



Original Article

Effectiveness of warm herbal compress on oxytocin hormone and breast milk production

Setyo Mahanani Laksonowati^{1✉}, Runjati¹, Ta'adi¹, Donny Kristanto Mulyantoro², Kholifah³

¹ Postgraduate Program in Applied Health, Poltekkes Kemenkes Semarang, Central Java, Indonesia

² Magelang Health Research and Development Center, Central Java, Indonesia

³ Batang III Public Health Center, Central Java, Indonesia

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CORRESPONDENCE

Phone: +6281215570859

E-mail: mahanani.setyo@gmail.com

ABSTRACT

Background: Breast milk is the best food for babies, needed for optimal growth and development. The lack of milk production influences the low coverage of exclusive breastfeeding. Increasing breast milk production could be done non-pharmacologically, using warm herbal compresses as breast care.

Purpose: Analyze the effect of warm herbal compresses as breast care on oxytocin hormone and postpartum mother's milk production.

Methods: Quasi-experimental design pretest-posttest with the control group, respondents were 36 normal mothers on the third day of postpartum; 18 respondents intervention group, and 18 respondents control group. Warm herbal compresses were provided once per day with 20 minutes on each breast for three days. The oxytocin hormone was measured pre and post three days of treatment, the volume of breast milk was measured pre, post 2, and 3 days of treatment.

Results: The intervention group's average difference in oxytocin hormone was 24.65 pg/ml, the control group was 2.48 pg/ml ($p < 0.01$). The average increase in milk production pre and post-three days of treatment in the intervention group was 32,250 ml. In the control group, 26,472 ml ($p < 0.01$), there was a significant difference in the average milk production between the two groups.

Conclusion: Warm herbal compresses as breast care affects the oxytocin hormone and postpartum mother's milk production.

INTRODUCTION

Breast milk is the best food for babies because the nutrients in breast milk, such as protein, white blood cells, and immune substances, are suitable for optimal growth and development. Mothers who give exclusive breastfeeding have significantly contributed to the prevention of cases of 1/3 (one third) of the incidence of upper respiratory tract infections, reduced the incidence of diarrhea by 50%, reduced the incidence of intestinal disease in infants born prematurely by 58% and mothers with the risk of breast cancer can also decrease to 6-10%.¹

Data on the percentage of exclusive breastfeeding in 2019 in Central Java shows that 66.0% of babies 0-6 months have been given exclusive breastfeeding. One area in <https://doi.org/10.30595/medisains.v19i3.12007>

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Data on the percentage of exclusive breastfeeding in 2019 in Central Java shows that 66.0% of babies 0-6 months have been given exclusive breastfeeding. One area in Central Java Province with coverage of exclusive breastfeeding is still below 66% is Pekalongan Regency, 57.2%. When viewed from the data on the coverage of the provision of Early Breastfeeding Initiation (IMD), Pekalongan Regency ranks third highest with total Early Breastfeeding Initiation coverage of 95.7%. However, the coverage of exclusive breastfeeding in the region occupies the eighth-lowest position in exclusive breastfeeding from a total of 35 regions in Central Java Province.² Therefore, efforts are needed to help increase exclusive breastfeeding so that the coverage is high when giving Early Breastfeeding Initiation and when giving exclusive breastfeeding.

One of the reasons for the low coverage of exclusive breastfeeding is the delayed production of breast milk after delivery and the lack of milk production.³ The lack of breast milk production is a reason to stop breastfeeding because the mother is worried that she will not be able to meet the nutritional needs of her baby, it can increase the possibility of the mother giving other foods to infants before the baby reaches the age of safety to be given additional food other than breast milk.⁴

Efforts are needed to support increased milk production, such as pharmacological or non-pharmacological.³ Pharmacological actions with the consumption of breast milk promoters such as domperidone, metoclopramide, sulphuride, chlorpromazine, and Thyrotrophin-Releasing Hormone (TRH) have several side effects, including headaches, dry mouth, and abdominal pain. Mothers who do not breastfeed will experience symptoms related to the prolactin hormone, such as gynecomastia, galactorrhea, breast tension, and irregular menstruation.⁵ Non-pharmacological measures to increase milk production using massage methods or suggestive therapy like Stimulating Massage Endorphin, Oxytocin, and Suggestive Method (SPEOS)⁶ have been shown to increase milk production. However, in its implementation, it is not too easy because it requires trained personnel or expertise and understanding of the exact location of massage points so that therapy can produce results.

Another alternative to increase breast milk production non-pharmacologically can use warm herbal compresses, namely non-pharmacological management with Ayurveda principles (principles that pay attention to aspects of the body, mind, and spirit) by utilizing herbal mixtures.⁷ Warm herbal compresses can be done independently by postpartum mothers and can increase the flow of breast milk to the glands used as milk producers. Another benefit is that it stimulates the letdown reflex, prevents the occurrence of breast dams that can cause swollen breasts, and provides smooth blood circulation in the breast area.⁸

Previous research regarding warm herbal compresses on the duration of colostrum expenditure in postpartum mothers <24 hours proved the average duration of colostrum expenditure in respondents who received hot herbal compress therapy was 21 hours 49 minutes, while for mothers who only breastfed their babies every 2-3 hours, namely 30 hours 37 minutes.⁷ Another study showed that giving one time a combination of hot herbal compress for 10 minutes for each breast followed by traditional Thai breast massage to postpartum mothers for 48 hours can increase milk production than the combination of breast massage with a mini hot bag compress.⁹

The difference between this study and the previous one is that this study measures oxytocin not in terms of the duration of colostrum release but in an objective way, namely

measuring levels of the hormone oxytocin in the mother's blood and measuring milk production obtained from the mother's expressed breast milk which is measured after the baby has finished breastfeeding. This study aims to determine the effect of breastfeeding intervention in warm herbal compresses on increasing levels of the hormone oxytocin and breast milk production in postpartum mothers.

METHOD

Study Design

This is a Quasy Experimental study with a pretest and posttest control group design.

Setting and Respondents

This research was conducted in the working area of Pan-Inggaran Health Center and Kajen II Health Center, Pekalongan Regency, with a population of 3 days postpartum mothers. The research sample consisted of 36 postpartum mothers divided into two groups, namely 18 respondents in the breast care intervention group in the form of warm herbal compresses and 18 respondents in the control group with breastfeeding every 2-3 hours. Inclusion criteria in this study were three days postpartum mother, no history of allergy to herbal ingredients, BMI > 18.5-25 kg/m² and upper arm circumference > 23.5 cm, and having a baby with birth weight > 2500 gr. The exclusion criteria for this study were that the mother had breast problems, the baby was given formula milk, the baby did not live with the mother, or the baby was still in the hospital because of the baby's health problems.

Experimental Procedure

The herbal compress comprises 90 grams of bangle rhizome, 36 grams of lime peel, 18 grams of lemongrass leaves, 18 grams of turmeric, 18 grams of white turmeric, 4 grams of salt, 6 grams of camphor. The intervention was carried out by providing education to respondents about how to apply compresses, including the location of administration; compresses were carried out one time per day in the morning at the same time, the contact time for each point was 10 seconds with a duration of 20 minutes for each breast¹⁰ for three days. The temperature of the warm herbal compress given as a breast treatment is 37⁰c-40.5⁰c¹¹. Before being given, the bottom of the herbal compress is soaked in plain water for ±1 minute, then lightly pressed so that the herbal ingredients are stretched and moistened, then steam the herbal compress at 100⁰c for 10 minutes before being given. The control group was provided standard lactation management care according to the MCH handbook guidelines.

The Variable, Instrument, and Measurement

The variables measured in this study were oxytocin hormone levels in the blood and postpartum mother's milk

production. The hormone oxytocin is calculated pre and post-intervention through the ELISA method. The amount of expressed breast milk assesses breast milk production after the mother breastfeeds her baby using a breast pump.

Statistical Analysis

To determine the difference in oxytocin levels and milk production between groups, the Mann Whitney test and Independent T-Test.

Ethical Consideration

This research has been registered with the Research Bioethics Commission of Poltekkes Kemenkes Semarang with the Ethical Clearance number 092/EA/KEPK/2021.

RESULTS

Figure 1 shows the level of the hormone oxytocin in the blood in respondents who were given warm herbal compresses and in respondents with standard lactation management. From the graph shown, it can be seen that in the warm herbal compress group before treatment, the level of the hormone oxytocin was 149.91 pg/dl. After three days of treatment, it increased to 174.56 pg/dl with the difference in the average level of the hormone oxytocin in the blood between before and after three days of compressing. Warm herbs as breast care were 24.65 pg/dl. In the group that received standard lactation management, the average oxytocin hormone level before treatment was 126.73 pg/dl; after three days was 129.21 pg/dl with a difference in the average oxytocin hormone level 2.48 pg/dl. The Mann-Whitney test result showed a significant difference before and after treatment between the warm herbal compress group and the lactation management group according to standards ($p < 0.01$).

Figure 2 illustrates an increase in breast milk production in both groups after three days of treatment. In the warm

herbal compress group, there was an increase in the average difference in milk production of 15.50 ml between before and after two days of treatment. There was an increase in the difference in the average milk production from the second to the third day, which was 16.75 ml, and an increase in the difference in the average milk production between before and after three treatments 32.25 ml. According to the standard, in the lactation management group, there was also an increase in milk production. However, the increase was lower than the warm herbal compress group. This is evidenced by the difference in the average milk production before and after two days of treatment is 14.77 ml; the difference in the average milk production after two days of treatment with three days of treatment is 11.69 ml. The difference in the average milk production increase before and after three days of treatment is 26.47 ml. The Independent T-Test test result showed a significant difference in milk production between the warm herbal compress group and the standard lactation management group ($p < 0.01$).

DISCUSSION

This study indicates that giving warm herbal compresses as breast care can increase levels of the hormone oxytocin and postpartum mother's milk production ($p < 0.01$). Warm herbal compresses can conduct heat (conduction) due to the phytochemical composition of the materials used. Warm herbal compress ingredients cause a hot effect, and some respondents stated that there was a slight spicy effect when touching the skin. Hot stimulation on the skin can cause vasodilation of blood vessels, increase blood circulation and stimulate the secretion of oxytocin released by the posterior pituitary, which then causes the myoepithelium in the mother's breast to contract so that milk can be pushed through the lactiferous ducts and sinuses and then out of the breast.¹²

The effect of heat will cause liquids, solids, and gases to expand in all directions and can increase chemical-

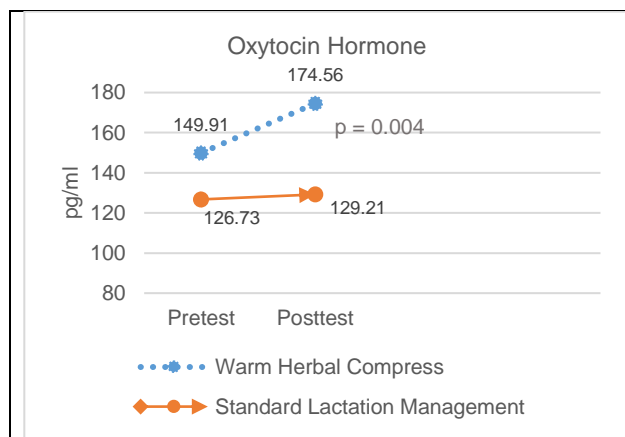


Figure 1. Changes in Average Oxytocin Hormone

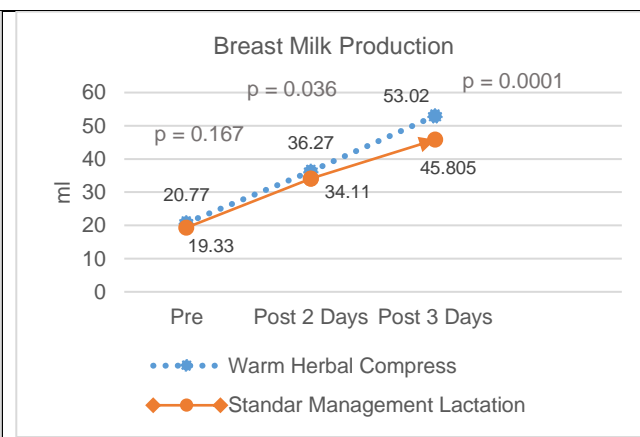


Figure 2. Changes in Average Breast Milk Production

reactions in tissues, resulting in metabolism and increased exchange of body chemicals with body fluids. The biological effect of heat can cause dilation of blood vessels resulting in increased blood circulation. Physiologically the body's response to heat is to reduce blood viscosity,¹³ cause blood vessel dilation, decrease blood viscosity, reduce muscle tension, increase tissue metabolism and increase capillary permeability.¹⁴

Stress can inhibit the milk ejection reflex, which causes the mother's milk production to be less. Mothers who feel stressed about their milk production should be helped to release it using relaxation techniques such as deep breathing, gentle massage, and listening to their favorite music to encourage the milk ejection reflex.¹⁵ Another advantage is that the herbs used as raw materials for compresses contain essential oils that function as aromatherapy.

Aromatherapy has a positive effect because the refreshing and fragrant aroma can stimulate the sensory nerves and receptors in the nose; then gives orders to the brain that controls emotions and memory and provides information to the hypothalamus, which regulates the body's internal systems, including the sexuality system, body temperature, and reactions to stress. Inhaling aromatherapy can reduce a person's level of anxiety because aromatherapy has unique pharmacological effects, including as a sedative, antibacterial, antiviral, diuretic, vasodilator, and stimulates the adrenals.¹⁶ The aroma of essential oils has a positive effect on the central nervous system by inhibiting the release of Adreno Corticotrophic Hormone (ACTH). This hormone causes anxiety in a person.¹⁷

The application of breast care in warm herbal compresses has many advantages. Warm compresses given to the breast can stimulate the sensory nerve ring and then send a signal to the hypothalamus to be forwarded to the pituitary to stimulate the alveolus cells to produce milk. Warm herbal compresses are known as non-pharmacological efforts to increase breast milk production because they can increase blood flow, local metabolism, remove metabolic waste in the body, facilitate nutrition and tissue renewal, as well as phagocytosis.¹⁸

In addition, the content of *terpinen-4-ol*, *sesquiphellandrene*, *monoterpene*, *delta cadinene*, and *elemol* in herbal compresses can also stimulate the pituitary gland and central nervous system to produce endorphins which play a role in creating feelings of pleasure, comfort, and relaxation for mothers when breastfeeding the baby, so that the breastfeeding process can run smoothly.¹⁹ Based on the theory that the mother's psychological conditions such as relaxation and peace of mind affect the production of the hormone oxytocin. The provision of breast care to increase milk production with the principle of improving blood circulation and preventing blockage of milk-producing alveolar

cells should be initiated during pregnancy.²⁰ Warm compresses given to the breast area can stimulate the sensory nerve ring and then send a signal to the hypothalamus to be forwarded to the pituitary to stimulate hormones that stimulate the alveolus cells to produce milk. An increase in blood circulation in the breast area causes more oxytocin to flow into the breast and makes breastfeeding smoother.²¹

The results of this study are supported by research conducted at Sakon Nakhon Hospital Thailand, which showed that the intervention group given hot herbal compress was able to shorten the duration of colostrum expenditure to 21 hours 49 minutes compared to the control group breastfeeding mothers on demand, which was 30 hours 37 minutes.⁷ Another study in Thailand also showed that Hot Herbal Compresses could speed up the release of breast milk in postpartum mothers with an average difference of 394,425 minutes of milk expulsion.⁸ The results of studies related to breast milk production are also supported by the results of research conducted at the Semarang City Health Center, which showed that giving warm herbal balls combined with cold cabbage leaves could increase the volume of breast milk from 15.27 ml to 53.6 ml ($p < 0.05$), which means that the combination of warm herbal balls with cold cabbage affects increasing breast milk production in postpartum mothers who experience breast milk damming.¹⁹

In addition, the results of research conducted at the Tomo Health Center, Sumedang Regency also showed that warm bra treatment could facilitate the release of breast milk by an average of 9.20 ml ($p < 0.05$), which means that warm bra care has more effect on the smoothness of breast milk in the mother 3-4 days postpartum.²² The results of this study are also in line with research conducted in Turkey which showed that breast milk production from breasts given warm compresses increased breast milk to a maximum of 47.02 ml compared to the control group without warm compresses, where the maximum increase in milk production was 33.15 ml ($p < 0.05$), meaning that warm compresses on the breast had a significant effect on the amount of milk production in postpartum mothers.²³

The results of this study contradict the research conducted in Majang Tengah Village, Malang, which shows that giving back massage is more effective than giving warm breast compresses to increase milk production ($p < 0.05$).²⁴ This study also contradicts the results of a study conducted in Medan, which showed that giving oxytocin massage had more effect on milk production than marmet massage and warm compresses ($p < 0.05$).²⁵

In this research, the temperature is stable on the herbal compresses used during applications. They have not measured the similarity of the temperature of the herbal compress when given between respondents; the difference in the temperature of the herbal compress received by each

respondent may affect the amount of increase in the hormone oxytocin or breast milk production. Also, the researchers did not examine parity status, physical activity, family support, rest patterns, mother's knowledge about breastfeeding, and the sex of the baby.

CONCLUSIONS AND RECOMMENDATION

The provision of warm herbal compresses can be applied in providing standard postpartum maternal care carried out by health service facilities because it has been proven to increase oxytocin hormone levels and maternal milk production for three days of intervention. In future research, it is expected to maintain the same temperature in giving warm herbal compresses between respondents.

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