

Jurnal Info Kesehatan

Vol. 22, No. 2, June 2024, pp. 335-346

P-ISSN 0216-504X, E-ISSN 2620-536X

DOI: [10.31965/infokes.Vol22.Iss2.1488](https://doi.org/10.31965/infokes.Vol22.Iss2.1488)Journal homepage: <https://jurnal.poltekkeskupang.ac.id/index.php/infokes>**RESEARCH****Open Access****Vibration Stimulation to Increase Milk Production in Puerperal Mothers****Rhela Panji Raraswati^{1a*}, Krisdiana Wijayanti^{1b}, Heni Hendriyani^{1c}**¹ Midwifery Study Program, Applied Master Program, Poltekkes Kemenkes Semarang, Semarang, Central Java, Indonesia^a Email address: relapanji@gmail.com^b Email address: wijayanti.k@hotmail.com^c Email address: heni_sahid@yahoo.com

Received: 12 May 2024

Revised: 29 June 2024

Accepted: 30 June 2024

Abstract

Breast milk is the best food for babies, but insufficient production can hinder breastfeeding. Many mothers face challenges with milk production, preventing optimal breastfeeding. This study aims to innovate and develop a vibration-based electric massage device to enhance breast milk production and analyze its effectiveness based on baby weight indicators. The research employs a quantitative method with a Quasi-Experimental design, divided into an intervention group and a control group. A random sampling technique selected 46 respondents, split evenly between the two groups. The intervention group received breast care using the vibration-based device, while the control group received standard breast care for 14 days. Breast care was administered twice daily for 2-3 minutes. Baby weight was measured at 14, 21, and 28 days. Tools to measure energy intake, protein intake, and fluid intake utilized food recall, and breastfeeding frequency was measured by a scale. Psychological status was assessed using the DASS questionnaire. Data analysis included Repeated Measure ANOVA and Independent Simple T-Test. Results indicated a significant difference in breast milk production based on baby weight between the intervention and control groups ($p=0.000$). The mean weight difference between the groups was 200.21 grams, favoring the intervention group. Increased breast milk production was not influenced by confounding variables such as energy intake, protein intake, fluid intake, breastfeeding frequency, and psychological status. In conclusion, the developed vibration-based electric massage device effectively increased breast milk production, evidenced by significant weight gain in babies within the intervention group compared to the control group ($p=0.000$).

Keywords: Massage Equipment, Postpartum, Vibration, Breast Milk Production.***Corresponding Author:**

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1. INTRODUCTION

Mother's milk (ASI) is the best food option aimed at babies because of the large nutritional content in breast milk needed for babies such as protein, white blood cells, and immune substances that are suitable for optimal growth and development. Exclusive breastfeeding refers to giving breast milk to babies for 6 months unbroken and does not provide other food or drinks, including water, except under certain circumstances such as the use of ORS (Linda, 2019).

Mother's milk (ASI) has nutrients, antioxidants, hormones, and antibodies, and both children such as fat, carbohydrates, protein, minerals, and vitamins are needed. ASI also has protective substances namely IG A, IG E, IG M, Lactobacillus Bifidus, Lactoferrin, and Lisozyme, Cellular Immunity does not cause allergies, so it can neutralize bacteria, fungi, viruses, and parasites. Providing breast milk (ASI) continuously or exclusively for 6 months brings a number of important benefits, including the presence of antibodies and macrophage cells contained in colostrum and ASI, which provides special protection for infants. Children who are given exclusive breast milk tend to be lower in contagious diarrhea, necrotizing enterocolitis, respiratory infections and ears (Handayani & Pujiastuti, 2016).

The World Health Organization (WHO) in the global strategy of feeding for infants and children states that exclusive breastfeeding for six months is effective in preventing child death. The World Health Organization (WHO) promotes actively that ASI is the best nutrition and exclusive ASI in 2025 at least the first 6 months as much as 50% (WHO, 2022). In Indonesia, the percentage of exclusive breastfeeding of 77.41% still does not meet the target set, which is 80% including under the target, while for the Central Java region in 2022 there are 78.71% of children who get exclusive breastfeeding less than 6 months of age (BPS, 2022). In addition, based on the preliminary results in the Magelang District Health Office, exclusive ASI was obtained 82.1% with the highest Pakis Pakis Puskesmas at 95% while the low ASI coverage in the Secang 2 Puskesmas area of 37% that had not yet received exclusive breastfeeding.

Exclusive breastfeeding is the provision of breast milk alone without additional liquids, whether formula milk, water, orange juice or other additional foods to babies aged 0-6 months, which will have extraordinary benefits for the baby's development and growth in addition to increasing the bond of affection. mother and baby (Hipson, Handayani & Erwanda, 2023). Problems that often arise in mothers during breastfeeding can start before delivery (antenatal period), in the early postpartum period, and in the late postpartum period (Rahayuningsih, 2020). Exclusive breastfeeding and the correct breastfeeding process are reliable means of building quality human resources. Apart from that, in the correct breastfeeding process, babies will get good physical, emotional, and spiritual development in their lives (Pratama et al., 2023).

Breast milk needs to be given because it has several uses for babies, namely providing a better life for the development and growth of the baby, and having antibodies so that it protects the baby from several viral, bacterial, parasitic, and fungal infections. Breast milk has a complex composition according to the baby's needs, which increases the baby's intelligence, and avoids the risk of allergies due to formula milk, direct breastfeeding can provide love to the baby and reduce the risk of metabolic diseases such as Type II diabetes mellitus, hypertension, obesity as an adult (Cynthia et al., 2019). One of the best investments to improve health, survival, economic improvement and social development of individuals and nations is breastfeeding. Optimal breastfeeding according to guidelines can overcome more than 20,000 maternal deaths and 823,000 child deaths every year (Hasan, & Saputra, 2023).

One of the problems that can arise from not giving exclusive breast milk to babies is inhibiting growth and development, such as stunting. The impact of stunting itself on children has the potential to reduce their intelligence level, increase children's vulnerability to disease, and potentially result in reduced productivity in the future. According to research conducted by Louis, babies who are not exclusively breastfed are 61 times more likely to suffer from stunting

than babies who are exclusively breastfed at the age of six months. In addition, not getting exclusive breast milk has a high risk of developing upper respiratory tract infections (ARI) (Louis, Mirania, & Yuniarti, 2022).

In reality there are still many mothers experiencing problems in breastfeeding, including the lack of smooth milk production so that breastfeeding cannot be done optimally. Before delivery, a mother must have imagined the first moment carrying her baby in her arms and began to prepare the main basic needs for her baby, namely breastfeeding. However, in reality, the stage of breastfeeding is not always in line with expectations. Most mothers, especially those who are experiencing experience for the first time become mothers, have difficulty when they have to breastfeed their babies for the first time. Some even face situations where their breasts do not produce breast milk, even after two days after giving birth (Chomaria, 2020).

The scope of exclusive breastfeeding that is still low is considered to play an important role in more than one number of children's deaths each year and has a bad impact on baby development, so that it can affect the quality of life of the nation's next generation. In addition, exclusive breastfeeding cannot be separated from the success of breast milk produced by breastfeeding mothers.

There are several factors including those that are closely related to the production of breast milk such as food consumed by the mother, the way the baby suckles seen from the baby's suction, the frequency of breastfeeding, the mother's rest patterns, the mother's nutritional intake, mother's psychological and breast care. Breast care can be started from the third trimester of pregnancy until after giving birth. Breasts according to the period of development both from pregnancy until after labor will experience changes. This change makes breast care considered important to do, because breast care is very influential in milk production (Katuuk & Kundra, 2018).

The results of the research described in the study conducted by Emilda on breast care in controlling the smooth flow of breast milk show that breast care has an influence on the smooth flow of breast milk in mothers after giving birth (Emilda, 2022). This is consistent with the findings found in research conducted by Mukarramah on breast care for breast milk production. This study concluded that there was a significant difference in breast milk production between the group that received breast care and the control group, with higher milk production in mothers who received breast care compared to those who did not. These results confirm that breast care has a positive impact on postpartum maternal breast milk production at the Kassi-Kassi Health Center, Makassar City (Mukarramah, Nurdin & Ahmad, 2021).

Breast care can be interpreted as a breast care method used to increase breast milk production during pregnancy and childbirth. Breast care is care carried out after pregnancy and childbirth with the aim of increasing breast milk production, maintaining breast cleanliness and caring for the nipple area (Wahyuni, et al., 2022). Success in breast milk production can be seen from the baby's weight which always increases every week, so it can be seen that the baby is getting enough breast milk. Increased milk production after childbirth is something that needs to be considered especially to support the success of the breastfeeding process, because the first day after giving birth is an important time that can affect the sustainability of breastfeeding. Efforts made to increase milk production in addition to squeezing breast milk can also be by providing pharmacological therapy such as drugs or breastfeeding pills while non-pharmacological therapy such as oxytocin massage, Woolwich massage, and breast care.

Breast care that is still mostly done today uses hands, besides that it requires an impractical duration, even though in the current era it should be able to use the latest technology in accordance with technological advances. In line with research conducted by Nasution, Erniyati, & Aizar, (2018), about vibration stimulus in the form of a bra that is used to overcome the smoothness of breast milk. Where the results indicate the influence of the vibrating bra for the smooth running of milk, but the vibrating bra has a weakness that is the size of the bra can

be different for each mother. Therefore the innovation that will be done by the author is to develop an electric massage tool for the breast with a vibrating technique in it. The benefit is that the breasts experience stimulation with massage tools used and facilitate milk production. DC Vibratory Motor which provides a vibrational effect to stimulate the hormone prolactin and oxytocin. DC Vibratory Motor Method is a vibrational spreading method that vibrates ions in the breast which is directed at the activation of the hormone prolactin and oxytocin which results in alveoli stimulation in flowing milk to the lacterus duct and entering the milk sin and the nipple hole (Nasution, Erniyati, & Aizar, 2018). Based on the background above the author is interested in conducting research related to vibration-based breast massage tools as breast care for milk production in postpartum mothers. Produce innovations in the development of viable vibration-based electric massage devices and analyze their effectiveness on breast milk production in postpartum mothers.

2. RESEARCH METHOD

This type of research this research method uses quantitative research with a Quasy Experiment design approach which is divided into two groups, namely the intervention group and the control group. In creating a product or model, researchers use descriptive methods to collect data, while to test the effectiveness of the product, they use the analytic method.

The research and development process involves five main steps, namely: 1) information gathering, 2) product design, 3) validation by experts and revisions, 4) product or model testing, and 5) the final results of the product or model.

The reference population in this study is a mother who has given birth and is on the 14th day after delivery and provides exclusive breastfeeding to her baby. The study population is the puerperium mother who breastfed her baby in the period December 2023 to February 2024 in the working area of the Secang 2 Puskesmas which includes the fulfillment of the inclusion and exclusion criteria that have been set. The sampling technique uses random sampling. The sample of this study for each group was 23 people with a total number of samples of 46 people.

The independent variable in this study is breast care with vibration-based electric massage tools. The dependent variable in this study is milk production with baby weight indicators. Confounding variables in this study are energy intake, protein intake, fluid intake, breastfeeding frequency, and maternal psychology.

Univariate analysis aims to explain or describe the characteristics of each research variable (Notoadmodjo, 2018). Univariate analysis is carried out using a computer program to produce presentation values, minimal, maximal, and standard deviation that is presented in the frequency distribution of respondents' characteristics presented in the form of tables consisting of age, parity, work, breastfeeding frequency, and nutritional intake. Bivariate analysis aims to consider the interaction between two variables, namely the dependent variable and free variables with a degree of significance of 95% or α 0.05.

Normality testing is used to evaluate whether the data follows the normal distribution or not. In this study, the data normality test used the Shapiro-Wilk test because the number of respondents samples was less than 50. Data was normally distributed if $p > \alpha$ ($\alpha = 0.05$), while the data was not normal if $p < \alpha$ ($\alpha = 0.05$).

This research hypothesis test, to analyze the impact of breast care using tools on milk production by observing changes in the baby's weight before and after treatment in each group, the data that is normally distributed it uses the Repeated Measure Anova test followed by the HOC Pairwise Compares Post Test. For the average difference test that is used, the t-test is not paired (independent t-test).

Linear multivariate regression analysis is carried out to determine the presence or absence of confounding variables (energy intake, protein, fluid, breastfeeding frequency, and

psychological status) simultaneously and each of the milk production based on indicators of the baby's weight. Furthermore, the researcher tested the magnitude of the effect (effect size) using Cohen's test. This study has obtained research ethics permission number 1293/EA/KEPK/2023.

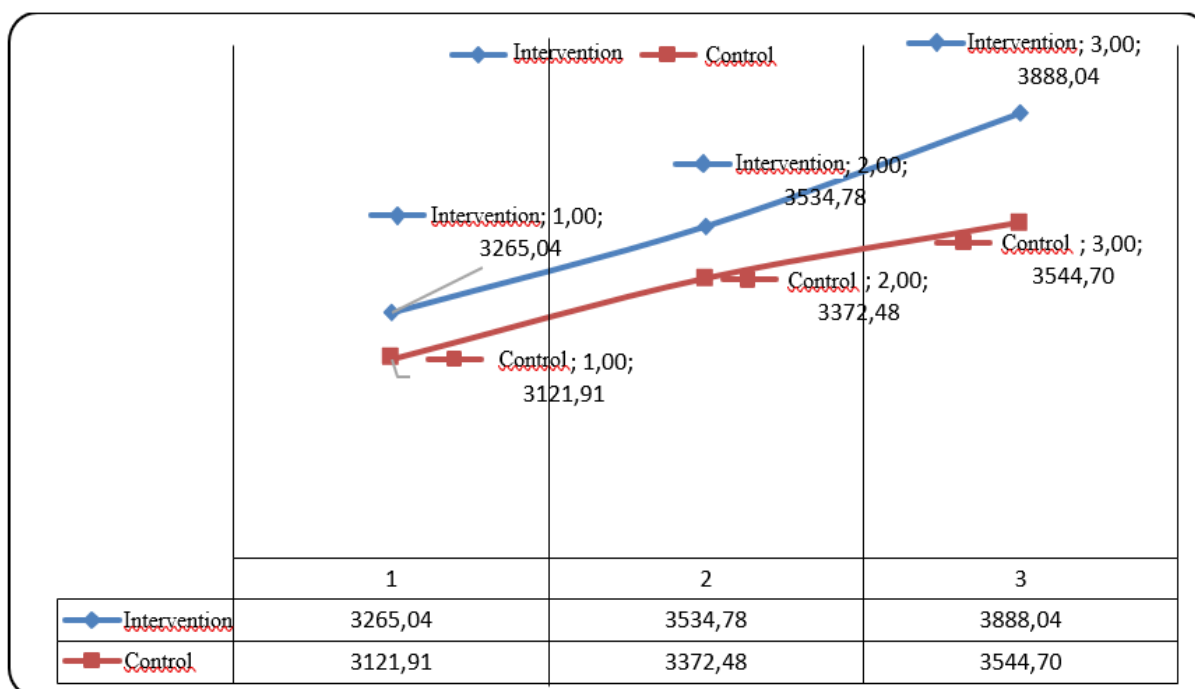
3. RESULTS AND DISCUSSION

Table 1. Results of Measurement of ASI Production Indicators of Infant Body Weight (gram) in The Intervention Group And The Control Group

Group	Measurement	n	Mean±SD	Min	Max
Intervention	Pretest (baby age 14 days)	23	3265.04±257.365	2830	3920
	Posttest 1 (baby age 21 days)	23	3534.78±283.451	3075	4210
	Posttest 2 (baby age 28 days)	23	3888.04±293.652	3340	4510
	Δ Pretest – Posttest 2		623±36,287	510	590
Control	Pretest (baby age 14 days)	23	3121.91±211.470	2710	3490
	Posttest 1 (baby age 21 days)	23	3372.48±169.031	2990	3690
	Posttest 2 (baby age 28 days)	23	3544.70±166.803	3308	3920
	Δ Pretest – Posttest 2		422,79±44.667	598	430

Table 1 In the first week the treatment of the average intervention group of the baby's body weight increased by 269.74 grams, while in the control group the average increase of 250.57gram. In the second week the treatment of the average intervention group of the baby's body weight increased 353.26 grams, while in the control group of 172.22 grams. It can be concluded that the average BB baby intervention group is higher than the baby's body weight in the control group.

To see the difference in increase that occurs in the baby's weight intervention and control groups by looking at the average weight of the baby at the first weighing of the baby's age 14 days, weighing the 2 ages of the baby 21 days, and weighing the 3 ages of the baby 28 days can be seen from the diagram below :



Based on the graph above, it is known that there is an increase in the average weight of the baby's weight in the intervention group and the control group, but in the intervention group

given breast care with vibration-based electric massage devices experienced more increases than the control group given ordinary breast care for 14 days. Therefore, the treatment of breast care with vibration-based electric massage devices affects the effect of increasing milk production with baby body weight (BW) indicators in postpartum mothers.

Table 2. Test The Baby's Weight Difference Before and After The Treatment of The Intervention Group and The Control Group (Gram)

Variable	Data	Group	
		Intervention	Control
Baby Weight	Pretest (baby age 14 days)	3265.04±257.365	3121.91±211.470
	Posttest 1 (baby age 21 days)	3534.78±283.451	3372.48±169.031
	Posttest 2 (baby age 28 days)	3888.04±293.652	3544.70±166.803
	p-value	0.000*	0.000*

Table 2 concerning the Analysis of the Effect of Breast Care with Vibration-Based Electric Massage Devices on ASI Production in Baby's Weight Obtained an average baby's BB in the intervention group with the value of day 1 of 3265.04 grams, on the 8th day 3534.78 grams, on The 15th day is 3888.04 grams. Whereas in the control group the average baby's BB value before the treatment of Ahri 1 was 3121.91 grams, the 8th day 3372.48 grams, the 15th day was 3544.70 grams. Then seen from the BB for the two groups of groups in each group of intervention and controls on day 1, day 8 and day 15 using the Repeated Measure Anovan test $p = 0,000$ so that H_0 is rejected, meaning there is a significant difference in the average weight of the baby day 1 day 1 , 8, and 15 in intervention groups and control groups. To find out the results of the measurement of time which most influences the baby's body weight, it will be continued by the Post Hoc Pairwise Comparisons test.

Table 3. Test of Measurement Time Differences Before and After Treatment of Intervention And Control Groups

Data	Group			
	Intervention	p-value	Control	p-value
Pretest- Posttest 1 (baby age 14 -21 days)	269,739	0,000	250,56	0,000*
Posttest 1- Posttest 2 (baby age 21 -28 days)	353,261	0,000	172,22	0,000*
Pretest- Posttest 2 (baby age 14 -28 days)	623	0,000	422,78	0,000*

Based on table 3 shows that the Post Hoc Statistics Test results Table 3 There is a significant difference between day 1 to day 8, and days 8-15 in the intervention group and the control group with $P = 0,000$. When viewed from the best difference in intervention the 8th - day 15, while for the control group is on days 1 - day 8.

Table 4. Test The Baby's Weight Difference Before and After Treatment Between Intervention and Control Groups (Grams)

Variable	Data	Group		p-value
		Intervention Mean±SD	Control Mean±SD	
Baby Weight	Pretest (baby age 14 days)	3265.04±257.365	3121.91±211.470	0,045*
	Posttest 1 (baby age 21 days)	3534.78±283.451	3372.48±169.031	0,023*
	Posttest 2 (baby age 28 days)	3888.04±293.652	3544.70±166.803	0,000*
	Δ Pretest – Posttest 2	623±36,287	422,79±44.667	0,000*

Table 4 in the Independent Sample T-Test test shows that in both groups 1, a 0.045 p-value means that there is a difference between the intervention group and the control group. In the two groups, 8 obtained a p-value 0.023 means there is a difference between the intervention group and the control group. In both groups, 15 obtained a p-value 0,000 means there is a difference between the intervention group and the control group. In addition, there is a difference in the average difference in the intervention group of 623 grams and the control group of 422.79 grams with a p-value of 0,000. This shows that there is a difference in the increase in infants between the intervention group and the control group. In general and the average difference of infant intervention and control of the difference is greater than 200.21 grams of the control group, it can be concluded that breast care using electric massage-based vibration-based devices is more effective in increasing milk production in postpartum mothers with a p-value of 0,000.

Table 5. Effect Size Providing Breast Care with a Vibration-Based Electric Massage Device

Group	n	Breast Milk Production Based on The Baby's Weight Indicator After Treatment	Effect size
		Mean±SD	
Intervention	23	3888.04±293.652	1,43*
Control	23	3544.70±166.803	

Table 5 shows the results of the effect size using the cohens'd formula that the provision of breast care with vibration-based electric massage tools for 14 days compared to manual breast care obtained a value of 1.43 with the range of criteria in the coohen's d formula which is 0.8-2.0 Included in the high category based on the Effect Size test classification, meaning that the provision of breast care with massage tools to milk production seen from the baby's body weight can have a large influence.

Table 6. The Results of The Analysis of Confounding Variables (Energy Intake, Protein, Fluid, Breastfeeding Frequency, And Psychological) on Milk Production Based on Baby's Weight

Variable	R	R Square	Baby Weight	
			Sig.	p-value
Energy Intake	0,298	0,089	0,785	0,568
Protein Intake			0,948	
Fluid Intake			0,153	
Breastfeeding Frequency			0,216	
Psychological			0,569	

Table 6 shows that the statistical test of the confounding variable uses multiple linear regression tests that the confounding variable of energy intake, protein, fluid, breastfeeding frequency, and psychological status simultaneously or each does not contribute to the production of breast milk based on the baby's weight indicator, this is indicated by The value of $P > 0.05$, then H_0 is accepted which has the meaning of an increase in milk production based on the baby's BB indicator in nursing mothers is not influenced by confounding variables. And based on the R Square value of 0.089, this illustrates that the effect of the confounding variable simultaneously on ASI production is 8.9%.

DISCUSSION

Analysis of Breast Care with Vibration-Based Electric Massage Tools on Breast Milk Production With Baby Weight Indicators

The provision of breast care with vibration-based electric massage tools given for 14 days to 23 respondents can affect the production of milk assessed from the baby's weight indicator. Assessment of milk production can refer to the amount of breast milk produced by the mother's breasts. ASI that is produced and stored in the storage of milk is then estimated to be the number by looking at how much breast milk is drunk by the baby. The baby's weight is influenced by lactose in digestion which is converted into glucose and galactose, which is then used as a source of energy and calories. Therefore, one way to assess milk production is through observation of the baby's weight.

The results of the statistical test in the intervention group by giving breast care with vibration-based electric massage tools are very significant to the baby's body weight starting on the 1st to the 15th day where the value of $p=0.000$. This means that there is an influence of breast care provision with vibration-based electric massage tools on milk production. Whereas standard breast care also has an influence on breast milk production where the value of $p=0,000$.

This study was conducted on puerperal mothers who breastfed the baby on the 14th day or 2 weeks of the puerperium on their babies were weighted before giving interventions, namely the day-1 intervention, the 7th day of the intervention and after the administration was on the 15th day. Selection at the age of 2 weeks in the first days after giving birth, newborns often lose about 10% of the initial body weight. Therefore research avoids bias that is likely to make this research there are other factors of the baby's weight. This weight loss is common and is caused by things like urine excretion and feces. However, the child's weight will return to his birth weight after approximately 2 weeks (Wulandari, Wijayanti, & Sunarjo, 2022).

Increased baby's weight will increase by about 125 grams every week (Wulandari, Wijayanti, & Sunarjo, 2022). In this study, there was an increase every week of more than 125 grams. Can be seen from the average obtained in the baby's body weight in the intervention group before treatment of 3265.04gram to 3888.04 grams with an average difference in the baby's weight gain of 623 grams while in the average control group of the baby's body weight of 3121, 91 grams to 3544.70 grams and has an average difference in an increase of 422.79 grams. From the results of the statistical test the average difference in difference in the results of p -value 0,000 can be interpreted that breast care with vibration-based electric massage devices is more effective for increasing milk production, generally visible and the difference between infant intervention and the difference in the difference is greater 200.21 Gram where. The intervention group is higher than the control group.

Breast care is one of the appropriate non-pharmacological efforts to carry out because it provides stimulation to the breasts to increase breast milk production. This breast care is achieved by sending signals to the pituitary to release the hormones oxytocin and prolactin (Anshari, 2023). In line with Rohani Siregar's research that there is an influence of breast care on breast milk production in postpartum mothers with a p value of 0.0001 (Siregar, 2023).

Breast massage tools are breast care that is developed using electronic components that are put together in the form of displaying which is flowed by an electric current. The breast care process is certainly inseparable from the development of technology in the health sector so there will be the latest innovation in the development of breast care. So that every mother postpartum is able to do breast care independently. Breast care done using tools one of them using a device based on vibration can increase milk production.

The mechanism of vibration -based electric massage tools that provide a vibrational effect to stimulate the hormone prolactin and oxytocin (Nasution et al., 2018). In the prolactin hormone when the vibration attaches to the breast around the nipple and mammae areola will cause stimulation in the sympathetic nerves in that place. Stimulation will be forwarded to the brain through anterior pituitary to remove the hormone prolactin which functions to produce

breast milk. In addition, stimuli will also be forwarded to the brain through posterior pituitary to remove the hormone oxytocin into the mother's bloodstream. The hormone oxytocin functions to encourage small muscles around the milk-producing cells (alveoli) to contract. Alveoli is a part that contains cells that secrete milk. Each alveoli is coated with cells that secrete milk called ACINI. ACINI secretes the factors of the blood that are important for the formation of milk. Around each alveoli there are myoepithelial cells that are sometimes called basket cells (basket cells) or spider cells (spider cells). If this cell is stimulated by oxytocin, it will contract. This contraction will push milk out of the alveoli through the lactiferous duct to the Lactiferous Sinus where the ASI is stored (Estiwidani, 2018).

The Effect of Confounding Variable on Milk Production with Weight Indicators Food Intake (Energy, Protein, and Fluid)

In this study, food intake /food intake in both groups both from energy, protein and fluid intake has a homogeneity where $p\text{-value} > 0.05$, where energy intake $p = 0.223$, protein intake $p = 0.088$, and fluid $p = 0.221$ so it is known that from energy intake, protein and fluid the same or homogeneous. Further analysis shows that there is no relationship between energy, protein, and fluid intake and milk production based on the baby's weight indicator with $p\text{-value} > 0.05$ for energy intake $p = 0.785$, protein intake $p = 0.948$, and fluid intake $p = 0.153$. So it can be seen that the increase in milk production based on the baby's weight indicator is not affected by energy, protein and fluid intake. This is in line with Nurul Asikin's research that there is no relationship between food intake and mother's milk production (Asikin, Agrina, & Rismadefi Woferst, 2023).

Besides that, in line with other studies that there is no correlation between energy intake, protein against milk production (Butts et al., 2018). But it is different from the research conducted by Lien Meilya that there is a significant relationship between the intake of protein eaten by the mother to the production of mother's milk, where the protein contained in the mother's milk is used for child growth (Prastiyaning & Nuryanto, 2019). In line with research conducted by Niar, a mother with good fluid intake has the opportunity to be 4.219 times to have good milk production (Niar, Dinengsih, & Siauta, 2021).

Breastfeeding Frequency

Further analysis of this study does not indicate the relationship between breastfeeding frequency and milk production based on baby weight indicators in all mothers breastfeeding $0.216 > 0.05$ so it can be known to increase milk production based on the baby's weight indicator in nursing mothers not affected by frequency breastfed. This explains that although mothers breastfeed frequently, they do not have a significant impact on milk production because milk production is influenced by many factors besides breastfeeding frequency.

In contrast research conducted in the outpatient polyclinic of the Kediri Baptist Hospital, it shows that the frequency of breastfeeding affects the production of breast milk in postpartum mothers (Syari, Arma, & Mardhiah, 2022) Supported research conducted by Ariani, et al., (2021), explained that there is a relationship between the frequency of breastfeeding and milk production in breastfeeding mothers (Ariani, et al., 2021). In addition, based on research Maharlika & Yuliana, (2023) show that there is a relationship between breastfeeding frequencies with breast milk production with the average frequency of breastfeeding 10-12 times a day (Maharlika & Yuliana, 2023).

Psychological

Further analysis in this study produced assumptions that there was no relationship between psychological status and milk production based on baby weight indicators with a value of $0.569 > 0.05$ so it could be said to be an increase in milk production based on baby weight

indicators not influenced by psychological status. The results of the research are in line with Dewia, Kusumastuti, & Astutic, (2023), research that psychological status does not affect breastfeeding to infants by postpartum mothers (Dewia, Kusumastuti, & Astutic, 2023). However, this is the opposite of the results of sustainable research that psychological factors are associated with milk production in postpartum mothers. Psychological factors are one that can affect milk production. When the mother's psychological condition is in good condition, the smooth muscle around the breast glands will stimulate the release of the hormone oxytocin and prolactin to launch the expenditure of milk and increase milk production (Lestari et al, 2022).

This research is not free from several limitations and weaknesses, including This study did not use biomarkers that support breast milk production. No temperature sensor regulates heat to monitor the existing heat temperature. The battery life is still low, so it requires recharging the battery several times.

4. CONCLUSION

Development of vibration-based electric massage devices has been created and can increase the production of breast milk seen from the baby's body weight by doing a pretest and posttest where there are significant differences in the average weight of the baby on day 1, 8, and 15 in the intervention group and the control group by getting p-value = 0,000. Electric massage-based vibrational massage tools are effective for increasing milk production seen from the baby's body weight by getting p-value = 0,000. Future researchers can expand the scope of the research by incorporating additional variables and expanding the population and sample coverage so that the research results become more diverse.

REFERENCES

- Anshari, Z. (2023). Analysis of Breast Care Factors for Increasing Breast Milk Production In Pagar Merbau Public Health Community Center, Medan. *Buletin Farmatera*, 8(1), 9-17. <https://doi.org/10.30596/bf.v8i1.5522>
- Ariani, P., Ariescha, P. A. Y., Sari, N. M., & Terulin, A. (2021). Hubungan Umur, Paritas Dan Frekuensi Menyusui Dengan Produksi Air Susu Ibu (ASI). 5(2), 26–30. Retrieved from <https://journal.universitaspahlawan.ac.id/index.php/doppler/article/view/2295>
- Asikin, N., Agrina, A., & Woferst, R. (2023). Hubungan Pola Makan Dengan Produksi ASI Pada Ibu Menyusui. *Jurnal Ilmu Kedokteran dan Kesehatan Indonesia*, 3(1), 13-27. <https://doi.org/10.55606/jikki.v3i1.1010>
- BPS. (2022). *Profil Kesehatan Ibu dan Anak 2022*. Jakarta: Badan Pusat Statistik.
- Butts, C. A., Hedderley, D. I., Herath, T. D., Paturi, G., Glyn-Jones, S., Wiens, F., Gopal, P. (2018). Human Milk Composition And Dietary Intakes Of Breastfeeding Women Of Different Ethnicity From The Manawatu-Wanganui Region Of New Zealand. *Nutrients*, 10(9), 1231. <https://doi.org/10.3390/nu10091231>.
- Chomaria, N. (2020). *Filosofi Payudara dan ASI*. Jakarta: Elex Media Komputindo.
- Cynthia, C., Suryawan, I. W. B., & Widiasta, A. M. (2019). Hubungan asi eksklusif dengan kejadian stunting pada anak usia 12-59 bulan di rsud wangaya kota denpasar. *Jurnal kedokteran meditek*, 25(1), 29-35.
- Dewia, A. P. S., Kusumastuti, & Astutic, D. P. (2023). Hubungan Perilaku Menyusui, Pola Hidup Sehat Dan Kondisi Kesehatan Dengan Pemberian ASI. 4(1), 154–160. <https://doi.org/10.26751/jikk.v14i1.1629>
- Emilda, S. (2022). Pengaruh Perawatan Payudara Terhadap Kelancaran Pengeluaran Asi Pada Ibu Postpartum Di Pmb Misni Herawati Palembang Tahun 2022. *Jurnal Kesehatan Dan Pembangunan*, 12(23), 100–107.

- Estiwidani, D. (2018). Aplikasi Mangkok Getar Sebagai Upaya Pencegahan Pembengkakan Payudara Ibu Menyusui. Yogyakarta: Poltekkes Kemenkes Yogyakarta.
- Handayani, E., & Pujiastuti, W. (2016). *Asuhan Holistik Masa Nifas dan Menyusui*. Yogyakarta: Trans Medika.
- Hasan, M., & Saputra, S. D. (2023). Edukasi Pentingnya Pemberian ASI Eksklusif pada Bayi di Puskesmas Gambesi. *Jurnal Surya Masyarakat*, 5(2), 208-213. <https://doi.org/10.26714/jsm.5.2.2023.208-213>
- Hipson, M., Handayani, S., & Erwanda, E. (2023). Hubungan Perawatan Payudara Pada Masa Kehamilan Dengan Kelancaran Pengeluaran Asi Pada Ibu Nifas. *Jurnal'Aisyiyah Medika*, 8(2), 274-282
- Katuuk, M., & Kundre, R. (2018). Hubungan pengetahuan Perawatan Payudara Dengan Kelancaran Produksi ASI Pada Ibu Post Partum Di Ruang Dahlia RSD Liun Kendaghe Tahuna Kabupaten Kepulauan sangihe. *Jurnal Keperawatan*, 6(1), 1-8. <https://ejournal.unsrat.ac.id/index.php/jkp/article/view/25180>
- Lestari, P., Fatimah, F., Ayuningrum, L., Herawati, H. D., & Afifaturrohmah, N. (2022). Influence Oxytocin Massage on Reduce Lactation Problems and Support Infants Growth. *Open Access Macedonian Journal of Medical Sciences*, 10(T8), 81-85. <https://doi.org/10.3889/oamjms.2022.9487>
- Linda, E. (2019). *ASI EKSKLUSIF*. Cilacap: Yayasan Jamiul Fawaid.
- Louis, S. L., Mirania, A. N., & Yuniarti, E. (2022). Hubungan Pemberian ASI Eksklusif dengan Kejadian Stunting pada Anak Balita. *Maternal & Neonatal Health Journal*, 3(1), 7–11. <https://doi.org/10.37010/mnhj.v3i1.498>.
- Maharlika, R., & Yuliana, D. (2023). Hubungan Teknik Dan Frekuensi Menyusui Dengan Kecukupan Asi Pada Bayi Di Ruang Delima RSUD Dr. H. Abdul Moeloek Provinsi Lampung Tahun 2023. *Nusantara Journal of Multidisciplinary Science*, 1(3), 399-411.
- Mukarramah, S., Nurdin, S. S. I., & Ahmad, Z. F. (2021). Pengaruh Perawatan Payudara Terhadap Kelancaran Produksi Asi Pada Ibu Postpartum Di Puskesmas Kassi-Kassi, Makassar. *Media Keperawatan: Politeknik Kesehatan Makassar*, 12(1), 11-16.. <https://doi.org/10.32382/jmk.v12i1.2143>
- Nasution, S. S., Erniyati, E., & Aizar, E. (2018). The effectiveness of DC Motor Vibrilatory Stimulus (DMV) among Postpartum Women on Giving Breast Milk. *Open access Macedonian journal of medical sciences*, 6(12), 2306–2309. <https://doi.org/10.3889/oamjms.2018.436>
- Niar, A., Dinengsih, S., & Siauta, J. (2021). Factors Affecting the Production of Breast Milk Breastfeeding Mother at Harifa RSB, Kolaka District Southeast Sulawesi Province. *Jurnal Kebidanan Midwiferia*, 7(2), 10–19. <https://doi.org/10.21070/midwiferia.v7i2.1288>
- Notoadmodjo, S. (2018). *Metodologi Penelitian Kesehatan*. Jakarta: Rineka Cipta
- Prastiyani, L. M. M., & Nuryanto, N. (2019). Hubungan Antara Asupan Protein Dan Kadar Protein Air Susu Ibu. *Journal of Nutrition College*, 8(4), 246–253.
- Rahayuningsih, T. (2020). Perawatan Payudara Dan Pijat Oksitosin. *Yogyakarta: Gosyen*.
- Pratama, E. R., Pitaloka, M. F., Wulandari, M., Annisa, N., Pratiwi, S. A., Suherni, W., & Indri, Y. (2023). Perawatan Payudara (Breast Care) di Ruang Rawat Kebidanan Rumah Sakit Islam Yarsi Bukittinggi. *Altafani: Jurnal Abdimas*, 1(1), 12-15.
- Siregar, R. (2023). Pengaruh Breast Care Terhadap Peningkatan Produksi ASI Pada Ibu Post Partum. *JURNAL ILMIAH OBGIN: Jurnal Ilmiah Ilmu Kebidanan & Kandungan*, 15(3), 473–479.
- Syari, M., Arma, N. ., & Mardhiah, A. . (2022). Faktor yang Mempengaruhi Produksi ASI Pada Ibu Menyusui. *Maternity and Neonatal : Jurnal Kebidanan*, 10(01), 1–9. <https://doi.org/10.30606/jmn.v10i01.1306>
- Wahyuni, E., Andriani, L., Yanniarti, S., & Yorita, E. (2022). *Perawatan Payudara (Breast*

-
- Care) untuk Mengatasi Masalah Puting Susu. Penerbit NEM*
- WHO. (2022). World health statistics 2022: monitoring health for the SDGs, sustainable development goals. World Health Organization
- Wulandari, S. S., Wijayanti, K., & Sunarjo, L. (2022). *Pengaruh Pemberian Dendeng Daun Singkong Terhadap Kadar Hormon Prolaktin Dan Produksi ASI Pada Ibu Menyusui*. Magelang: Pustaka Rumah Cinta.