

# The Use of KORSIMU to Enhance Breast Milk Production

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**Abstract---** *This research aims to increase the production of breast milk by breastfeeding mothers through the development of a chair device known as KORSIMU. This is an R&D research consisting of two phases. The result showed that in the first phase, six mothers stated that KORSIMU was comfortable to use, and the incorporated massage facilities, helped to stimulate the oxytocin hormone. In the second phase, a trial was carried out on six breastfeeding mothers, and four felt the breast milk flow smoothly after using the device. Therefore, it is necessary to develop the oxytocin massage part of the device in the fifth and sixth costae and to add foams in the chair to make it more comfortable.*

**Keywords---** *Oxytocin, Breast Milk, KORSIMU*

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## I. INTRODUCTION

Breast milk is the optimal and best food for a baby's growth and development [1]. According to research, it is essential to give exclusive breastfeeding to babies from 0 days to 6 months without any additional food or drink till they are 2 years old [2]. Babies between the ages of 6-23 months without exclusively breastmilk, stand a risk of death by approximately 1.8 - 2.0 times higher than those exclusively fed with breastmilk [3].

According to the Indonesian Ministry of Health, the coverage of exclusive breastfeeding in Indonesia was below the national target of 80%, however it was achieved the national plan strategies of 44% [4]. And according to the Health Office of Special Region of Yogyakarta in 2018, the highest and lowest coverage occurred in Sleman regency and Yogyakarta city at the percentage of 82.62% and 66.13%, respectively. This means the Sleman regency has higher than the national target. Therefore, various efforts have been made to support and overcome the problems associated with inadequate production of breast milk by mothers through Yogyakarta City Regulation Number 1 of 2014 in article 3 on the Provision of Exclusive Breast Milk. Unfortunately, a good percentage of mothers have failed to breastfeed their babies exclusively [5].

The failure to give exclusive breastfeeding, is still very high [6] at 99% due to the perceptions of mothers and their inability to produce an adequate amount of milk [7]-[8]. Conversely, studies have proven that the continuous and regular massage of the oxytocin hormone increases breast milk production, therefore, this problem is overcome through this process [9].

Oxytocin is a powerful small molecule produced in the hypothalamus and consisting of nine amino acids. It acts as a neurotransmitter, carrying signals between nerve cells, regulates the cardiovascular and immune systems, stress responses, mental health, and social behavior [10]. This hormone is released as a pulse, thereby causing muscle contractions in tissues such as the uterus and mammary glands [11].

Oxytocin massage is carried out in the spinal part on the fifth-sixth costae to stimulate the medulla oblongata by neurotransmitters to the hypothalamus, secrete the hormone, and provides comfort to the breastfeeding mother, thereby, aiding in the adequate production of breast milk [12]. Furthermore, other studies reported that this massage

therapy reduces pain, provides psychological support, lowers anxiety, and increases the hormone oxytocin [13]. However, massage cannot be independently conducted, because it requires the assistance of health workers or someone that already understands and knows the correct technique [14].

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Therefore, to overcome these problems, KORSIMU was developed for mothers to independently massage their oxytocin hormones without seeking help from others. This device is a breastfeeding mother's chair with an oxytocin massage facility precisely installed in the fifth and sixth costae back area to help stimulate breast milk.

## II. METHODOLOGY

### Research design

This is a research and development (R& D) studies approved by the ethics committee of the University of Aisyiyah Yogyakarta number 1096/KEP-UNISA/V/2019. It consists of the development and product trial stages. In the first phase, data were collected on breast feeding problems by mothers, which were used in the development of KORSIMU to increase milk production. This design comprises of electro massage devices which helps in stimulating the oxytocin hormone. Finally, the second phase also known as the product trial stage, examines the effectiveness of the device. The study was carried out at Ngampilan Public Health Center of Yogyakarta with a duration of six months. The research location was chosen because it has the lowest exclusive breastfeeding coverage compared to other districts by 66.13%.

### Sample

The sample comprises of six pregnant women with a slight problem associated with breast milk. The inclusion criteria were vaginal delivery, 3 day old breastfeeding mothers, and those at level I health facilities in Ngampilan Health Center. It also comprises of mothers that are not consuming breastfeeding drugs, those not using contraceptives containing estrogen and progesterone. Furthermore, it consists of mothers combining pills and birth control injections for 1 month, and babies without abnormalities or congenital disabilities. Meanwhile, the exclusion criterion comprises of mothers with abnormalities in the breast.

### Data Collection

The observation sheets of breast milk production assessment based on baby or infant and maternal indicators were used for data collection. The questionnaire comprises of 10 statements which were provided after the respondent received KORSIMU treatment. Meanwhile, the observation sheets for both babies and mothers consist of 6 and 10 indicators, respectively. The statistical analysis used is descriptive.

## III. RESULTS

The study comprises six breastfeeding mothers unable to produce an adequate amount of breastmilk. Table 1 showed that 83.3% of the mothers were above 25 years, while 16.7% were below. Furthermore, 66.7% were Senior/Vocational High School graduates, 16.7% diploma, and 16.7% undergraduate. Also, 50% of their husbands were private employees and 50% entrepreneurs. A total of 33.3% of the mothers are Housewives, 16.7% tailors, 16.7%

private employees, 16.7% nurses, and 16.7% doctors. The percentage of mothers with 1 child is 66.7% and those with 2 or more children are 33.3%.

**Table 1: Characteristics of Respondents**

Characteristics	Frequency (n=6)	Percentage (%)
<b>Mother's age</b>		
<25 years old	1	16.7
≥25 years	5	83.3
Total	6	100
<b>Mother's education</b>		
Elementary school	0	0
Middle School	0	0
Senior/Vocational High School	4	66.7
Diploma	1	16.7
Undergraduate	1	16.7
Total	6	100
<b>Husband's work</b>		
Private employees	3	50.0
Entrepreneur	3	50.0
Total	6	100
<b>Mother's work</b>		
Housewife	2	33,3
Tailor	1	16.7
Private employees	1	16.7
Nurse	1	16.7
Doctor	1	16.7
Total	6	100
<b>Number of children</b>		
< 2	4	66.7
≥ 2	2	33.3
Total	6	100

This research consists of three phases. In the first phase, also known as the descriptive stage, a total of six mothers producing small amount of breast milk were examined. It was found that the amount of milk produced can be increase by carrying out oxytocin massage. However, this requires the assistance of health workers with ideas on how to give the correct technique. Based on these problems, the authors designed a tool to help increase the amount of milk produced through the development of an oxytocin massage independently carried out by mothers using KORSIMU.

The interviews showed that all felt happy and relaxed using the newly developed tool. However, two mothers stated that there were no improvements in the amount of milk produced as they only felt the vibration in their entire back area. Furthermore, some stated the need for additional foam in the seating area to increase comfort as well as the inclusion of seat cushions, which multi-functions as a resting place for the baby's head when breastfeeding.

The next phase is the development stage of making KORSIMU based on community needs and specifically designed for breastfeeding mothers to feel comfortable during the oxytocin massage and to increase breast milk production. This has a backrest on the back, arms, footrests, and pads for the baby's head, with electro massage devices in the fifth and sixth costae to stimulate the hormone oxytocin. The main material used as a framework in the development of the device is wood, while the chair's crate is modified into a bag made of a parachute, thereby efficiently protecting the chair from getting wet. In addition, the chair's power was developed by employing a battery as a source of motion in the device.

The last stage called phase II is a trial product conducted on six pregnant women, where only four felt experienced smooth breast milk production. Table 2 showed that the frequency of urination in 50% of the babies is 6-8 times and 100% possessed clear yellow urine characteristics. Meanwhile, 66.7% of the frequency of defecation is 2-5 times, and 33.3% are less than 2 times, with 100% characteristic of yellow-golden stool color. The duration of a baby sleeps after breastfeeding are <2 hours (66.7%) and 2-3 hours (33.3%) with a frequency of breastfeeding at 8-12 times (66.7%) and <8 times (33.3%). Table 3 shows the assessment of breast milk production based on infant indicators categorized as smoothly at 66.7% and non-smooth at 33.3%.

**Table 2: Breast Milk Production Using KORSIMU Based on Infant Indicators**

<b>Infant Indicators</b>	<b>Frequency (n=6)</b>	<b>Percentage (%)</b>
<b>Frequency of Urination</b>		
6-8 times	3	50
<6 times	3	50
Total	6	100
<b>Characteristic of Urination</b>		
Clear yellow	6	100
Dark yellow	1	0
Total	6	100
<b>Frequency of Defecation</b>		
< 2 times	2	33.3
2-5 times	4	66.7
Total	6	100
<b>Characteristic of Defecation</b>		
Red	0	0
Gold yellow	6	100
Pale white	0	0

Total	6	100
<b>The duration of sleep</b>		
<2 hours	4	66.7
2-3 hours	2	33.3
> 3 hours	0	0
Total	6	100
<b>Frequency of breastfeeding</b>		
< 8 times	2	33.3
8 – 12 times	4	66.7
> 12 times	0	0
Total	6	100

**Table 3: Assessment of Breast Milk Production Using KORSIMU Based on Infant Indicators**

Breast Milk Production	Frequency (n=6)	Percentage (%)
Smoothly	4	66.7
Not smooth	2	33.3
Total	6	100

Table 3 shows that a total of 5 breastfeeding mothers experienced tense breast because the milk was full at 83.3%, and decreased to 50% after using KORSIMU. However, they all felt the presence of *let down reflex*, which helps in stimulating the hormone oxytocin to produce adequate breast milk. The frequency of breastfeeding for 8-12 times is 66.7%, and both breasts were alternated. However, only 50% of them maintained a good breastfeeding position, while 83.3% were carried out *on demand*. Approximately 66.7% of the mother's breast looked full of milk and then feels empty after breastfeeding. Table 4 shows that 50% of babies suck adequately and slowly, while in table 5, the assessment on the smoothness of breast milk based on mother indicators was found by 66.7%.

**Table 4: Breast Milk Production Using KORSIMU Based on Mother Indicators**

Mother Indicators	Frequency (n=6)	Percentage (%)
<b>Breasts tense because filled with milk</b>		
Yes	5	83.3
No	1	16.7
Total	6	100
<b>Relax</b>		
Yes	3	50
No	3	50
Total	6	100
<i>Let down reflex</i>		

Yes	6	100
No	0	0
Total	0	100
<b>Frequency of breastfeeding at 8-12 times</b>		
Yes	4	66.7
No	2	33.3
Total	6	100
<b>Use breasts alternately when breastfeeding</b>		
Yes	6	100
No	0	0
Total	6	100
<b>With a good breastfeeding position</b>		
Yes	3	50
No	3	50
Total	6	100
<b>On-demand</b>		
Yes	5	83.3
No	1	16.7
Total	6	100
<b>The breast looks full of breast milk</b>		
Yes	4	66.7
No	2	33.3
Total	6	100
<b>Breasts feel empty after feeding</b>		
Yes	4	66.7
No	2	33.3
Total	6	100
<b>The baby suck adequately and slowly</b>		
Yes		
No	3	50
Total	3	50
	6	100

**Table 5: Assessment of Breast Milk Production Using KORSIMU Based on Mother Indicators**

Breast Milk Production	Frequency (n=6)	Percentage (%)
Smoothly	4	66.7
Not smooth	2	33.3
Total	6	100

#### IV. DISCUSSION

Breast milk is the optimal food and perfect combination of nutrients needed by babies for growth, decrease in obesity, development of gum jaws, proper formation of teeth and early speech, as well as protection against many diseases [1]. It is the main and best source of food and strengthens the emotional bond between mother and baby [15, 16,17]. Breastfeeding plays an important role in achieving the objectives of Sustainability Development Goals (SDGs) [18].

This provides many benefits for mothers, babies, communities, and countries, however, some are unsuccessful in breastfeeding their babies due to Perceived insufficient milk supply (PIMS). This problem often occurs, therefore, efforts to increase the production of breast milk are by stimulating the hormone oxytocin through massage [19].

Oxytocin and acupressure massage therapy increase the hormone prolactin level, therefore it can be given to postpartum and breastfeeding mothers [12]. *Let down reflex* takes place when the baby sucks the mother's breast, and this triggers blood in the nipple, thereby causing the hormone prolactin to be released into the bloodstream. Hormone oxytocin causes the breast to channel milk to the alveoli cells, and enhances production [20].

This is in accordance with the studies on the ability of back massage to effectively increase lactation. Therefore, it is recommended for all mothers, with breastfeeding problems. This is a simple method applicable to the existing health services without exhausting resources [21]. Back massage and therapy are worth considering for women suffering from postpartum primiparous to help increase the hormone oxytocin [22].

The feeling of excessive anxiety and fear affect the performance of the hormone oxytocin, which decreases lactation, and prevents the flow of milk. Therefore, breastfeeding mothers need to be in good moods while feeding their babies because their psychological state tends to affect the hormone and milk production [23].

Psychological stress, due to pain, the presence of fatigue after childbirth, lack of support, and difficulty in initiating breastfeeding is found in endocrine neuro-dysregulation. This leads to the dysfunction of the hypothalamus-pituitary-adrenal axis, and delay in milk production [24].

Breastfeeding mothers need the assistance of health workers or those with adequate understanding of the oxytocin massage. Therefore, this study makes a recent innovation in supporting the success of breastfeeding mothers through the development of an independent massage chair, with oxytocin facilities in the form of an electro tool located on the back.

The results showed that mothers feel more relaxed, comfortable, and calm when breastfeeding on this chair due to its ability to stimulate the hormone oxytocin, thereby increasing the flow of milk. KORSIMU is used once in 24 hours with duration of  $\pm$  10-20 minutes, and mothers have the ability to adjust the switch after feeling better. Furthermore, mothers feel comfortable, while breastfeeding in a sitting position.

The research also showed that four out of six mothers had an increase in milk production, characterized by the good frequency of breastfeeding in babies by 8-12 times. Furthermore, the frequency of urinating in the baby was clear yellow and above 6 times a day, while the defecation was 2-3 times and golden yellow in color. According to studies, the symptoms of babies with sufficient breastfeeding and increased milk production are characterized by the frequency of 8-12 times with clear yellow urine and defecation by 2-5 times. [8].

The increase in milk production is also characterized by the duration of a baby's nap after every feeding for 2-3 hours, and when awake, they have slept for more than 3 hours, they need to be awakened and fed. Furthermore, the mother's breasts feel tense due to milk and need to be taken out immediately to avoid pain [16].

An increase in milk production is seen through symptoms of good milk intake in babies for 8-12 times in 24 hours. During this process, they look calm, and the mother does not feel pain, despite the increase in weight. The frequency of urination on infants between 2-3 days is  $\geq 6$  times with a clear yellow color, and the defecation was 2-5 times with yellow gold/greenish-black color. A baby's ability to sleep after breastfeeding, shows satisfaction. According to mothers, an increase in milk production is characterized by a tense breast full of milk, relaxation, let down reflex is good, the frequency of breastfeeding is 8 times/day, increase in alternating both breasts, and correct feeding position. Furthermore, the breasts appear enlarged due to full milk and empty after the baby sucks adequately and slowly [25].

The research showed that there are several mothers breastfeed in the wrong position, therefore KORSIMU helps them to sit properly. There are also cushions to support the baby's head and the footing of a chair that has been specifically designed to prevent the mother's feet from hanging.

## V. CONCLUSIONS AND RECOMMENDATIONS

### Conclusion

In conclusion, four out of six breastfeeding mothers stated that the milk came out smoothly after using KORSIMU due to its comfort and massages in the spinal part.

### Recommendation

Further research is required in KORSIMU development. The collaborative support with other agencies such as provincial, district health offices and hospitals are needed to develop loan service system.

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