

Effect of the Combination of Acupressure and *Moringa oleifera* Extract Consumption on Elevating Breast Milk Production and Adequacy in Lactating Mothers

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ABSTRACT

Background: Exclusive breastfeeding is highly recommended because the nutrition is suitable for babies. However, there are still many babies who do not get exclusive breastfeeding. For this reason, there is a need for innovation that can be used as an effort to increase the production and adequacy of breast milk for breastfeeding mothers with a combination of Acupressure and *Moringa oleifera* extract. This study aimed to prove the potential of a combination of acupressure and *Moringa oleifera* extract as an intervention in increasing the production and adequacy of breast milk for breastfeeding mothers.

Subjects and Method: This study used quasi experiment and pretest-posttest design with control group conducted at the Kelingi IV/C Health Center, Musi Rawas Regency, from December 2022-January 2023. It consisted of an intervention group consisting of a combination of 2x4 minutes of acupressure and 650 mg of *Moringa oleifera* extract and a control group of counseling for breastfeeding mothers, namely 40 breastfeeding mothers with babies 0-6 months. The dependent variables were the hormone prolactin and baby's weight. The independent variable was the combination of acupressure and extra *Moringa oleifera*. The data were analyzed by Wilcoxon.

Results: The indicator affected by the combination of acupressure and *Moringa oleifera* extract was an increase in milk production using the prolactin hormone indicator after intervention (Mean= 304.60; SD=131.22) than before intervention (Mean= 162.85; SD= 140.44), and this was statistically significant ($p < 0.001$). There was an increase in the adequacy of breastfeeding using the infant's weight indicator after intervention (Mean= 5550.00; SD=1240.75) than before intervention (Mean= 5015.00; SD= 1444.87), and this was statistically significant ($p = 0.030$).

Conclusion: The combination intervention of 2x4 minutes of acupressure and 650 mg of *Moringa oleifera* extract for 10 days effectively increases the production and adequacy of breast milk for nursing mothers.

Keywords: acupressure, *Moringa oleifera*, prolactin hormone, baby's weight.

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BACKGROUND

Health in terms of one's growth and development has a close relationship with nutritional intake, for example breast milk (ASI) obtained during infancy. Breastfeeding is one of the best investments for survival and for improving the health, social and economic development of individuals and nations. Although the initiation rate for breastfeeding globally is relatively high, only 40% of all babies under 6 months are exclusively breastfed and 45% are breastfed until 24 months of age. United Nations International Children's Emergency Fund (UNICEF), World Health Organization (WHO) and the decision of the Ministry of Health of the Republic of Indonesia No. 450/MENKES/SK/VI/2004 recommending exclusive breastfeeding for the first 6 months of life to improve the health of mothers and babies and reduce maternal and child morbidity and mortality. Exclusive breastfeeding is highly recommended because the nutrition is suitable for the baby's age, complementary feeding at an early age can increase the risk of babies getting unhygienic food and can experience malnutrition and be contaminated with infection, so they have a weak immune system (Ministry of Health RI, 2014).

The benefits of giving breast milk to infants have been proven in several epidemiological studies which state that breast milk protects infants and children from infectious diseases such as diarrhea, *otitis media* (ear infections), coughs, colds, lower acute respiratory infections (ARI) and allergies (Lok, Bai and Tarrant, 2017). The first breast milk that comes out is colostrum, the nutritional content contained in colostrum has 10-17 times more than mature milk. Breastfeeding according to research (Bhutta and Das, 2013; Lamberti et al., 2013; Hanieh et al., 2015), conducted in a number of developing countries concluded that exclusive

breastfeeding can reduce infant morbidity and mortality due to diarrhea and pneumonia. Breastfeeding in the first hour of a baby's life or Early Breastfeeding Initiation (IMD) has been shown to reduce neonatal mortality (Baccolini et al., 2013; Victora et al., 2016).

The coverage of exclusive breastfeeding in Indonesia for babies 0-6 months has fluctuated in the last 3 years, namely in 2020: 69.62%, 2021: 71.58% and 2022: 72.04% (Statistics, 2022). Exclusive breastfeeding coverage in South Sumatra in 2020 was 52.7%, 2021: 69.93% and 2022: 70.46% (Ministry of Health RI, 2020; Statistics, 2022). Data from the Health Office for the Musi Rawas district noted that in 2018: 46.8%, 2019: 26.19% and in 2020: 9.5% (Ministry of Health, 2019; Rawas, 2020; South Sumatra Provincial Health Office, 2021).

Knowledge is an important component that must be owned by a mother regarding how to facilitate breastfeeding (Chen et al., 2018), but there are many factors and efforts that influence production, including: consuming nutritious food, psychologically (Rahmadani et al., 2020), relaxation techniques such as: hypnobreastfeeding (Dini, 2017; Asih, 2020), traditional healing techniques such as acupressure (Wulandari et al., 2019), aromatherapy techniques (Susilawati and Halim, 2018) marmet technique (flushing and massaging the breasts) (Pujiati et al., 2021), "SPEOS" technique (Oxytocin Massage Stimulation, Endorphin and Suggestive Massage) (Mas'adah and Rusmini, 2015; Arsi, Rejeki and Juniarto, 2021), and support or motivation (Asih and Nyimas, 2020). From these several methods, the author is interested in researching traditional techniques that have actually been developed in society but do not yet understand certain points related to stimulation points in increasing breast milk and food, namely

Moringa oleifera (*Moringa*) which thrives in areas where study has not been utilized optimally by society and has tremendous benefits in the production of breast milk, by combining the two.

Acupressure is a therapy that is generally used in the field of obstetrics (Arumsari et al., 2018), a complementary therapy and alternative therapy that has no side effects and can be used to reduce the level of acute pain and chronic pain (Kurniyawan, 2016), but must be maintained pay attention to someone's indications when acupressure techniques will be carried out, for example acupressure at the point to stimulate labor is not recommended for pregnant women because it can cause miscarriage (Wong, 2019).

This technique uses the hands to press several acupuncture points on the body, restoring and balancing the body's energy to improve bodily functions. From a medical perspective, acupressure can stimulate the release of endorphins, block pain receptors, affect prolactin production and stimulate the release of oxytocin (Mollart and Leiser, 2013; Raras et al., 2016). Emphasis or acupressure massage has an effect on providing stomatic sensory stimulation through afferent pathways so that it affects the flow of bioenergy that flows in one meridian or stream, stimulation at meridian points will provide maximum work function related to that organ. These stimuli can pass through the nerve pathways, somatovisceral, meridians and local reactions. The resulting sensory stimulation, acupressure will stimulate the posterior pituitary and pituitary to release the hormone prolactin and the hormone oxytocin into the blood to stimulate the letdown reflex: the process of ejecting milk from the alveoli and ductus lactiferous to increase and release milk (Wulandari et al., 2019; Liliana and Wahyuningsih, 2021). Acupressure at points CV 17, ST 15, ST 16,

and L14 for (4 minutes) 10 times or a maximum of 1 minute at one point of the first session and (4 minutes) 10 times or a maximum of 1 minute at one point of the second session with a distance of 10 minutes (Wong, 2019). These two sessions can increase the mother's milk production because the emphasis on the acupressure points can stimulate the prolactin reflex. The hypothalamus stimulates the nerves to secrete prolactin into the blood at intervals of 10-20 minutes after receiving stimulation (Jeremy et al., 2009; Wulandari et al., 2019).

Acupressure technique, the author also associates it with the consumption of the *Moringa oleifera* plant extract. The *Moringa oleifera* plant is a food that can act as a facilitating agent and increase milk production. *Moringa oleifera* contains polyphenols, alkaloids, phytosterols in the form of campesterol, β -sitosterol, and stigmasterol which work by stimulating milk production. Polyphenols work by stimulating the hormone prolactin. While alkaloid compounds work by increasing the activity of the hormone oxytocin. Phytosterol compounds act as precursors in the production of the hormone estrogen which works by triggering the release of the hormone prolactin (Sumarni et al., 2020).

In addition to containing compounds that act as galactogogues, *Moringa oleifera* also contains various nutrients that can support the growth and development of the baby, as well as the health of the mother. *Moringa oleifera* contains a number of amino acids consisting of arginine, histidine, lysine, tryptophan, phenylalanine, methionine, threonine, leucine, isoleucine, and valine and calcium which can affect the production of the hormone prolactin (Prayekti et al., 2021). Several studies related to *Moringa oleifera* include: Based on study Mu-liawati (2020) 2 grams of *Moringa* leaf extract for 30 days can increase toddlers'

weight, study (Zakaria et al., 2016) mixed capsules of Moringa leaf extract with Moringa leaf flour 2x2 800 capsules mg/day is effective on the volume of breast milk, (Sulistiyawati, 2017; Maharani, 2020) Moringa biscuits 50 grams of Moringa biscuits for a month increase levels of fat, protein, carbohydrates and vitamin A in breast milk (Sumarni et al., 2020).

Researchers combined acupressure with consumption of *Moringa oleifera* extract 650 mg 1 day for 10 days because it is a safe administration dose and based on the Decree of the Minister of Health of the Republic of Indonesia number HK.01.07/-MENKES/187/2017 concerning the formula of Indonesian traditional medicinal ingredients, that Moringa leaves are safe for consumed up to 6 g per day (Ministry of Health RI, 2017). Based on study Nilamsari et al. (2020) which was divided into 3 doses, namely: dose 1 (800 mg/kg: 800 mg/kg), dose 2 (650 mg/kg: 650 mg/ kg) and dose 3 (800 mg/kg: 650 mg/kg), showed increased expression of proinflammatory cytokines in diabetic rats and only doses 1 and 2 showed the ability to reduce inflammation in diabetic rats. Based on study (Ekundina et al., 2015) which has proven that Moringa leaf extract (*Moringa oleifera*) doses of 400 mg/kg, 600 mg/kg and 800 mg/kg for 21 days did not show any damage to the histopathological picture of the liver of Wistar rats and administration The ethanol extract of Moringa leaves (*Moringa oleifera*) in graded doses is not toxic to the liver cells of Wistar rats at low or high doses and is safe for consumption (Putri et al., 2019).

Based on the description above, researchers are interested in conducting study with the title the effect of the combination of acupressure and consumption of *Moringa oleifera* extract on increasing the production and adequacy of breast milk for breastfeeding mothers.

SUBJECTS AND METHOD

1. Study Design

This study uses quasi experiment and pre-test-posttest design with control. The study location was at the Kelingi IV/C Puskesmas, Musi Rawas Regency. Study data collection was carried out in December 2022 to January 2023.

2. Population and Sample

The target population is all breastfeeding mothers with babies aged 0-6 months who work in the working area of the Kelingi IV/C Public Health Center, Musi Rawas Regency. A total sample of 40 was selected using purposive sampling.

3. Study Variables

The dependent variables studied were the hormone prolactin and baby's weight, and the dependent variable was the Combination of Accupressure and Extra Moringa Oleifera.

4. Operational Definition of Variabel

Acupressure, namely wiping lightly or massaging the CV 17, ST 15, ST 16, and L14 acupressure points 10 times or a maximum of 1 minute at one point. *Moringa oleifera* extract, namely giving *Moringa oleifera* extract 650 mg to be consumed for 10 days. The hormone prolactin is an indicator of increased milk production which is measured using a sample of subject serum to see the increase in changes before and after the intervention, and the baby's weight which is an indicator of the adequacy of milk production.

5. Study Instrument

data was taken by taking a 3 cc blood sample from the subject, then centrifuging it and taking serum for testing using the Prolactin Human ELISA Kit. The baby's weight was measured with the Onemed baby scale. Other variables were collected using questionnaire and observation.

6. Data Analysis

The data analysis used is excel and with the help of the SPSS program. the mean diffe-

rence between the experimental and control groups was tested using the Wilcoxon test.

7. Research Ethics

Study ethics issues including informed consent, anonymity, and confidentiality, are carefully handled throughout the study process. The study ethics approval letter was obtained from the Study Ethics Committee of the Ministry of Health Semarang, Indonesia, No. 0757/EA/KEPK/2022, on 18 November 2022.

RESULTS

The results of the sample characteristics are in Table 1. Bivariate analysis of the effect of

the combination of acupressure and *Moringa oleifera* extract was an increase in milk production using the prolactin hormone indicator after intervention (Mean= 304.60; SD= 131.22) than before intervention (Mean= 162.85; SD= 140.44), and this was statistically significant (p<0.001) (Table 2). There was an increase in the adequacy of breastfeeding using the infant's weight indicator after intervention (Mean= 5550.00; SD=1240.75) than before intervention (Mean= 5015.00; SD= 1444.87), and this was statistically significant (p=0.030) (Table 3).

Table 1. Sample Characteristics

Variable	Intervention group				Control Group			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Mother's age (year)	27.5	5.68	19	36	26.7	5.23	18	34
Baby age (month)	2.50	1.23	1	4	2.55	1.14	1	4
Parity	1.50	0.51	1	2	1.45	0.51	1	2
Breastfeeding frequency	10.35	0.58	10	12	10.25	0.44	10	11

Table 2. Bivariate analysis of prolactin hormone

Prolactin hormone	Mean	SD	p
Intervention			
Pre	162.85	140.44	<0.001
Post	304.60	131.22	
Control			
Pre	141.10	133.89	0.010
Post	113.50	98.97	

Table 3. Bivariate analysis of infant weight

Baby weight	Mean	SD	p
Intervention			
Pre	5015.00	1444.87	<0.001
Post	5550.00	1240.75	
Control			
Pre	5265.00	1511.45	<0.001
Post	5700.00	1115.76	

DISCUSSION

1. Prolactin level after acupressure and *Moringa oleifera* extract consumption

Based on the results of statistical analysis, it

showed that the difference in the mean prolactin hormone in the intervention group was higher (Mean= 141.35; SD= 113.89) than the control group with a difference (Mean= 27.60; SD= 47.78) and statistically

significant ($p < 0.001$).

The hormone prolactin is a hormone that plays a role in the production of breast milk. In this study given a combination of acupressure and *Moringa oleifera* extract Which aims to increase milk production naturally based on the hormone prolactin. The increase in milk production based on the hormone prolactin after intervention in both groups can reflect the influence exerted by each intervention so that there is an increase in milk production and changes in the hormone prolactin is the effect of the intervention given.

Technique battery pressure able to stimulate the release of endorphins, block pain receptors, affect prolactin production and stimulate the release of oxytocin (Mollart and Leiser, 2013; Raras et al., 2016), pressure or acupressure massage has an effect on providing stomatic sensory stimulation through afferent pathways thereby affecting the flow of bioenergy flowing in one meridian or stream, stimulation at the meridian point will provide maximum work function associated with that organ. These stimuli can pass through the nerve pathways, somatovisceral, meridians and local reactions. Sensory stimulation produced by acupressure will stimulate the posterior pituitary and pituitary to release the hormone prolactin and the hormone oxytocin into the blood to stimulate the letdown reflex: the process of ejecting breast milk from the alveoli and ductus lactiferious to increase and release breast milk (Wulandari et al., 2019; Liliana and Wahyuningsih, 2021). *Moringa oleifera* has a lactogogum effect and contains quite high protein and amino acids. which can stimulate an increase in the hormone prolactin, so that milk production becomes abundant (Sormin and Nuhan, 2018; Utary, Murti and Septadina, 2019; Abou-Elkhair et al., 2020; Prayekti et al., 2021; Budiono et al., 2022) .

2. Infants weight after maternal acupressure and *Moringa oleifera* extract consumption

Based on the results of statistical analysis showed that the difference in mean baby weight in the intervention group was higher (Mean= 535.00; SD= 321.63) than the difference in the control group (Mean= 435.00; SD= 397.60) and was statistically significant ($p = 0.030$).

Babies with sufficient breast milk are characterized by weight gain >200 grams in one week. In this study given a combination of acupressure and intervention *Moringa oleifera* extract which aims to increase the adequacy of breast milk based on the baby's weight. The results of this study indicate that the administration of a combination of acupressure and *Moringa oleifera extract* can increase milk production based on evaluation of the baby's weight because it is assessed from several factors indicating that a baby is said to be sufficiently breastfed if there is a weight gain of >200 grams in one week.

Based on study Hamzah (2018) explains that babies with sufficient breast milk (Ikhlasiah and Winarni, 2020) will provide significant benefits in terms of baby weight gain (Aprilia et al., 2020). The protein content (Hendarto and Pringgadini, 2019) in breast milk is quite high, namely whey protein which is easily absorbed by the baby's intestines. Other protein derivatives that play a role in optimal absorption are nucleotides which play a role in increasing intestinal growth and maturity and increasing iron absorption as well as the baby's immune system in breast milk. There is also carnitine which plays a role in maintaining the body's metabolic processes, so that the absorption of nutrients in infants is relatively mature and provides developmental effects in terms of weight gain. Mineral calcium, high vitamin A and long chain fat

composition in breast milk, namely DHA and ARA play a role in the growth of body tissues, stimulate the growth and development of the baby's body. In the baby's digestive tract there is lactose (Khasanah, 2021) which is then converted into glucose and galactose (Johan et al., 2019) and metabolized into energy and calories which can affect the baby's weight (Pratiwi and Srimiati, 2020) . So it was concluded that sufficient breastfeeding had an effect on increasing the baby's weight (Pratiwi, 2018; Lubis et al., 2020).

Almost all water-soluble vitamins such as B vitamins, folic acid, vitamin C which are found in breast milk have high levels, so they are very good for the development of the baby's musculoskeletal system, namely those that consists of bones, muscles, joints, ligaments, nerves, and baby tissues and the integumentary system, which leads to the structure of the skin and its accessories, namely nails, hair, and glands, and is the largest organ system in the human body (Hendarto and Pringgadini, 2019) .

The acidic condition of the large intestine due to breastfeeding is an ideal condition for the growth and activity of good bacteria (*Bifidobacterial* and *Lactobacillus*), but not ideal for pathogenic bacteria by sticking to the walls of the digestive tract and fighting over food. Good microorganisms also produce substances that can inhibit the activity of pathogenic bacteria, resulting in optimal absorption of breast milk nutrients in the baby's intestines which has an impact on the baby's weight gain.

AUTHOR CONTRIBUTION

Nurul Wahidah, Endah Aryati Eko Ningtyas, and Leny Latifah collaborated to develop a manuscript. Nurul Wahidah prepared all research administration documents (research permits) and data collection. Endah Aryati

Eko Ningtyas, and Leny Latifah analyzed data, interpret and publish.

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The study was self-funded.

CONFLICT OF INTERESTS

There is no conflict of interest in this study.

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