

OPTIMIZING THE ENDORPHIN AND OXYTOCIN MESSAGES TO INCREASE BREAST MILK PRODUCTION AMONG POSTPARTUM MOTHERS IN INDONESIA

Sumirah Budi Pertami¹, Budiono², Ira Rahmawati³

^{1,2,3}Department of Nursing, Poltekkes Kemenkes Malang, Jalan Ijen Besar Malang, Indonesia

ABSTRACT

Keywords:

endorphin massage
oxytocin massage
exclusive breastfeeding
primiparous postpartum women

Exclusive breastfeeding is the gold standard of infant feeding in the first six months. In Indonesia, breastfeeding practice has become a social norm among women. However, some women have experienced inadequate breast milk production, especially in the first and second days after birth. This study aimed to investigate the effect of endorphin and oxytocin massage on breast milk production among primiparous postpartum women and their baby weight. A quasi-experimental design was utilized with pre-test and post-test control group design. The population in this study were 175 postpartum mothers in Lawang Primary Health Care Indonesia. Forty postpartum mothers were selected and allocated to the intervention and control groups. Ten women were received endorphin massage, and ten were given oxytocin massage. Ten mothers have received the combination of endorphin and oxytocin massage, and the remaining ten were allocated into the control group. The dependent variables were breast milk production and infant body weight, whereas the independent variables were endorphin massage, oxytocin massage, and combination of endorphin and oxytocin massages. Data were analyzed by using t-test followed by One Way ANOVA Test with $\alpha = 0.05$. The results indicated differences between the four groups regarding the breast milk production and an increase in baby weight with $p = 0,00 < \alpha = 0,05$ and $p = 0.046 < \alpha = 0.05$ respectively. According to the results, the combination of endorphin and oxytocin massage is the most effective technique to increase breast milk production among postpartum women and, therefore, facilitating the baby weight gain in the first six months of their life.

BACKGROUND

According to the Indonesian Health Demographic Survey (IDHS), the infant mortality rate in Indonesia is still high, with 35 deaths per 1000 live births in 2012. The most common causes of infant deaths included low birth weight and asphyxia which accounted for 29% and 27% of the case respectively (Kementerian Kesehatan Republik Indonesia, 2014).

Giving the infant breast milk soon after birth may help to prevent infant death. This practice is commonly known as early breastfeeding initiation (IMD). Colostrum is the first form of milk produced by the mothers, which should be given to the baby in the first 24 hours. The babies need about 30 ml of colostrum for the early 24 hours (Nurmiati & Besral, 2008).

Breast milk carries antibodies that help pro-

tect infants from infections. Besides, breast milk contains nutrients including lactose, fat, digestible proteins called lactalbumin, a lot of vitamins and minerals (Castellote et al., 2011). However, the exclusive consumption of maternal milk among infants under the age of six months was only 39% (Kementerian Kesehatan Republik Indonesia 2014). Factors contributing the lower maternal milk consumption included a lack of knowledge about the benefits of breast milk and lower maternal social economic status (Saldan et al., 2017). However, the most frequent cause of breastfeeding failure is insufficient milk production and secretion (Yaqub & Gul 2013). Other factors such as a lack of family and social support may also contribute to the lower breastfeeding practice among postpartum mothers (Budiharjo, 2003).

During the puerperal period mothers experience physical and emotional trauma which may in-

terfere with their daily functions including lactation (Jahani shoorab et al., 2019; Lu et al., 2019). Insufficient breast milk secretion has become one of many reasons for non-exclusive breastfeeding among mothers especially the primiparous women. Breast milk production and secretion are regulated by two main hormones namely prolactin and oxytocin. Prolactin is synthesized by the anterior pituitary gland released as a response to the suckling (Ozalkaya et al., 2018). Meanwhile, oxytocin will cause myoepithelial cells in the breast to contract to cause the ejection of milk from the alveoli toward the nipple (Moberg & Prime, 2013). In addition, promotes well-being, as it reduces pain sensitivity and produces anti-stress effects (Moberg & Prime, 2013).

Many efforts have been proposed to promote breast milk production in postpartum mothers such as Relaxation techniques, psychological supports and acupoint-tuina therapy (Lu et al., 2019). Varied massage techniques are known as powerful tools to enhance milk production including breast massage, oxytocin massage and endorphin massage (Bowles). Oxytocin massage is a technique of massaging the spine from the level of cervical seven to thoracal 5-6. This will activate the parasympathetic nerve and induce oxytocin release, hence the name oxytocin massage (Sari et al., 2017). Meanwhile, endorphin massage is a technique that provides a sense of calm and comfort that can increase the release of the endorphin hormone, hence the name endorphin massage. It includes a touch and a light massage throughout the body. Endorphin massage is originally developed by Constance Palinsky as a pain controlling method (Saudia & Murni, 2017). Mothers who are feeling comfortable and relaxed will maintain adequate breast milk production and secretion (Saldan et al., 2017; Sari et al., 2017). To date, only few study have been conducted to assess the effect of combining these two interventions on breast milk production, specifically in primiparous postpartum mothers.

Sufficient production of breast milk will provide adequate nutrition for infants in the first months of the birth, which facilitate infant weight gain up to 10% of the birth weight. This study aimed to investigate the effects of oxytocin and endorphin massages on breast milk production and baby weight among primiparous postpartum mothers in Malang- Indonesia.

METHODS

This research utilized a quasy-experimental with pretest and posttest control group design. Forty

primiparous mothers who met the inclusion criteria and agreed to participate were included in this study. The respondents were then randomly assigned into four groups. Each group received different treatments. Oxytocin group received oxytocin massage, endorphin group received endorphin massage, combination group received both oxytocin and endorphin massages, and the control group received conventional postpartum therapies. In all intervention groups, the massages were performed twice a day for fifteen minutes for two months.

This study conducted in Lawang Primary Health Care Malang Indonesia in 2019 for six months from March to September 2019.

The dependent variables were breast milk production and infant body weight, whereas the independent variables were endorphin massage, oxytocin massage, and combination of endorphin and oxytocin massages. The Kolmogorov test was performed and showed that all data are normally distributed. Data were then analyzed using a t-test for each group, followed by the One Way ANOVA test with $\alpha = 0.05$. The ethics committee has approved this study of Poltekkes Kemenkes Malang number 687/KEPK-POLKESMA/2017.

RESULTS

The average age of the respondents in our study were 24.6 years' old which is in the range of reproductive age.

Table 2 describes the result of paired T-test in the endorphin massage group. For the breast milk production $p = 0,005 < \alpha = 0,05$ which means there is a difference in the mean of breast milk secretion before and after the endorphin massage given. Meanwhile for the baby weight $p = 0,001 < \alpha = 0,05$ which means there is a difference in the mean of baby weight before and after the intervention.

Table 3 describes the result of paired T-test in the oxytocin massage group. For variable breast milk production $p = 0,008 < \alpha = 0,05$ which means there is a difference in the average breast milk production before and after the oxytocin massage given. Similarly, for the baby weight $p = 0,009 < \alpha = 0,05$ which means there is a difference in the mean of baby weight before and after the intervention.

Table 4 showing the result of paired t-test in the combination group. For variable breast milk production $p = 0,000 < \alpha = 0,05$ which means there is a difference average of breast milk production before and after the combination of oxytocin and endorphin massages given. Meanwhile, for the baby

Table 1. Showing the Age of the Respondents

Variable	N	Mean	Std
Age	40	24.60	4.86

Table 2. Comparison of Breast Milk Production and Infant Weight Before and After Intervention in the Endorphin Massage

Variable	Mean	Std Dev	T	df	Sig. (2-tailed)
Breast milk products Pre - posttest	-1.60	0.65	-5.488	4	0.005
Baby's weight pre - posttest	-355.0	83.66	-9.488	4	0.001

Table 3. Comparison of Breast Milk Production and Infant Weight Before and After Intervention in the Oxytocin Massage

Variable	Mean	Std Dev	T	df	Sig. (2-tailed)
Breast milk products pre - posttest	-2.100	0.96177	-4.882	4	0.008
Baby's weight Pre-posttest	31.00	572.86	0.121	4	0.009

Table 4. Comparison of Breast Milk Production and Infant Weight Before and After Intervention in the Combination

Variable	Mean	Std Dev	T	df	Sig.(2-tailed)
Breast milk products pre - posttest	-2.60	0.542	-10.614	4	0.000
Baby's weight pre - posttest	-460.00	255.92	-4.019	4	0.016

Table 5. Comparison of Breast Milk Production and Infant Weight at Beginning and End of the Study in the Control

Variable	Mean	Std Dev	T	df	Sig.(2-tailed)
Breast milk products pre-posttest	-1.500	0.3535	-9.487	4	0.132
Baby's weight pre-posttest	-100.00	209.16	-1.069	4	0.345

weight, $p = 0,016$ $\alpha \leq 0,05$ which means there is a difference in the mean of baby weight before and after the intervention.

Table 5 shows the result of paired t-test in the control group. For the breast milk production $p =$

$0,132 > \alpha = 0,05$ which means there is no difference in the average of breast milk production in the beginning and at the end of the study in the control group. Meanwhile, for the baby weight, $p = 0,345 > \alpha = 0,05$ which means there is no difference in the

Table 6. Comparison of the Mean of Breast Milk Production and Baby Weight Across all Group Using One-way ANOVA Test

Variable		N	Mean	Min	Max	Std.	Sig.
Breast milk production Post	Endorpin	10	5.60	5.00	6.00	0.418	
	Oxytocin	10	5.50	5.00	6.00	0.353	
	Endhorpin+ Oxytocin	10	6.00	6.00	6.00	0.000	0.000
	control	10	3.70	3.00	4.50	0.570	
Baby's weight -Post	Endhorpin	10	3295	2800	4350	636.5	
	Oxytocin	10	2929	1895	3650	658.3	
	Endhorpin+ Oxytocin	10	3970	3400	4400	375.2	0.046
	control	10	3160	2550	4200	640.7	

mean of baby weight in the beginning and at the end of the study.

Table 6 describes the results of One Way ANOVA Test measuring the difference of the mean score of the pre-test - post-test across all groups. For breast milk production, $p = 0,00 < \alpha = 0,05$ which means that there is a difference in the average of breast milk secretion across all groups. Similarly, for the infant weight, $p = 0.046 < \alpha = 0.05$, which means that there is a difference infant weight gain across all group with the highest increase of infant weight gain was seen in respondents who received both oxytocin and endorphin massages.

DISCUSSION

This study revealed that both oxytocin and endorphin massages given to postpartum mothers enhance breast milk production and infant weight. However, the effect of these massages will be more effective if given as a combination. We found that the highest increase of breast milk secretion and infant weight were seen in respondents who received both massages. At the end of the study, the average breast milk production in this group increased by 2.60, and infant weight increased by 460. Breast milk production increased by having Insufficient breast milk secretion is the most frequent cause of inadequacy of exclusive breastfeeding followed by the illness of the baby, illness of the mother and working mothers (Yaqub & Gul, 2013). This study included forty primiparous mothers aged 21 to 35 years old. Indeed, the optimal age for childbearing is 20 to 35 years old because Mothers who are less than 35 years old produce more breast milk than mothers who are older. Similarly, mothers who are very young (less than 20 years) produce less breast milk (Biancuzzo, 1999).

Many factors affecting the amount of milk produced and ejected from the mammary gland. Insufficient or even a perception of insufficient milk production is the most common reason for non-breastfeeding reported by the mothers (Bowles; Kent, Prime & Garbin, 2012). Oxytocin and prolactin are two major hormones involved in breast milk secretion and ejection. Meanwhile, endorphin is a mood booster hormone that may stimulate relaxing feeling in postpartum women, hence facilitating lactation. In this study, we aimed to stimulate the secretion of oxytocin and endorphin hormones with specific massage techniques. We found that there is significant difference in regards to the breast milk production and baby weight gain in the intervention group compared to the control group with $p = 0,005 < \alpha = 0,05$ and $p = 0,046 < \alpha = 0,05$ respectively. The highest increased in breast milk production was found among respondents who receive combination of oxytocin and endorphin massages.

The secretion oxytocin is triggered by the receptors located in the ductal system. When the duct is stretched, the pituitary gland will release oxytocin, causing the milk to eject from the mammary gland's alveoli. The oxytocin massage, which merely a spinal massage, will stimulate the medulla oblongata, which then sends impulses to the hypothalamus in the posterior pituitary to release oxytocin, causing milk secretion from the breast. Other mechanisms that are caused by this spinal massage are relaxation and stress relief. Massaging the mothers' spine may cause the mothers to feel calm, relaxed, reduced sensitivity to the pain, and loving more the baby. This may cause the release of oxytocin hormones, which then cause breast milk ejection. Indeed, Mothers need to be relaxed and free of tension to ensure adequate breast milk production (Widia; & Meihartati, 2018).

In this study, we found that the massages given have significant effects on infant weight gain. The messages facilitate exclusive breastfeeding in the intervention group as it promoted sufficient breast milk production and secretion during the first weeks of the postpartum period. Indeed, sufficient breastmilk production will cause the adequacy of exclusive breastfeeding, which then enhance baby weight gain.

At first days of birth, the baby will breastfeed on an irregular schedule and have a certain pattern one or two weeks later. A healthy baby can empty the breast for about 5-7 minutes. The milk will be fully absorbed within 2 hours. It is recommended to breastfeed a baby without being scheduled because the baby will determine their own needs.

Oxytocin and endorphin massages are the favorable non-pharmacological methods to enhance breast milk production because it can facilitate spouse involvement as the massages are delivered to mothers by their spouses. Moreover, endorphin massage might be utilized to relieve postpartum depression symptoms among postpartum mothers (Saudia & Murni 2017).

Our study is the first study that involved four groups evaluating the effect of oxytocin massage, endorphin massage, and combination of both massages. We also included a control group. We found that although endorphin and oxytocin massages may help to increase breast milk secretion when given alone compared to the control group when it is given as a combination therapy, the effect will be much more enhancing. Our study did not evaluate the husband's views or experiences when providing the massages. Therefore, Future studies may also be enriched by experience or perception of the spouse in delivering the massages, especially endorphin massage.

CONCLUSIONS

Endorphin massage, oxytocin massage, or both might be used as adjunction therapies to facilitate exclusive breastfeeding among primiparous postpartum mothers. Oxytocin and endorphin massages are the favorites because it involves the spouses. Endorphin massage can also reduce the severity of postpartum blues among postpartum mothers. Future studies may also be enriched by experience or the spouse's perception in delivering the massages, especially endorphin massage.

REFERENCES

Biancuzzo, M. 1999. 'Breastfeeding the Newborn:

Clinical Strategies for Nurses. *The Journal of Perinatal & Neonatal Nursing*, vol. 13, no. 1, pp. 92-93.

Bowles, B.C. 2000. Breast Massage: A "Handy" Multipurpose Tool to Promote Breastfeeding Success. *Clin Lactation*, no. 4, pp. 21-24.

Budiharjo, N.S.D. 2003. Masalah-masalah dalam menyusui, *Perkumpulan Perinatologi Indonesia*, Jakarta.

Castellote, C., Casillas, R., Ramírez-Santana, C., Pérez-Cano, F.J., Castell, M., Moretones, M.G., López-Sabater, M.C. & Franch, À. 2011. Premature Delivery Influences the Immunological Composition of Colostrum and Transitional and Mature Human Milk. *The Journal of Nutrition*, vol. 141, no. 6, pp. 1181-1187.

Jahani shoorab, N., Mirteimouri, M., Taghipour, A. & Latifnejad Roudsari, R. 2019. Women's Experiences of Emotional Recovery from Childbirth-Related Perineal Trauma: A Qualitative Content analysis. *International Journal of Community Based Nursing & Midwifery*, vol. 7, no. 3, pp. 181-191.

Kementerian Kesehatan Republik Indonesia. 2014. Profil Kesehatan Indonesia 2014, <<http://www.depkes.go.id/>>.

Kent, J.C., Prime, D.K. & Garbin, C.P. 2012. Principles for Maintaining or Increasing Breast Milk Production. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, vol. 41, no. 1, 01/01/January 2012, pp. 114-121.

Lu, P., Ye, Z.Q., Qiu, J., Wang, X.Y. & Zheng, J.J. 2019. Acupoint-tuina therapy promotes lactation in postpartum women with insufficient milk production who underwent caesarean sections. *Medicine*, vol. 98, no. 35, pp. e16456-e16456.

Moberg, K.U. & Prime, D.K. 2013. Oxytocin effects in mothers and infants during breastfeeding. *Infant*, vol. 9, no. 6.

Nurmiati & Besral. 2008. Pengaruh Durasi Pemberian ASI Terhadap Ketahanan Hidup Bayi di Indonesia. *Makara, Kesehatan*, vol. 12, no. 2, pp. 47-52.

Ozalkaya, E., Aslandogdu, Z., Ozkoral, A., Topcuoglu, S. & Karatekin, G. 2018. Effect of a galactagogue herbal tea on breast milk production and prolactin secretion by mothers of preterm babies. *Niger J Clin Pract*, vol. 21, no. 1, Jan, pp. 38-42.

Saldan, P.C., Venancio, S.I., Saldiva, S.R.D.M., Vieira, D.G. & Mello, D.F.D. 2017. Milk Consump-

- tion in Infants under One Year of Age and Variables Associated with Non-Maternal Milk Consumption. (Consumo de leites em menores de um ano de idade e variáveis associadas ao consumo de leite não materno), *Revista paulista de pediatria : orgao oficial da Sociedade de Pediatria de Sao Paulo*, vol. 35, no. 4, Oct-Dec, pp. 407-414.
- Sari, N., Soejoenoes, A., Wahyuni, S., Setiani, O. & Anwar, C. 2017. The Effectiveness of Combination of Oxytocin and Endorphin Massage On Uterine Involution in Primiparaous Mothers. *Belitung Nursing Journal*, vol. 3, no. 5.
- Saudia, B.E.P. & Murni, N.N.A. 2017. Pengaruh Endorphin Massage terhadap Peningkatan Produksi ASI pada Ibu yang terdeteksi Postpartum Blues dengan Skrining EPDS (Edinburg Postpartum Depression Scale) Di Puskesmas Wilayah Kerja Sekota Mataram. *Journal Kesehatan Prima*, vol. 11, no. 1, pp. 36-42.
- Widia, L. & Meihartati, T. 2018. Oxytocin Massage Enhanced Breast Milk Production in Postpartum Women. *e-Journal Unair*.
- Yaqub, A. & Gul, S. 2013. Reasons for failure of exclusive breastfeeding in children less than six months of age. *J Ayub Med Coll Abbottabad*, vol. 25, no. 1-2, Jan-Jun, pp. 165-167.