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THE IMPACT OF COMBINATION OF ROLLING AND OKETANI MASSAGE ON PROLACTIN LEVEL AND BREAST MILK PRODUCTION IN POST-CESAREAN SECTION MOTHERS

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ABSTRACT

Background: Normal childbirth or cesarean section has an effect on the initiation of early breastfeeding. Thus, rolling massage and oketani massage are considered helpful for milk production. However, little is known about the combination of rolling and oketani massage.

Objective: To examine the effect of combination of rolling and oketani massage on the levels of prolactin and milk production in post-caesarian section mothers.

Methods: A quasi-experimental study with pretest-posttest control group design. Thirty-six samples were selected using consecutive sampling, with 18 each assigned to an experiment and control group. Breast milk production was measured based on the baby's weight, while prolactin levels were measured using ELISA method. Data were analyzed using univariate and bivariate analysis.

Results: Results showed that there was a statistically significant difference of prolactin levels after intervention in the experiment and control group with p-value 0.035 (<0.005), and significant difference in breast milk production in both groups in posttest 1 and posttest 2 with p-value 0.000 (<0.05).

Conclusion: There was statistically significant effect of the combination of rolling and oketani massage on the increase of prolactin levels and breast milk production. It is suggested that this intervention can be applied in midwifery care in post-cesarean section mothers.

Keywords: rolling massage, oketani massage, breast milk production, prolactin, post-caesarian section mother

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INTRODUCTION

Exclusive breastfeeding is breast milk given to infants since birth for six months, without adding and/or replacing with other foods or beverages, except drugs, vitamins and minerals.[1] Literature indicated that school children who exclusively breastfed 6-7 months are 8.5 times more likely not to be overweight and obese than those who did not exclusively breastfeed.[2]

Breast milk production is affected by prolactin reflexes and let down reflexes.[3] The prolactin reflex is affected by the infant's suction that will stimulate the receptor on the nipple and the breast, and then the stimulation is directed to the sensory nerve, and then to the hypothalamus via the spinal cord and mesencephalon to stimulate the prolactin-secreting adeno hypophyses and stimulate the alveoli to produce milk.[4] The oxytocin or let down reflex is derived from the infant's suction, which continues into the neurohypophyses (posterior hypophonia) that secretes oxytocin resulting in contraction of the myoepithelial cells of the alveoli wall with mamae cells, which then enter the ductular system, and the milk will flow through the lactiferous ducts. This oxytocin reflex is affected by maternal psychological factors. If there is anxiety, stress and doubt occur, the expenditure of breast milk can be hampered.[3]

Cesarean section mothers often have a problem in the initiation of early breastfeeding due to rooming-in factors, weakness as an effect of anesthesia, and incisions on the mother's abdomen.[5] Therefore, patients with new caesarean section can successfully breastfeed after a few hours postpartum.

In Semarang regency, from 2013 to 2014, the coverage rate of breast milk has increased from 36.29% to 44.3%. However, this is still far from the coverage target of exclusive breastfeeding in 2012, which was 80% of coverage.[6] Preliminary study at the General Hospital of Ambarawa revealed that the number of deliveries in 2014 - 2015 had a significant increase of 29.50%. The data of caesarean section patients were 54.81% in 2015, and there were 333 caesarean section patients at the first semester of 2016.[7]

Total hospital care of post-cesarean section and early breastfeeding patients have been activated since January 2016, and performed in the maternity unit of Ambarawa General Hospital. Most of the patients had a problem with breast milk production after 4 hours after cesarean section, which caused dehydration, fever and hyperbilirubin in the babies.[7] In addition, infant fever rates in 2016 were 20 babies per month, and babies who experienced hyperbilirubin for phototherapy reached 15 babies per month. The hospital only provides breast care to address breast milk production, which may not be effective enough to deal with this problem.[7] Thus, the alternative that can be used to accelerate breastfeeding in the post-cesarean section besides breast care, early breastfeeding and maternal nutrition is to provide massage stimulation or massage.

Rolling massage is a spinal massage (costae 5-6 to a scapula in a circular motion) performed on mothers after delivery that can help the hormone oxytocin work in breast milk, speeding up the parasympathetic nerves delivering signals to the back of the brain to stimulate oxytocin drain the milk out.[4] Mothers who are given rolling massage earlier than 12 hours after the cesarean section are having breast milk secretion (18 hours) quickly compared with mothers who have the provision of rolling massage more than 24 hours after the cesarean section.[8] Another study also stated that rolling massage has 6 times faster in breast milk secretion compared to mothers who are not given the intervention.[4]

On the other hand, Oketani massage is also one of the breast care methods that do not cause pain and is popular in Japan.[9] This massage stimulates the pectoralis muscle strength to increase milk production and make the breasts become softer and elastic so as to facilitate the baby to suck milk.[10] Oketani massage has been shown to be very effective in reducing breast pain and increasing the pH of breastmilk and the speed of neonatal suction reflex.[11] In addition, this massage can also improve the quality of colostrum. Previous studies have been examined the effect of oketani massage and oxytocin massage on milk production in post-caesarean section mother, and showed that there were different frequency of breastfeeding, frequency of defecation and urination in respon-dents.[12,13] However, little is known about the combination of rolling massage and oketani massage. Therefore, this study aimed to examine the effect of the combination of rolling and oketani massage on the breast milk production and prolactin levels in post-cesarean section mothers.

METHODS

Design

This research was a quasi-experiment with pretest and posttest control group design. This research was conducted in the General Hospital of Ambarawa Semarang Regency from 16 September to 30 October 2016.

Population and sample

The population in this study was all post-caesarian section mothers. Thirty-six samples were selected using consecutive sampling, with 18 each assigned to an experiment and control group. The inclusion criteria of the samples were: 1) mother with post-caesarean section day-1, 2) aged 20-35 years, 3) exclusive breastfeeding for 3 days, 4) baby born alive and normal with weight >2500 grams, 5) mother and baby were in health condition, 6) baby had a good suction reflex, 7) had normal breast condition, and 8) willing to be respondent.

Intervention

Intervention was given to the post-cesarean section mothers in 12 hours for 3 days in the morning and afternoon. Each intervention was performed for 45 minutes. Massage was done alternately, which performing the rolling massage first, then continued to oketani massage. For the control group, breast care was given every morning for 3 days, with 15 minutes in each intervention. Interventions were provided by researchers and trained and certified enumerators. Interventions were given in each patient room. The obstacles that researchers experienced in providing intervention were the fear of early mobilization, but this could be overcome by motivation and encouragement.

Instruments

Prolactin levels were measured by the ELISA (Enzyme-Linked Immunosorbent Assay). Researchers took venous blood of each respondent for three times: 1) before intervention, 2) after three days treatment at twelve hours post-caesarean sections, and 3) the third day of the afternoon before the patient returned. Breastmilk production was measured based on the baby's weight difference before and after breastfeeding in every 24 hours; in the first 24 hours or before treatment (pretest), in 24 hours in the 2nd day (posttest 1), and in 24 hours in the 3rd day (posttest 2). The difference in weight was measured by a digital baby scales with a precision of 5 grams that have been calibrated.

Data analysis

Data were analyzed using SPSS series 21. The analysis of this study was univariate

and bivariate, in which bivariate analysis examined the effect of combination of rolling massage and oketani massage on prolactin level and milk production.

Ethical consideration

Ethical consideration was obtained from the Health Research Ethics Committee (K.E.P.K) of Health Polytechnic of Ministry of Health (Poltekkes) of Semarang with No. 128 / KEPK / Poltekkes-SMG / EC / 2016. This study was also obtained permission from the General Hospital of Ambarawa Semarang. Informed consent has been performed for all respondents.

RESULTS

Table 1 shows that the majority of respondents in the experiment group and control group 20-25 years old. Chi Square test showed p-value 0.735 (> 0.05), which indicated that there was no age difference in the experiment and control group. Most of respondents in the experiment group and control group had given birth more than 1 time but not more than 4 times. Levene's test results showed that the p-value was 0.738 (> 0.05) so there was no parity difference in both groups.

Table 1 Characteristics of the respondents based on age and parity

Variable	Group		*p-value*
	Intervention N (%)	Control N (%)	
Age (year)			0.735[a]
20-25	9 (50 %)	8 (44.4 %)	
26-30	4 (22.2 %)	6 (33.3 %)	
31-35	5 (27.8 %)	4 (22.2 %)	
Parity			0.738
Primipara	8 (4.4 %)	7 (38.9 %)	
Multipara	9 (50 %)	10 (55.6 %)	
Grand multipara	1 (5.6 %)	1 (5.6%)	

[a]*Chi Square*

Table 2 Difference of prolactin level and milk production in the intervention and control group

Variable	Treatment	Group	N	Mean ± SD	*p-value*
Prolactin level (ng/ml)	Pretest	Intervention	18	214.11 ± 23.449	0.114[b]
		Control	18	211.62 ± 41.426	
	Posttest	Intervention	18	235.64 ± 20.874	0.035[b]
		Control	18	225.89 ± 20.050	
	Mean difference	Intervention	18	21.56 (14.920)	0.000[c]
		Control	18	2.08 (38.248)	
Breast milk production (gr)	Pretest	Intervention	18	46.06 ± 17.881	0.071[c]
		Control	18	36.05 ± 13.909	
	Posttest1	Intervention	18	189.12 ± 46.056	0.000[c]
		Control	18	89.84 ± 25.551	
	Posttest2	Intervention	18	339.33 ± 62.849	0.000[c]
		Control	18	173.67 ± 48.723	

[b]*Independent t-test,* [c]*Mann Whitney Test*

Table 2 shows that there was no difference of prolactin levels before intervention between the intervention and control group with p-value 0.114 (>0.05). However, there was a statistically significant difference of prolactin levels after intervention with p-value 0.035 (<0.005), which indicated that the

combination of rolling and oketani massage had a significant effect on the increase of prolactin levels.

For breast milk production, both groups had no difference before intervention with p-value 0.071 (>0.05), however Mann Whitney test showed a statistically significant difference in milk production in the two groups in posttest 1 and posttest 2 with p-value 0.000 (<0.05), which indicated that the combination of rolling and oketani massage had a significant effect on the increase of milk production.

Table 3 Mean difference of breast milk production between intervention and control group using Friedman test

Variable	Group	Treatment	N	Mean ± SD	*p-value*
Breast milk production (gr)	Intervention	Pre-test	18	46.06 ± 17.881)	0.000
		Posttest 1	18	189.12 ± 46.056)	
		Posttest 2	18	339.33 ± 62.849)	
	Control	Pre-test	18	36.05 ± 13.909)	0.000
		Posttest 1	18	89.84 ± 25.551)	
		Posttest 2	18	173.67 ± 48.723)	

Friedman test as shown in table 3 indicated that there was a statistically significant difference of breast milk production in the intervention and control group between pretest, posttest 1, and posttest 2 with p-value 0.000 (<0.05).

Similar result with the Wilcoxon test in the table 4 shows that there were significant differences in all times of the treatment between the intervention and control group with p-value 0.000 (<0.05).

Table 4 Breast milk production in the intervention and control group using Wilcoxon test

Variable	Group	Treatment	*p-value*
Breast milk production (gr)	Intervention	Pretest – Posttest 1	0.000
		Pretest – Posttest 2	0.000
		Posttest 1– Posttest 2	0.000
	Control	Pretest – Posttest 1	0.000
		Pretest – Posttest 2	0.000
		Posttest 1– Posttest 2	0.000

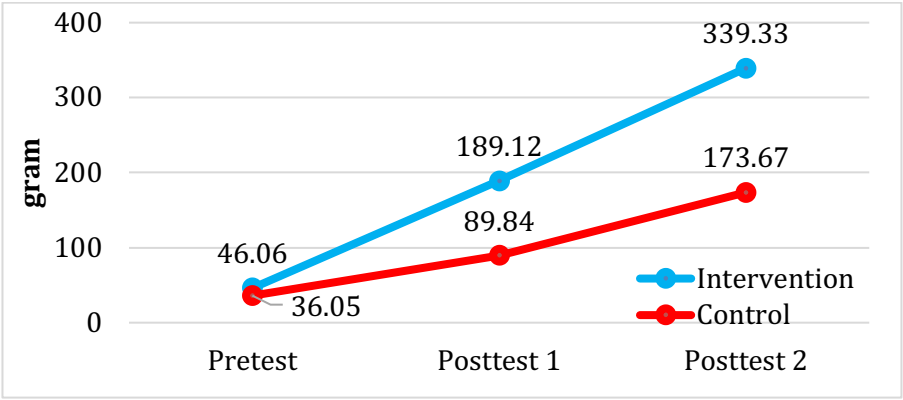

Figure 1 Graphic of mean difference of breast milk production in the intervention and control group before and after the treatment

Figure 1 shows that there was a significant increase of breast milk production in the intervention and control group before and after intervention. However, breast milk production in the intervention group has a higher increase compared to breast milk in the control group.

DISCUSSION

Findings of this study revealed that there was statistically significant effect of the combination of rolling and oketani massage on the increase of prolactin levels and breast milk production. This is consistent with the previous studies stated that prolactin levels increase after given a variety of massages such as Woolwich massage and endorphin massage, oxytocin massage and aromatherapy in postpartum mothers because the effects of massage will give comfort, relax and more confidence.[14] In addition, this finding is also in line with previous research conducted in Muhammadiyah hospital of Palembang, revealed that there was a significant difference of milk production among post-caesarian mothers after doing rolling massage between control and intervention group with p-value 0.001.[15]

Rolling massage can stimulate the body to release endorphin compounds that are natural pain relievers.[16] For post-caesarean section mothers who breastfeed, massage helps mothers feel more relaxed and comfortable. The touch of someone who cares and wants to help is a source of strength when the mother is sick and tired. Body parts that can be massaged are starting from the head, neck, back and legs. However, when massaging, the masseuse should pay attention to the mother's response, whether the pressure given is correct.[16]

Gate control theory says that the stimulation of the skin surface (sub cutaneous) activates transmission cells (T) of sensory A-Beta nerve fibers larger and faster.[17] This process decreases the transmission of pain through fibers C and delta-A with a small diameter so that the synapse gate closes the transmission of the pain impulse. Cutaneous stimulation of the body is generally centered on the back and shoulders. It will stimulate peripheral fibers to transmit impulses through the dorsal horn of the spinal cord. When the impulse carried by the A-Beta fibers dominates, the gate mechanism closes so that the pain impulse is not delivered to the brain, and ultimately gives a relaxed sensation to the body.[17]

On the other hand, giving oketani massage can stimulate the pectoralis muscle strength to increase milk production and make the breasts soft and elastic, so it makes it easier for the baby to suck milk. Oketani massage will also provide a sense of relief and overall comfort to the respondents, improve the quality of breast milk, prevent nipples and mastitis, and can improve / reduce lactation problems caused by flat nipples and inverted nipples.[9]

In addition, oketani massage can also cause mamae glands to become mature and wider, resulting in more milk produced. Previous research suggests that oketani massage has been shown to increase milk production, and the quality of breast milk is to increase levels of protein and milk carbohydrates.[12]

The rolling and oketani massage are a great combination to increase breast milk production and prolactin levels, provide stimulation reflex of breastmilk formation and let down reflex. This combination can provide a relaxed sensation to the mother and smooth the flow of nerves and breast milk channels (duct system)in both breasts.[18]

Limitation of this study

Not all confounding variables that affect milk production and prolactin levels can be controlled such as maternal psychological factors and family support,

which could be considered as the limitation of the study.

CONCLUSION

It can be concluded that there was statistically significant effect of the combination of rolling and oketani massage on the increase of prolactin levels and breast milk production. Therefore, it is suggested that the combination of rolling and oketani massage can be applied in midwifery care in post-caesarean section mothers. Further study is needed to deal with all confounding variables.

Declaration of Conflicting Interest

None declared

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Author Contribution

All authors contributed equally in this study.

References

1. Leung AKC, Sauve RS. Breast is best for babies. *Journal of the National Medical Association.* 2005;97(7):1010.
2. Martin CR, Ling P-R, Blackburn GL. Review of infant feeding: Key features of breast milk and infant formula. *Nutrients.* 2016;8(5):279.
3. WHO. *The optimal duration of exclusive breastfeeding.* A systematic review. Geneva, WHO; 2001.
4. Thet MM, Khaing EE, Diamond-Smith N, Sudhinaraset M, Oo S, Aung T. Barriers to exclusive breastfeeding in the Ayeyarwaddy Region in Myanmar: Qualitative findings from mothers, grandmothers, and husbands. *Appetite.* 2016;96:62-69.
5. Agunbiade OM, Ogunleye OV. Constraints to exclusive breastfeeding practice among breastfeeding mothers in southwest Nigeria: implications for scaling up. *International Breastfeeding Journal.* 2012;7(1):5.
6. Muchacha M, Mtetwa E. Social and economic barriers to exclusive breast feeding in Rural Zimbabwe. *International Journal of MCH and AIDS.* 2015;3(1):16.
7. Thomas JV. *Barriers to exclusive breastfeeding among mothers during the first four weeks postpartum.* Minnesota: Walden University, College of Health Sciences; 2016.
8. Kementerian Kesehatan Republik Indonesia. *Basic health research report 2013.* Jakarta: Kementerian Kesehatan Republik Indonesia; 2013.
9. Hajeebhoy N. The Lancet breastfeeding series. Geneva: World Health Organization; 2016.
10. Department of Health of East Java. *Health profile of Kediri City.* East Java: Department of Health of East Java Indonesia; 2016.
11. Munir M. Infantile diarrhoea: Breast and bottle feeding compared with special reference to their clinical role. *Paediatrica Indonesiana.* 1985;25(5-6):100-106.
12. Nindiyaningrum RA. Pengaruh pemberian ekstrak daun katuk terhadap produksi ASI pada ibu post partum [Effect of katuk leaves extract on breast milk production in postpartum mothers]. *Jurnal Ilmu Keperawatan dan Kebidanan.* 2014;1(6).
13. Turlina L, Wijayanti L. Pengaruh pemberian serbuk daun pepaya terhadap kelancaran ASI pada ibu nifas di BPM Ny. Hanik Dasiyem, Amd. Keb di Kedungpring Kabupaten Lamongan [Effect of papaya leaf powder on breast milk production in postpartum mothers at BPM Ny. Hanik Dasiyem, Amd. Keb in Kedungpring Kabupaten Lamongan]. *Jurnal Media Komunikasi Ilmu Kesehatan.* 2015;7:01.
14. Syarief H, Damanik RM, Sinaga T, Doloksaribu TH. Pemanfaatan daun bangun-bangun dalam pengembangan produk makanan tambahan fungsional untuk ibu menyusui [Utilization of bangun-bangun leaves in development of functional additional food product in breastfeeding mothers]. *Jurnal Ilmu Pertanian Indonesia.* 2014;19(1):38-42.

15. Wahyuni E, Sumiati S, Nurliani N. Pengaruh konsumsi jantung pisang batu terhadap peningkatan produksi ASI di wilayah Puskesmas Srikuncoro, Kecamatan Pondok Kelapa, Bengkulu Tengah tahun 2012 [Effect of banana stone heart on breast milk production in the area of Public Health Center of Srikuncoro, Kecamatan Pondok Kelapa, Bengkulu Tengah in 2012]. *Buletin Penelitian Sistem Kesehatan.* 2013;15(4), 418-424.
16. Mamuaja CF, Aida Y. Karakteristik gizi abon jantung pisang (Musa Paradisiaca) dengan penambahan ikan layang (Decapterus sp) [Nutritional characteristics abon of banana inflorescence (Musa Paradisiaca) with addition of scad fish (Decapterus sp)]. *Jurnal Ilmu dan Teknologi Pangan.* 2014;2(2):28.
17. Soetjiningsih D. *ASI: Petunjuk untuk tenaga kesehatan [Breast milk: Guideline for health workers]*. Jakarta: EGC; 1997.
18. Sulistyawati A. *Buku ajar asuhan kebidanan pada ibu nifas [Textbook of Midwifery care for postpartum mothers].* Yogyakarta: Andi Offset; 2009.
19. Kumar KPS, Bhowmik D. Traditional and medicinal uses of banana. *Journal of Pharmacognosy and Phytochemistry.* 2012;1(3), 57-70.

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