

Original Research

**Effectiveness Of Dates Extract And Oxytocin Massage On Increasing Breast Milk Production For Breastfeeding Mothers**

**Aprilina Aprilina<sup>1\*</sup>, Dian Lestari<sup>2</sup>**

<sup>1,2</sup> Department of Midwifery Health Polytechnic Ministry of Health Palembang, Indonesia

**ABSTRACT**

**Backgrounds:** *The problem of insufficient breast milk production causes stress for mothers and hinders exclusive breastfeeding programs. This study aims to see how breastfeeding mothers can produce breast milk when they consume date extract and are given oxytocin massage.*

**Methods:** *This study used an experimental research design (posttest with control group design), with a purposive sampling technique, inclusion and exclusion criteria, and the inclusion criteria were drawn for grouping. The control group was breastfeeding mothers given oxytocin massage only, while the treatment group was breastfeeding mothers given oxytocin massage and date palm extract simultaneously. Each group consisted of 20 samples. The measurement of breast milk volume was conducted on day 7<sup>th</sup> and day 14<sup>th</sup> of postpartum.*

**Results:** *The results showed that there was no significant difference on the 7<sup>th</sup> day of measurement in all groups, while on the 14<sup>th</sup> day of measurement there was a significant difference in breast milk production in the group of mothers who were given date palm extract and oxytocin massage simultaneously, with a p-value of 0.000.*

**Conclusion:** *Date palm extract and oxytocin massage were very effective when given simultaneously to breastfeeding mothers in increasing milk production, so it was a good solution for breastfeeding mothers.*

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**CONTACT**

Aprilina



[aprilina@poltekkespalembang.ac.id](mailto:aprilina@poltekkespalembang.ac.id)

Department of Midwifery Poltekkes  
Ministry of Health Palembang, Jl.  
Jenderal Sudirman Complex RSMH  
Km. 3.5 no. 1365, Palembang,  
Indonesia.

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**INTRODUCTION**

Exclusive mother's breast milk (ASI) is the first food, the main and the best food for babies. It is a natural food and cannot be replaced by any food or drink. Breast milk contains various nutrients needed in the process of growth and development of infants. The benefits of breastfeeding are so great that it can reduce the risk of babies suffering from various diseases causing death, such as cancer, heart disease, hypertension, diabetes in adulthood, malnutrition, and will increase the incidence of obesity in children (Noviyana et al., 2022) (Scherbaum & Leila, 2016) (Wang et al., 2017) (Witkowska-zimny & El-Hasan, 2017).

The World Health Organization (WHO) states that in the Child Growth Standards applied throughout the world, it is emphasized that breastfeeding infants from birth to the age of 6 (six) months is very important. Furthermore, babies can be given complementary foods (*MPASI*) while still being breastfed until they reach 2 years old (Nabunya et al., 2020) (Triansyah et al., 2021) (Umbarsari, 2017). Exclusive breastfeeding is one of the most effective, practical, and inexpensive ways to prevent infant and child mortality (Taha et al., 2020) (World Health Organization, 2020).

Optimal breastfeeding is very beneficial because it can save more than 800,000 children under five every year. Children who have been exclusively breastfed are 14 times more likely to live than those who have not. According to the Data and Information Center of the Indonesian Ministry of Health in 2017, exclusive breastfeeding in Indonesia is only 35%.

This figure is still far below the WHO recommendation of 50%. The coverage of exclusive breastfeeding for the city of Palembang in 2017 was 72.76%. This coverage is still below the target of achieving Indonesia's exclusive breastfeeding, which is 80%. Various factors can cause this coverage not to be achieved, one of which is insufficient milk production (Aprilina et al., 2022) (Palembang, D. kota, 2020).

Lack of milk production is one of the reasons breastfeeding mothers decide to give their babies formula milk. Lack of confidence and excessive worry can cause inhibition of the production of the hormone oxytocin, which will eventually affect the production of breast milk, while the production of the hormone prolactin will be influenced by the food intake consumed by the mother (Noviyana et al., 2022) (L. P. Sari et al., 2017). In accordance with Government Regulation Number 33 of 2012 concerning Exclusive Breastfeeding, breast milk is a liquid produced by the secretions of the mother's breast glands. Exclusive breastfeeding is breast milk that is given to babies from birth for six months without adding and/or replacing it with other foods or drinks.

Breast milk is produced by the synergistic result of the mechanical stimulation of hormonal factors and the nervous system. Breastfeeding will have a positive impact on a baby's health because breast milk is the best and most important natural food for babies (Krol & Grossmann, 2018). The content and composition of substances in breast milk are in accordance with growth and development. Breastfeeding babies has been scientifically proven to increase children's intelligence. This is because one of the ingredients contained in breast milk and the most useful for increasing intelligence is DHA, one of the efforts to save costs (Hajian et al., 2020) (Sakti, 2018).

Many problems can occur during breastfeeding, for example in the first weeks of the postpartum period, one of which is the lack of milk production. The problem of insufficient milk production is one of the factors causing the failure of exclusive breastfeeding. Around 35% of breastfeeding mothers stop the breastfeeding process because they feel that the milk produced is still insufficient and not smooth, so they feel unable to meet the nutritional needs of their babies (Kuswaningrum et al., 2017) (Vitriani et al., 2021).

Various efforts have been made to increase breast milk production, one of which is through various massages or massage techniques, for example, by doing oxytocin massage. Oxytocin massage aims to stimulate the oxytocin reflex, or let down reflex. Oxytocin massage is conducted by massaging the back area along both sides of the spine, so it is hoped that by doing this massage, the mother will feel relaxed and stimulate milk production. A study on the relationship between oxytocin massage and

smooth milk production in postpartum mothers proved that 54.2% of respondents had smooth milk production (Depkes RI, 2018) (Nuampa & Payakkaraung, 2020).

Other efforts made by the community to increase breast milk production vary, one of which is by consuming drugs and foodstuffs that have a *galactagogue effect*. The most commonly used pharmaceutical drugs are domperidone and metoclopramide, but they have dangerous side effects such as arrhythmia, cardiac arrest, anxiety, depression, and sedation, so they are not very popular. In general, people prefer herbal supplements, which can usually be easily obtained around their homes.

The plant, which is traditionally believed to be able to reproduce and facilitate the release of breast milk, does not cause side effects and is cheap. A galactagogue is a substance that can help stimulate and increase the quality or quantity of breast milk. The mechanism of *galactagogue power* is a compound that can occur through direct stimulation of the protoplasmic activity of the secretory cells in the mammary glands so that milk secretion increases or stimulates the hormone prolactin to act on the alveolar epithelial cells (Karapati et al., 2022) (Rizqi et al., 2022).

Public knowledge about the use of food ingredients that have a galactagogue effect is an experience passed down from generation to generation by ancestors. One of them is the date palm, which is believed by the community to be a food additive that can increase the production of ASI. Dates are the fruit of the *Phoenix dactylifera plant*, which has one seed. Dates contain lots of carbohydrates, fats, proteins, various minerals, and vitamins, have fairly high fiber content, and have a galactagogue effect. Dates in exchange food ingredients are included in the fifth group, namely the fruit group, in which one exchange unit contains 50 calories, 10 grams of protein, and 10 grams of carbohydrates.

One unit of data exchange is equivalent to three dry dates weighing 100 grams. Today's society wants an instant culture or one that is practical and not burdensome. Making date palm juice preparations is one way to make it easier for mothers to consume dates (Hidana, 2018) (Karapati et al., 2022). Several previous studies have proven the effects of date palm juice and oxytocin massage on breast milk production separately. No one has investigated how effective it is if given simultaneously on breast milk production and since then, there has been a significant increase in breast milk production seen during the puerperium.

## **MATERIALS AND METHODS**

The sample in this study were all breastfeeding mothers who came to visit the Midwife Independent Practice in the city of Palembang in 2021 who had met the inclusion criteria and exclusion criteria and were willing to be included after receiving an explanation. Sampling in this study was carried out with the *purposive sampling technique* to determine whether the sample included in the treatment group or control group was done by lottery (lottery). This type of research is comparative analytic with 1 measurement using an experimental research design (*posttest only design*).

The sample size in this study was calculated using the comparative sample size formula for categorical paired measurements. The sample used was 40 people, consisting of the treatment group who were given date palm extract and oxytocin massage, the control group was respondents who only received oxytocin massage, and previously *informed consent was given* before the examination. Inclusion criteria: respondent's age is 20–40 years, exclusive breastfeeding, normal parturition, baby's weight of 2500 g. Exclusion criteria: consuming breast milk supplements, using

hormonal contraceptives, smoking/drinking alcohol, anatomical breast abnormalities, sick or hospitalized babies, and not complying with SOPs.

Respondents who had met the inclusion criteria and had given *informed consent* were then interviewed using a questionnaire guide. On days 1–14 of group I, the treatment was given 1 tablespoon of date juice twice a day, and oxytocin massage was also performed twice a day in the morning and evening. The control group was only given oxytocin massage twice a day in the morning and evening.

Group II (control) was only given oxytocin massage twice a day in the morning and evening. To control nutrition and intake, all groups used the daily menu guidelines for breastfeeding mothers found in the MCH handbook. In the first measurement, namely on the 7th day (transitional breastfeeding) postpartum, and the second measurement on the 14th day postpartum (mature breastfeeding), each respondent measured the volume of breast milk using a breast pump before feeding the baby.

Both breasts were pumped with a manual pump for  $\pm 30$  minutes or until both breasts felt empty. The volume of breast milk was measured using a measuring cup in mL. To distinguish milk production between the treatment group and the control group, a categorical comparative formula for 2 unpaired groups was used, namely the *Mann-Whitney test* because the data was not normally distributed.

This research has obtained *ethical clearance* from the Health Research Ethics Committee of the Health Polytechnic of the Health Ministry of Palembang No: 1174/KEPK/Adm2/IX/2021.

## RESULTS

This research was conducted in 2021 at the Independent Practice of Midwives in the city of Palembang. All research subjects who came to visit PMB during the study were taken as samples and had to meet the inclusion and exclusion criteria. The complete research results are presented in the following tables:

**Table 1.** Characteristics of Respondents in the Two Research Groups

Characteristics of Respondents	Group		Value
	Experiment (Date extract + Oxytocin massage)	Control (Oxytocin massage)	
<b>Age Category</b>			
< 35 years old	19(95%)	15(75%)	0.077
$\geq 35$ years old	1(5%)	5(25%)	
<b>Work</b>			
Working	2(10%)	2(10%)	0.1
Not working	18(90%)	18(90%)	
<b>Education</b>			
High	13(65%)	18(90%)	0.127
Low	7(35%)	2(10%)	
<b>Parity</b>			
Primipara	9 (45%)	7(35%)	0.519
Multipara	11(55%)	13(65%)	

Description: \*Chi Square Test

Based on table 1, the characteristics of the respondents in the two research groups show that there is no significant difference between the experiment group and the control group in terms of age, occupation, education, and parity categories where the p-value is  $> 0.05$ . It shows that the two groups are homogeneous, so they deserve to be compared.

**Table 2.** Differences in breast milk production between the experiment group and control group on the first measurement (day 7<sup>th</sup>) and second measurement (day-14<sup>th</sup>)

Measurement		Group		p-value
		Experiment (Date extract + Oxytocin massage)	Control Oxytocin massage )	
I (Day 7 <sup>th</sup> )	Mean (SD)	95.75	88.75	0.312
	Median	97.50	90	
	Range	10 – 130	20 – 150	
II (Day 14 <sup>th</sup> )	Mean (SD)	193.75	133.25	0.000
	Median	210	120	
	Range	90 - 250	30 - 190	

Description: Mann Whitney test

Based on table 2, it can be seen that there is no significant difference in breast milk production between the experiment group and the control group in the first measurement where the p-value  $> 0.05$  is 0.312, while in the second measurement there is a very significant difference between the experiment group and the control group where the p-value  $< 0.05$ , which is 0.000. There is a significant difference in the average milk production at the time of the first measurement; the average milk production is 95.75 in the experiment group and 88.75 in the control group. In the second measurement for the experiment group, there is an increase of 193.75, and in the control group, there is an increase of 133.25. It means that date palm extract is very effective in increasing breast milk production, especially in the second week of postpartum.

**Table 3.** Distribution of Breast Milk Production by Age, Education, Working and Parity in the First Measurement (day 7<sup>th</sup>)

Category	Breast milk production				OR 95%CI	p-value
	Good		Insufficient			
	n	%	n	%		
<b>Age</b>						
≤ 35 years old	18	94.7	16	76.2	5.63 (0.6-53.4)	0.105
> 35 years old	1	5.3	5	23.8		
<b>Education</b>						
High	13	68.4	18	85.7	0.36 (0.08-1.71)	0.197
Low	6	31.6	3	14.3		
<b>Work</b>						
Working	1	5.3	3	14.3	0.33 (0.03-3.52)	0.348
Not working	18	94.7	18	85.7		
<b>Parity</b>						
Primipara	11	57.9	13	61.9	1.18 (0.24-3.01)	0.846
Multipara	8	42.1	8	38.1		

Based on table 3 above, the first measurement shows that breastfeeding mothers in the age group of 35 years old with good milk production have an average of 18 (94.7%), while the age group > 35 years old with good milk production has an average of 1 (5.3%). There is no significant difference in breast milk production between mothers at age 35 and mothers in the age group of > 35 years old, with a p-value of 0.105, so there is no effect between age and milk production. The results of further analysis obtained OR = 5.63, which means that breastfeeding mothers who are 35 years old have a 5.63 times higher chance of having good breast milk production than mothers in the age category of > 35 years old.

On the characteristics of education, breastfeeding mothers who are highly educated have a good amount of breast milk production: 13 (68.4 %) compared to 6 (31.6 %). Those with a higher education are 0.36 times more likely to have good milk production compared to those with a low education. The first measurement of work characteristics shows that the majority of mothers with good breast milk production are not working mothers. There are a total of 18 people (94.7%), while working mothers are one person (5.3%).

There is no difference between the milk production of working mothers and non-working mothers. p-value = 0.199, OR = 0.33, which means that non-working breastfeeding mothers have a 0.33 times higher chance of having good breast milk production than the group of working mothers. Based on maternal parity in the first measurement, it shows that there are 11(57.9 %) multiparas with good breast milk production, while there are as many as 8 (42.1%).

There is no difference between primipara and multipara milk production with a p-value of 0.799. OR value = 0.85, which means that multipara breastfeeding mothers are 0.85 times more likely to have good breast milk production than the primipara group.

**Table 4.** Distribution of Breast Milk Production by Age, Education, Working and Parity on the Second Measurement (14<sup>th</sup> day)

Category	Breast milk production				OR 95%CI	p-value
	Good		Insufficient			
	n	%	n	%		
<b>Age</b>						
≤ 35 years old	22	84.6	12	85.7	0.92	0.93
> 35 years old	4	15.4	2	14.3	(0.15-5.76)	
<b>Education</b>						
High	21	80.8	10	71.4	1.68	0.51
Low	5	19.2	4	28.6	(0.37-7.64)	
<b>Work</b>						
Working	2	7.7	2	14.3	0.5	0.51
Not working	24	92.3	12	85.7	(0.06-3.1)	
<b>Parity</b>						
Multipara	18	69.2	6	42.9	3	0.109
Primipara	8	30.8	8	57.1	(0.78-11.53)	

Description: Chi-Square, Mann Whitney

Based on table 4 above, the second measurement shows that breastfeeding mothers in the age group of ≤ 35 years old with good milk production are 22 people (84, 6%), while the age group > 35 years old with good milk production is 4 people (15, 4 %). There is no significant difference in breast milk production between mothers in the

age group of  $\leq 35$  years old and mothers in the age group of  $> 35$  years old, with a p-value = 0,93, so there is no effect between age and breast milk production, OR value = 0,92. It means that breastfeeding mothers who are aged  $\leq 35$  years have a 0.92 higher chance of having good breast milk production than mothers in the age group of  $> 35$  years old.

On the characteristics of education in the second measurement, the high education group has 13 people (68.4) with good breast milk production, compared to only 6 people with low education (31.6%). There is no difference in milk production between high-educated and low-educated mothers with a p-value of 0.51 OR = 1.68. It means that a breastfeeding mother with a higher education is 1.68 times more likely to have good breast milk production than the low-education group.

Based on the second measurement of the working category, it shows that there are 24 non-working mothers (92,3%) with good breast milk production, while among working mothers with good breast milk production, there are only 2 (7.7%). There is no difference between breast milk production of working and non-working mothers with a p-value of 0.51, the value of OR = 0.5. It means that breastfeeding mothers who are not working have a 0.5-times higher chance of having good breast milk production than working mothers.

Based on maternal parity in the second measurement, it shows that there are 18 multipara mothers with good milk production (69.2%), while there are 8 primipara mothers with good breast milk production (30.8%). It shows that there is no difference between primiparas and multiparas with good breast milk production. p-value = 0.109, with OR = 3. It means that breastfeeding mothers with multipara are 3 times more likely to have good breast milk production than the primipara group.

## **DISCUSSION**

The results of this study are in accordance with research conducted that suggests there is no significant correlation between age and breast milk production ( $p = 0.513$ ), and it is also in line with research conducted that suggests age, parity, level of education, and work do not have a significant correlation to breast milk production. The ideal age range for reproduction, including breastfeeding, is 20–35 years. In this study, most of the respondents were in this age category, so the level of psychological maturity was good.

There was no difficulty in breastfeeding. When the level of psychological maturity is lower, it will affect the production of breast milk because the anxiety factor can affect the prolactin and oxytocin hormones, which play a very important role in breast milk production. In this study, in terms of maternal education, both in the first and second measurements, there was no difference in breast milk production between mothers with high education and mothers with low education. p-value  $> 0.05$  in this study.

It is also in line with research conducted by (Neves et al., 2021), that education will be affected by one's knowledge. In this study, it was found that respondents aged 20–35 years old had good knowledge of 83.3%. The higher the age, the higher the grasping power and mindset will develop, so that the knowledge obtained will also improve and increase.

The increase in a person's age will change the physical and psychological aspects (mental). Growth in humans occurs due to the maturation of organ functions. In the

psychological or mental aspect, a person's level of thinking is getting more mature and wise.

The higher the level of knowledge of breastfeeding mothers. The higher the knowledge and awareness of breastfeeding mothers to try to increase their breast milk production (Neves et al., 2021) (Prince et al., 2020), both having food and breast care treatment. On the characteristics of work in the first and second measurements, it was found that there was no significant relationship between work and breast milk production where a p-value  $> 0.05$  was not found.

This research is in line with what was done by Tsai (2022), who claimed that the type of mother's work is not related to breast milk production. Because when they have different workloads or all types of work produce the same effect on the mother's physical and psychological condition, even though all types of work have their own difficulties and demands. In this study, 62% of working mothers had breast milk production  $< 100$  ml/day, but there was a very significant correlation between the duration of work and breast milk production with a p-value of 0.001.

Based on the results of this study, it can be seen from the parity of mothers in the first and second measurements that there is no significant difference between the milk production of primiparas and multiparas mothers where the p-value was  $> 0.05$ . According to several studies that have been conducted previously, there are many factors that can affect parity. Including education, economic status, culture, and a person's occupation.

Primiparas will usually be more enthusiastic in welcoming the birth of their first child, and it is also a first-time experience in giving birth because it allows primiparas to find out about exclusive breastfeeding. While women who have given birth more than once certainly have experience in breastfeeding so that lactation management will be carried out properly (Nugraha & Andini, 2022). In this study, it was found that there was a significant difference in breast milk production between the treatment group and the control group in the first measurement where the p-value  $> 0.05$  was 0.312, while in the second measurement there was a very significant difference between the treatment group and the control group where the p-value  $< 0.05$  was equal to 0,000.

Many factors can cause failure in the process of exclusive breastfeeding, some of them come from internal and external factors. Internal factors include physical and psychological conditions, mother's knowledge, and physical factors of the baby, while external factors include early initiation of breastfeeding (IMD), stress and breastfeeding frequency, including insufficient milk production, difficulty in sucking baby, unsupportive condition of the mother's nipples/nipple anatomy, working mothers, nutrition. The desire to be called modern, the influence of advertising and promotion of breast milk supplements, and the assumption that all breastfeeding mothers have good knowledge about the benefits of breastfeeding (Jalal et al., 2017) (L. P. Sari et al., 2017).

Breast milk production is a process of forming breast milk from the cooperation of the hormones prolactin and oxytocin. The hormone prolactin during pregnancy increases even though breast milk has not come out because it is still inhibited by the high level of the estrogen hormone. When giving birth, the hormones estrogen and progesterone will decrease, and the hormone prolactin will become more dominant so that milk secretion occurs.

Breast milk production is influenced by the prolactin hormone, while the secretion of breast milk is influenced by the hormone oxytocin. The oxytocin hormone will come



out through stimulation of the nipples through the baby's mouth sucking or through massage on the mother's spine, such as oxytocin massage (Alex et al., 2020) (Noviyana et al., 2022). Breast milk production is influenced by the hormones prolactin and oxytocin. Some efforts to stimulate prolactin and oxytocin hormones after giving birth, apart from expressing breast milk, can also be done in various ways, such as breast care, early initiation of breastfeeding (IMD), breastfeeding on demand, oxytocin massage, consuming food or supplements to stimulate increasing breast milk production. (L. P. Sari et al., 2017) (Triansyah et al., 2021).

Massage or stimulation of the spine, the *neurotransmitter* will stimulate the *modula oblongata*, which then sends a message to the *hypothalamus* in the *posterior pituitary* to release oxytocin, causing the breasts to secrete milk. Massage in the area along the spine will increase the release of the hormone oxytocin, which will cause a relaxing effect and will relieve stress (Hallowell et al., 2017), which will help improve milk (Katmini & Sholichah, 2020) (N. Sari et al., 2017). In this study, milk production was seen to increase in the second measurement, on day 14<sup>th</sup>  $\rho$ -value <0.05 with an average volume of breast milk in the treatment group of 193.75 and the control group was 133.25. It showed that date palm extract was very effective in increasing breast milk production, especially in the second week postpartum.

This study is also in line with research conducted by Prianti et al., (2020), who found that most respondents have good milk production after being given date palm extract with 86.7%, where  $p$ -value = 0.023. It proves that there is an effect of giving date palm extract on breast milk production. Breastfeeding mothers who have insufficient milk production, mothers who want to breastfeed their babies again, or mothers who have just adopted a child and want to breastfeed their babies again (relactation) are recommended to take additional supplements and herbal foods containing galactagogues so that they can stimulate the increase in breast milk production.

A type of herbal supplement that was used to increase breast milk production a long time ago. Commonly used herbal supplements are Shatavari, milk thistle, fenugreek, fennel, cumin, and anise (Khorshidian et al., 2019). According to the Sanford Health health journal, date fruits are one of the herbal foods that contain galactagogues, which can increase prolactin, a hormone involved in the production of breast milk.

This fruit contains many important micronutrients, such as potassium, magnesium, phosphorus, zinc, manganese, and selenium, which are believed to be important minerals in immune function and cancer prevention, as well as macronutrients such as carbohydrates, proteins, fats, and almost 90 % composed of water. (Prianti et al., 2020).

## CONCLUSION

Based on the results of the data analysis, it can be concluded that there is a significant difference in breast milk production between mothers who were given a combination of date palm juice and oxytocin massage on the second measurement, suggesting that date palm extract and oxytocin massage were very effective given simultaneously in the second week of postpartum and breastfeeding in increasing breast milk production.

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