women who have given birth need special skills in caring for their babies, especially if they are giving birth for the first time. The skills needed are related to caring for the baby being born, including the breastfeeding process, namely the correct position and attachment of the baby, postpartum breast massage, or providing complementary techniques such as oxytocin massage, endorphin massage, or back acupressure. The recommended frequency for postpartum breast massage, oxytocin massage, endorphin massage, or back acupressure is every day and should be done continuously. These complementary therapies can help mothers be more confident in increasing breast milk production.[14]

The low coverage of exclusive breastfeeding is influenced by many factors which include the mother's intention to breastfeed her baby[15], promotional factors for formula milk and cultural values,[16–18] it is customary to give mashed bananas when babies are four months old to make them fuller and increase their strength,[19] culture of giving pacifiers, giving prelacteal intake,[20,21] the assumption that formula milk is better, a healthy baby is a fat baby, mothers do not want to breastfeed because they are afraid that the shape of their breasts will no longer be attractive,[22] imitating friends giving formula milk and the opinion that breastfeeding is outdated,[23] and family habits.[24]

Exclusive breastfeeding is a global problem and affects infant morbidity and mortality rates. Despite this, only about 2/5 of babies worldwide are exclusively breastfed and only about 2/3 of babies are introduced to solid foods at the right time. WHO data shows that the average rate of exclusive breastfeeding in the world is 38%.[25] Year 2020 data on exclusive breastfeeding in Indonesia showed 66.1% which was still below the national target of 80%.[25] Meanwhile, data on the same year showed exclusive breastfeeding in East Java and Sidoarjo Regency were 61% and 64%, respectively.[26] Coverage of exclusive breastfeeding has decreased due to the COVID-19 pandemic, resulting in a reduction in IMD (early initiation of breastfeeding) which resulted in a lack of breast milk production.

After giving birth, a mother needs special skills to care for her baby, provides breast milk correctly, both in position and attachment, and requires complementary therapies which are currently being developed, such as back acupressure, especially for breastfeeding mothers. Complementary therapies commonly carried out by health workers include oxytocin massage, endorphin massage, and oketani massage. Topung is a type of complementary therapy to prevent various diseases and provide a comfortable effect.[27]

Efforts that have been made to increase breast milk production include implementing early initiation of breastfeeding, correct positioning and latching of the baby, consuming vegetables (katuk leaves, papaya leaves, torbangun leaves, beluntas), nuts, herbal medicine (jamu uyup-uyup, gepyok), drinking lots of water,[21] as well as providing complementary therapies such as tuina massage for postpartum mothers,[28] oxytocin massage with breast care,[4] back massage therapy and acupressure[29]. Back acupressure therapy, baby latching positions, and breast massage are a combination of efforts to help breastfeeding mothers launch and increase breast milk production. These three actions are performed simultaneously because back acupressure can help relieve stress and increase blood flow to the breast area, which can stimulate breast milk production. Meanwhile, the correct baby latching position is crucial to ensure that the baby can effectively suckle, thereby increasing stimulation to the breast and milk production. Breast massage helps stimulate the mammary glands, improve milk flow, and prevent clogged milk ducts. By combining these three actions, it is hoped that the benefits of each method will complement each other and provide more optimal results in increasing breast milk production in breastfeeding mothers.

The aim of the research is to analyze the effect of back acupressure, baby attachment position, and breast massage on breast milk production. The simultaneous implementation of back massage, correct baby positioning and attachment, and postpartum breast care is crucial because these interventions complement each other to enhance milk production and maternal and infant health. Back massage can help improve blood circulation and stimulate the nervous system, contributing to maternal health and well-being. Correct baby positioning and attachment ensure that the baby can effectively suckle, which is essential for stimulating milk production and preventing issues such as engorgement or mastitis. Meanwhile, postpartum breast care like breast massage can reduce discomfort and prevent breast complications. In combination, these actions can increase milk production, ensure the baby receives adequate nutrition, and support maternal breast health.

## METHODS

The research received the ethical approval (Reg. No.: 353/KEPK-POLKESMA/2022) and was carried out in July-August 2022and in Balongdowo village, Candi District, Sidoarjo Regency. The intervention was conducted at the respondents' homes.

This study used a controlled clinical trial design. The indicators used to assess pre-test and post-test related to breast milk production, aside from milk volume, include nipple condition (clean or dirty), milk ejection reflex when areola is pressed (spraying or dripping), baby's weight gain (increase, remain the same or decrease), frequency of breastfeeding per day, and whether the baby is still crying or sleeping peacefully after being breastfed. The independent variables in this study are back acupressure, baby attachment position, and breast massage. The dependent variable is breast milk production.

The interventions in this study were providing back acupressure, baby positioning, and breast massage at one time for the treatment group. Meanwhile, the control group did not take any action. The research population was breastfeeding mothers. This study used a purposive sampling technique, in accordance with the inclusion criteria and exclusion criteria.[30] Inclusion criteria include breastfeeding mothers who are willing to be research respondents, breastfeeding mothers who gave birth spontaneously, mothers who are breastfeeding babies aged 0-6 months. The exclusion criteria are mothers who are breastfeeding babies older than 6 months. The sample size was determined based on the Gay method - for the experimental method, the sample size for each group was a minimum of 30 subjects.[31] Respondents were randomly selected for the intervention or control group through a lottery process. Researchers recruited respondents through information on breastfeeding mothers from midwives in the village area. The research was carried out within one month. During the study period, there were five respondents who withdrew because they had to return to work, but the researchers immediately found replacements.

Figure 1 shows the areas where back acupressure was performed on the respondents.

Analysis of research data was done using the Wilcoxon Test.[31] To avoid missing data, data entry of respondents was done carefully and meticulously, and data storage was managed properly.

The back acupressure was carried out by the research team members who have completed training in back acupressure massage. The research team was assisted by ten integrated service post cadres who had been trained in back acupressure and certified as qualified. All of them are females. Back acupressure is done once a week for one month. The duration of the back acupressure is around 15-20 minutes. Pressure is applied to the back area by pressing and vibrating using the fingertips at certain points in the T1-T6 back area.

Next, monitoring is carried out for the baby's position and attachment during the first three days after the research team explains the correct position and attachment. After the breastfeeding mother does it correctly, monitoring is carried out once a week for one month. The duration of breastfeeding is around 15-20 minutes. The correct position for breastfeeding is to hold the baby with one arm. Place the baby's head near the elbow of the mother, and support the baby's bottom with the mother's hand. The baby's stomach should be in contact with the mother's body. The baby's mouth should be in front of the mother's nipple. The lower arm should be wrapped around the mother's body, avoiding the space between the mother and the baby. The upper hand can be held by the mother or placed on the mother's chest. The ear and upper arm should be in a straight line. This position ensures that the baby is properly attached and comfortable during breastfeeding, allowing for efficient milk transfer and reducing the risk of discomfort or pain for both the mother and the baby. The correct attachment of a baby during breastfeeding is the baby's chin should be in contact with the mother's breast. The mouth should be open wide. Significant portion of the areola, particularly the lower part, should be inserted into the baby's mouth. The baby's lower lip should be folded outward. The baby's upper lip should not be puffed out, indicating that the baby is not sucking effectively, but rather compressing the breast. There should be no audible sucking sound, only the sound of swallowing.

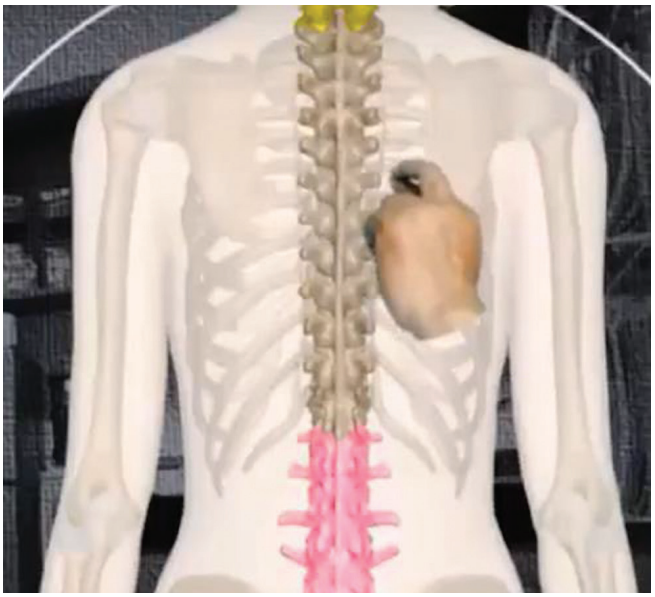

**Figure 1.** Back acupressure area.

*Source: https://www.youtube.com/watch?v=y7dZ9O-wsl4*

Breast massage was carried out by the research team at the first meeting, then continued by breastfeeding mothers. Breast massage is done twice a week for one month. Using baby oil on both palms, place both hands between the breasts, massaging from the middle to the top while lifting both breasts and releasing them slowly (done 10-20 times). Next, massage the breast with the little finger from the base towards the nipple (done 10-20 times). Then massage the breast with the side of the knuckles from the base towards the nipple (done 10-20 times). Once finished, compress the breasts with warm water and then cold water alternately for about five minutes. The duration of breast massage is around 15-20 minutes.

Breast milk production was measured using a manual breast pump performed before mothers breastfed their babies. Subsequently, it was measured using a measuring cup. The expressed breast milk was given to the baby using cup feeding.

## RESULTS

### Characteristics of Respondents

Table 1 shows that the majority of respondents both in the treatment (68%) and control (64%) groups belong to the 25-34-year age group. The highest level of education in the treatment group and control group is senior high school, with respective percentages of 66% and 48%. The majority of respondents in both groups are not working. The highest parity in both groups is two births (56%). The most common method of delivery in the treatment group (76%) and control group (68%) is normal spontaneous delivery.

Figure 2 shows that the breast milk production of the control group (group 1 - blue) was a maximum of 135 ml and a minimum of 50 ml. Meanwhile, the breast milk production of the treatment group (group 2 - red) before the procedure was a maximum of 120 ml and a minimum of 55 ml.

Figure 3 shows that the control group's (Group 1 - blue) breast milk production was a maximum of 125 ml and a minimum of 58 ml. Meanwhile, the treatment group's (Group 2 - red) breast milk production after the procedure was a maximum of 125 ml and a minimum of 72 ml.

Figure 3 shows that there were 34 respondents in the control group's (group 1 – blue) breast milk production who experienced a decrease in breast milk production of between 2-22 ml. Meanwhile, breast milk production in the treatment group's (group 2 – red) after the action was carried out increased by between 2-36 ml.

Table 2 shows that there is a significant difference in breast milk production between the treatment group before and after the intervention, with a p-value of 0.000 (Asymp. Sig. (2-tailed)). This indicates that the intervention had a

**Table 1.** Characteristics of Respondents at Balongdowo Village Sidoarjo Regency, July-August 2022

| Variable | N | | Percentage | |
|---|---|---|---|---|
| | Treatment Group | Control Group | Treatment Group | Control Group |
| ***Age (years)*** | | | | |
| <25 | 7 | 7 | 14 | 14 |
| 25-34 | 34 | 32 | 68 | 64 |
| 35-45 | 9 | 11 | 18 | 22 |
| ***Education*** | | | | |
| Elementary school | 2 | 3 | 4 | 6 |
| Junior high school | 15 | 23 | 30 | 46 |
| Senior high school | 33 | 24 | 66 | 48 |
| ***Activity*** | | | | |
| No work | 33 | 30 | 66 | 60 |
| Work | 17 | 20 | 34 | 40 |
| ***Number of children*** | | | | |
| 1 | 20 | 18 | 40 | 36 |
| 2 | 28 | 28 | 56 | 56 |
| 3 | 2 | 4 | 4 | 8 |
| ***Childbirth*** | | | | |
| Spontaneous delivery | 38 | 34 | 76 | 68 |
| Caesarean section | 12 | 16 | 24 | 32 |

**Table 2.** Wilcoxon Signed Rank Test

| Variable | After-Before |
|---|---|
| *Z* | -3.735[b] |
| *Asymp. Sig. (2-tailed)* | 0.000 |

**Table 3.** Descriptive Statistics

| Group | N | Mean | Minimum | Maximum |
|---|---|---|---|---|
| ***Control*** | | | | |
| Before | 50 | 90.34 ml | 135 ml | 125 ml |
| After | 50 | 86.20 ml | 50 ml | 58 ml |
| ***Treatment*** | | | | |
| Before | 50 | 86.20 ml | 120 ml | 125 ml |
| After | 50 | 93.96 ml | 55 ml | 72 ml |

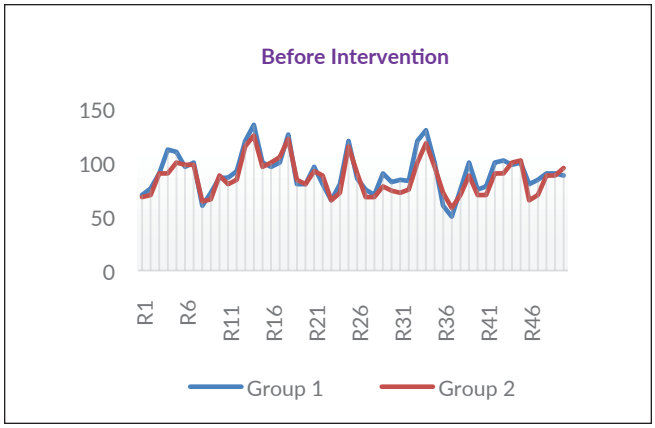


**Figure 2.** Data on breast milk production before intervention.

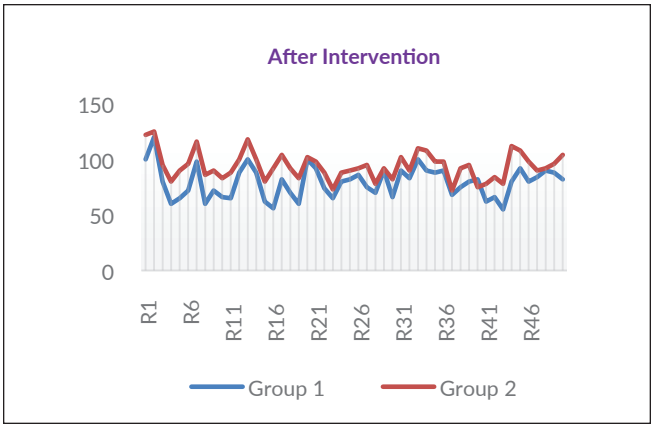


**Figure 3.** Data on breast milk production after intervention.

significant impact on increasing breast milk production in the treatment group.

Table 3 shows that the average breast milk production in the control group at the beginning of the session was 90.34 ml and one month later was 86.20 ml. In the treatment group, the average breast milk production before treatment was 86.20 ml and after treatment was 93.96 ml.

Table 4 shows that in the control group, there were minimal changes, including the nipple condition being clean from 78% to 82%, the areola condition spraying from 56% to 60%, the baby's weight increasing from 16% to 20%, the frequency of breastfeeding 8 times or more from 36% to 42%, and the baby's condition after breastfeeding being asleep from 70% to 76%. In the treatment group, there was a significant improvement in conditions before and after treatment, including the nipple condition being clean from 66% to 90%, the areola condition spraying from 64% to 76%, the baby's weight increasing from 24% to 38%, the frequency of breastfeeding 8 times or more from 38% to 56%, and the baby's condition after breastfeeding being asleep from 78% to 88%.

**Table 4.** Respondent Data before and after Treatment

| Group | N | | Percentage | |
|---|---|---|---|---|
| | Before | After | Before | After |
| **Control** | | | | |
| ***Nipple*** | | | | |
| Clean | 39 | 41 | 78 | 82 |
| Dirty | 11 | 9 | 22 | 18 |
| ***Areola*** | | | | |
| Spraying | 28 | 30 | 56 | 60 |
| Dripping | 22 | 20 | 44 | 40 |
| ***Baby's weight*** | | | | |
| Increased | 8 | 10 | 16 | 20 |
| Remained the same | 33 | 35 | 66 | 70 |
| Decreased | 9 | 5 | 18 | 10 |
| ***Frequency of breastfeeding*** | | | | |
| 8 times or more | 18 | 21 | 36 | 42 |
| 6-7 times | 32 | 29 | 64 | 58 |
| ***Baby's condition after breastfeeding*** | | | | |
| Sleeping | 35 | 38 | 70 | 76 |
| Crying | 15 | 12 | 30 | 24 |
| **Treatment** | | | | |
| ***Nipple*** | | | | |
| Clean | 33 | 45 | 66 | 90 |
| Dirty | 17 | 5 | 34 | 10 |
| ***Areola*** | | | | |
| Spraying | 32 | 38 | 64 | 76 |
| Dripping | 18 | 12 | 36 | 24 |
| ***Baby's weight*** | | | | |
| Increased | 12 | 19 | 24 | 38 |
| Remained the same | 31 | 22 | 62 | 44 |
| Decreased | 7 | 9 | 14 | 18 |
| ***Frequency of breastfeeding*** | | | | |
| 8 times or more | 19 | 28 | 38 | 56 |
| 6-7 times | 31 | 22 | 62 | 44 |
| ***Baby's condition after breastfeeding*** | | | | |
| Sleeping | 39 | 44 | 78 | 88 |
| Crying | 11 | 6 | 22 | 12 |

## DISCUSSION

The research results show that back acupressure, baby positioning and latching, breast massage influence breast milk production with a significance value of 0.000. Back acupressure is a type of complementary therapy carried out in the back area. The aim of the back acupressure is to break down fat deposits in the blood vessels which inhibit blood circulation and stimulate the back nerves. Blood is responsible for delivering nutrients and oxygen to body cells. When blood flow is disrupted, the supply of nutrients and oxygen needed by body cells will be disrupted. Massage or pressure and vibration carried out for around 15-20 minutes can increase the feeling of comfort and relaxation for nursing mothers, thus stimulating the release of endhorpine hormones which have a calming effect on nursing mothers. An increase in the hormone endorphin can stimulate the release of the hormone oxytocin so that breast milk production in breastfeeding mothers increases.[32] Providing stimulation in the form of piercing certain points or nerve nodes centered in the back area, is directly connected to complaints of disease or organs that are experiencing problems so that it can facilitate breast milk production for breastfeeding mothers who experience obstacles in breast milk production.[33] In line with research by Kuswati & Istikhomah (2017) shows that there is an increase in breast milk production by doing breast acupressure and oxytocin massage.[34] The study conducted by Ahmad, M, et all (2023) also shows that back massage and acupressure can increase breast milk production in postpartum multipara mothers. This study used a quasi-experimental design and involved 30 postpartum multipara mothers, divided into two groups: a group that received back massage and acupressure, and a control group. The study's results showed that the group that received back massage and acupressure had a higher level of breast milk production compared to the control group.[35]

The correct breastfeeding position is that the baby's earlobe and upper arm are in a straight line (if a line is drawn). Meanwhile, the correct attachment is that most of the areola enters the baby's mouth, the baby's mouth is wide open, the baby's lips are folded out when breastfeeding, the baby's chin is pressed against the mother's breast, and the baby's cheeks are puffed out because they are expressing breast milk. Research conducted by Untari (2017) shows that the success of exclusive breastfeeding is supported by good knowledge and insight possessed by the mother.[36] In addition, information support from health workers makes mothers more optimistic in facing obstacles in breastfeeding.[37,38]

Postpartum breast massage is an action or effort that mothers can take so that their breasts are in good condition and ready to produce breast milk and be breastfed by the baby. Postpartum breast massage is useful for stimulating the breasts and improving blood circulation, thereby influencing

the pituitary to release the hormones prolactin and oxytocin. The hormone prolactin from the anterior pituitary will affect the amount of breast milk produced. Meanwhile, the hormone oxytocin from the posterior pituitary will influence the process of producing breast milk.[39] Postpartum breast massage also cares for the nipples of nursing mothers to keep them clean and prevents blisters. Research conducted by Fatmawati, et al (2019) shows that breast milk production increases after breast massage.[39]

According to researchers, regular back acupressure can stimulate endorphin hormones because breastfeeding mothers can feel relaxed and comfortable, thereby stimulating the release of oxytocin hormone. Additionally, back acupressure can also increase blood flow to the breast, making it possible for milk production to increase. Therefore, back acupressure can help increase milk production and ensure that the baby receives sufficient nutrition. Besides, the correct position and placement of the baby can also stimulate the hormone oxytocin, leading to increased milk production. The correct position can help the baby suckle milk more effectively, making it possible for milk production to increase. The correct placement can also help reduce pain and discomfort in the breast, allowing the breastfeeding mother to feel more comfortable and relaxed. The correct position and placement of the baby can help increase milk production and ensure that the baby receives sufficient nutrition.

Breast massage during the breastfeeding period can increase milk production and prevent nipple soreness, ensuring that the baby's nutritional needs are met optimally. Breast massage can help reduce pain and discomfort in the breast, allowing the breastfeeding mother to feel more comfortable and relaxed. Additionally, breast massage can also help improve blood flow to the breast, making it possible for milk production to increase. Breast massage can also help increase milk production and ensure that the baby receives sufficient nutrition.

Therefore, regular back acupressure, supported by the correct position and placement of the baby during breastfeeding, can help increase milk production and ensure that the baby receives sufficient nutrition. The correct position can help the baby suckle milk more effectively, making it possible for milk production to increase. Meanwhile, the correct placement can also help reduce pain and discomfort in the breast, and allow the breastfeeding mother to feel more comfortable and relaxed. Therefore, the combination of these three actions can help increase milk production and ensure that the baby receives sufficient nutrition.

The limitations of this study are that the researchers did not measure the nutritional status of breastfeeding mothers before recruiting them as respondents, which could lead to bias. Additionally, the control group received sufficient family support, allowing their breast milk production to still meet the nutritional needs of the baby. Furthermore, the lack of randomization introduces the potential for performance bias, as the control group may have engaged in other maneuvers due to not receiving the intervention, while the treatment group might have received psychological boosts knowing they were receiving the intervention, thereby increasing breast milk production.

## CONCLUSION

Back acupressure, baby positioning and latching, and breast massage which were carried out for four weeks at a frequency of twice a week with a total duration of around 60 minutes, can increase breast milk production for breastfeeding mothers. These methods make breastfeeding mothers feel comfortable and relaxed whichcan stimulate lactation hormones to increase breast milk production.

### Statement of Authorship

All authors participated in data collection and analysis and agreed to the final version submitted.

### Author Disclosure

All authors declared no conflicts of interest.

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