Sari N, et al. Belitung Nursing Journal. 2017 October;3(5):569-576
Received: 8 March 2017 | Accepted: 30 October 2017
http://belitungraya.org/BRP/index.php/bnj/

ORIGINAL RESEARCH **ISSN: 2477-4073**

THE EFFECTIVENESS OF COMBINATION OF OXYTOCIN AND ENDORPHIN MASSAGE ON UTERINE INVOLUTION IN PRIMIPAROUS MOTHERS

Nurmala Sari[1*], Ariawan Soejoenoes[1], Sri Wahyuni[1], Onny Setiani[2], Choiroel Anwar[3]

[1]Magister Applied Midwifery, Poltekkes Kemenkes Semarang, Indonesia
[2]Faculty of Public Health, University of Diponegoro, Semarang, Indonesia
[3]Department of Radiology, Program Pascasarjana Magister Terapan Kesehatan, Poltekkes Kemenkes Semarang, Indonesia

***Corresponding author:**
Nurmala Sari
Magister Applied Midwifery, Poltekkes Kemenkes Semarang
Jl. Tirto Agung, Pedalangan, Banyumanik Kota Semarang, Jawa Tengah, Indonesia (50268).
E-mail: nurma.midwife@yahoo.com

ABSTRACT
Background: One of the puerperal complications is uterine subinvolution that can cause bleeding to maternal death. Oxytocin massage can stimulate oxytocin hormone that plays a role in the process of uterine involution. Endorphin massage can increase the release of oxytocin and endorphin hormone that give a sense of calm and comfort. It also increases production of oxytocin hormone that can improve the process of uterine involution.
Objective: To prove the effectiveness of a combination of oxytocin massage and endorphin massage to uterine involution in primiparous mothers during postpartum period.
Methods: This was a quasi-experimental study with pretest-posttest with control group design. Total samples were 44 normal postpartum mothers selected using purposive sampling technique, which were randomly assigned in four groups, namely: 1) oxytocin massage group, 2) endorphin massage group, 3) combined oxytocin-endorphin massage group, and 4) control group. Data were analyzed using univariate, bivariate and One-Way ANOVA to test the effectiveness of the intervention.
Results: There were statistically significant differences of fundal height before and after intervention among the four groups (p=<0.05).
Conclusion: The combination of oxytocin massage and endorphin massage proved most effective in accelerating uterine involution in normal postpartum mothers.

Keywords: oxytocin massage, endorphin massage, uterine involution

Editor's Note: This article has been updated on 9 July 2020 in terms of minor changes in the reference format. The update is according to BNJ Policy on article correction.

INTRODUCTION

Majority of incidence of maternal mortality is during puerperium period, which is mostly caused by bleeding.[1] Bleeding that occurs more than 24 hours to 6 weeks after birth is due to lack of adequate uterine contractions (50-60%).[2] The results of research in the United States found that 25,654 cases of bleeding during the puerperium in which 79% of the major causes were uterine atony or lack of uterine contractions.[3]

Lack of adequate uterine contractions during the puerperium can inhibit the process of uterine involution causing uterine subinvolution, which can lead to complications.[4] Study found that there were 21 respondents out of a total of 180 respondents experienced uterine subinvolution due to lack of adequate uterine contractions.[5]

However, uterine contractions can be increased by administration of oxytocin. The oxytocin hormone is useful for strengthening and regulating uterine contractions, compressing blood vessels and assisting maternal hemostasis, thus reducing the incidence of uterine atony especially in prolonged labor. Strong uterine contractions will also result in a more effective uterine involution process.[6] It is also revealed by Wakasa that oxytocin plays an important role in the involution process by inducing uterine smooth muscle contractions during the puerperium period.[7]

Oxytocin can be stimulated by doing massage. Massage techniques that can stimulate the release of the hormone oxytocin include the oxytocin massage and endorphin massage. The oxytocin massage is a spine massage action (vertebra) ranging from cervical 7 to costa to 5-6 to a scapula that will speed up the work of the parasympathetic nerve to deliver commands to the back of the brain to produce oxytocin.[8] Endorphin massage is a technique of touch and light massage for providing a sense of calm and comfort that can increase the release of oxytocin and endorphins hormones. Thus, when endorphin massage is administered to the postpartum mother, it can provide a sense of calm and comfort that increases the hypothalamus response in producing the oxytocin hormone that can improve the process of uterine involution.[9]

Previous study revealed that there is an influence of oxytocin massage with uterine involution process with p-value = 0.01 (<0.05).[10] Hidayati also found that endorphin massage can increase release of oxytocin and endorphin hormones as well as decrease levels of stress hormones in the blood.[11] Therefore, this study aimed to examine the effectiveness of a combination of oxytocin and endorphin massage to accelerate the process of uterine involution in normal primipara mothers.

METHODS

Design

A quasi-experiment with pretest-posttest control group design. The study was conducted on October-December 2016 at Independent Midwife Practice in the Community Health Center of Bayan, Purworejo district, Indonesia.

Population and Sample

Forty-four samples were selected using a purposive sampling, with 11 samples were

randomly assigned in four groups, namely: 1) oxytocin massage group with serial number 2, 6, 10, 14, 18, 22, 26, 30, 34, 38 and 42; 2) endorphin massage group with serial number 3, 7, 11, 15, 19, 23, 27, 31, 35, 39 and 43; 3) combined oxytocin-endorphin massage group with serial number 4, 8, 12, 16, 20, 24, 28, 32, 36, 40 and 44; and 4) control group with serial number 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41. The inclusion criteria included: 1) postpartum mother with normal pregnancy / aterm (37-42 weeks), 2) postpartum mother with single pregnancy, 3) normal and spontaneous delivery, 4) received oxytocin injection in the third stage of active management, and 5) aged 20-35 years. The exclusion criterion included mothers and babies with postpartum complications.

Intervention

In the oxytocin massage group, the researchers gave intervening massage of oxytocin for 15 minutes every morning and afternoon for 3 days. The massage of oxytocin is a spinal (vertebral) massage action from the cervical 7 to the 5th to 5th cost of the scapula which will speed up the work of the parasympathetic nerves to deliver the command to the back of the brain to produce oxytocin. The steps of doing the oxytocin massage were: a) Removing the upper mother's shirt and bra so that the breasts hanging off, b) Mother sat leaning forward, folding her arms on the table in front of her and laying her head on her arm, c.) Wetting both hands with oil or baby oil, d) Massage started from the seventh cervical to the scapula by way of massage using 2 fist with the thumb pointing forward, e) Continue the massage along both sides of the spine (vertebra) starting from the seventh cervical to the 5-6th costae by pressing hard to form a small circular motion clockwise using both thumbs downwards then upwards by 2-3 time, and f) Massage for 15 minutes with attention to patient response.[8]

In the endorphin massage group, the researchers gave intervention for endorphin massage for 20 minutes every morning for 3 days. Endorphin massage is a technique of touch and light massage to help provide a sense of calm and comfort. This light touch includes a very light massage and can make the fine hairs on the surface of the skin stand. The steps of endorphin massage were: a) Asking the mother to take the position as comfortable as possible, can be done by sitting or lying on your side, b) Performing gentle massage on the outer surface of the mother's hand, from the upper arm to the forearm. Massage was very gently done with the fingers or just the fingertips only and done on both arms for 5 minutes for each arm, c) Performing soft and light massage starting from the 7th cervical to form an inverted V letter, outward to the side of the rib for 5 minutes, d) Performing the massage up to the mother's lower back for 5 minutes, and e) Strengthening the effect of the massage with words that reassure the mother.[9]

In the combined oxytocin-endorphin massage group, the researchers gave intervening combination of massage oxytocin and endorphins every morning and evening for 3 days. In the control group, the researchers gave a counseling for 3 days.

Instrument

A measuring tape in centimeters was used to measure fundal height. Pretest was performed after 24 hours postpartum, and posttest measurements was performed on the 4th day in the morning. The procedure

of measurement as follows: a) mother was asked to urinate first, b) positioning the mother flat on the mattress with the head placed in a comfortable position with a pillow, c) determining the hardness and consistency of the uterus, d) measuring the height of the uterine fundus by using a tape measure, and e) Record the measurement results

Table 1 Fundal height during postpartum period

Involution	Fundal height
1st day	As high as the umbilicus
2nd day	1 finger/1 cm under umbilicus
3rd day	2 fingers/2 cm under umbilicus
4th day	3 fingers under umbilicus
5th day	At the center of symphysis umbilicus
7th day	1 finger above symphysis
10th day	As high as symphysis
12th day	Not palpable above the symphysis
6 weeks	Getting smaller
8 weeks	Normal

Data Analysis

A univariate analysis was performed to describe age, lactation and nutritional status variables. Paired T-Test was performed to test the difference of fundal height decrease before and after intervention in each group, and Independent T-Test was to test the differences between groups. One Way ANOVA was to find out the most effective intervention among 4 groups.

RESULTS

Table 2 Characteristics of the respondents

Variable	Group				*p-value*
	Control	Oxytocin massage	Endorphin massage	Combination	
Age (year) :					
Mean±SD	22±1.73	22.91±1.76	23±1.79	23.36±1.91	0.344
Min-max	20-25	20-26	20-25	20-26	
Lactation:					
Breastfeeding	8 (72.7%)	8 (72.7%)	10 (90.9%)	9 (81.8%)	0.674
Bottle-feed	3 (27.3%)	3 (27.3%)	1 (9.1%)	2 (18.2%)	
Nutritional status:					
Thin	1 (9.1%)	0 (0%)	2 (18.2%)	0 (0%)	0.269
Normal	10(90.9%)	11(100%)	9 (81.8%)	11(100%)	

Table 2 shows that the age of respondents was in the range of 20-26 years. Individual matching had been done according to the inclusion criteria (age range 20-35 years). The majority of respondents did not bottle-feed and in

normal nutritional status. P-value of age was 0.344, lactation was 0.674, and nutritional status was 0.269 (>0.05), which indicated that there were no significant differences of the characteristics of the respondents among the four groups. It could be said that the process of uterine involution was not influenced by age, lactation and nutritional status.

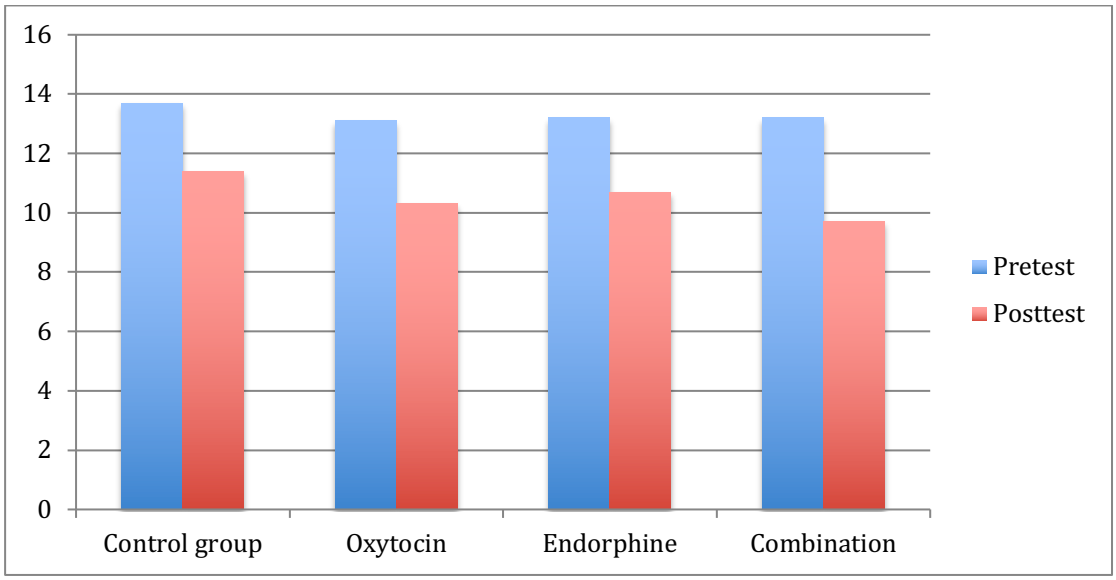

Figure 1 Comparison of fundal height mean before and after intervention

Figure 1 shows that there were differences of fundal height before and after intervention among the four groups. Independent t-test and One-way ANOVA test as shown in the table 3 indicated that there were significant mean differences of fundal height among the four groups with p-value <0.05. However, there was no difference between control group and endorphin group with p-value 0.328 (<0.05).

Table 3 Difference of Fundal height mean before and after intervention

Fundal height (cm)	Group				*p-value*
	Control	Oxytocin massage	Endorphin massage	Combination	
Mean difference: a. Control-oxytocin b. Control-endorphin c. Control-combination d. Oxytocin-combination e. Endorphin-Combination f. Oxytocin-endorphin					 0.002[e] 0.328[e] 0.000[e] 0.002[e] 0.000[e] 0.034[e]
Mean difference: a. Mean±SD b. Min-max	 2.37±0.37 2-3	 2.88±0.31 2.5-3.5	 2.54±0.39 2-3	 3.43±0.41 2.9-4	 0.000[f]

e : *Independent T -Test* f : *One Way ANOVA*

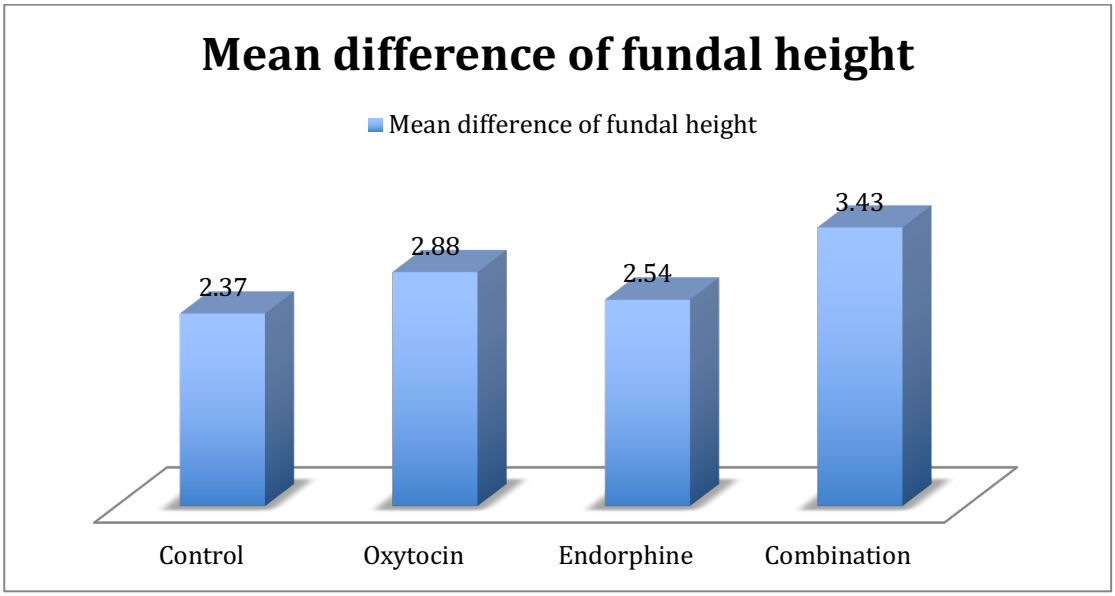

Figure 2 Mean difference of fundal height

Figure 2 shows the mean differences among the four groups. It is indicated that all interventions in the four groups had a significant impact on fundal height. However, the combination of oxytocin and endorphin massage had the higher impact than the other interventions on fundal height.

DISCUSSION

This study aims to examine the effectiveness of a combination of oxytocin and endorphin massage to accelerate the process of uterine involution in normal primipara mothers. The results of this study revealed that the combined oxytocin-endorphin massage was very effective compared to the oxytocin and endorphin massage alone. This combination causes a more significant impact on the process of uterine involution because the massage performed around the connective tissue will increase the levels of beta-endorphins and oxytocin in which the mother will relax so it can reduce stress and oxytocin hormones will be produced without any inhibitors. Furthermore, the massage will trigger anterior pituitary to secrete endorphins that result in reduced pain sensation and the body will feel relaxed, which will increase the release of the hormone oxytocin which acts to increase uterine contractions in uterine involution process.[9,12]

This finding is in line with the Morhenn's research explained the relationship of spinal muscle massage with increased oxytocin levels. The average levels of oxytocin was from 190.37pg/ml to 223.50 pg/ml. Comparative effects of massage in the intervention group and the control group had significant differences with $p < 0.05$.[13]

Hidayati also revealed that endorphin massage can increase the release of oxytocin and endorphins as well as decreased levels of stress hormones in the blood. She also revealed that endorphin massage can increase beta endorphin level of 688.5 ng/l ($p<0.05$). Thus, with this increase in beta endorphins, relaxation

will occur, which there is a vasodilatation of blood vessels that can accelerate the blood supply carrying oxytocin.[11]

Therefore, it could be said that the more the mothers doing massage, the faster the process of uterine involution. Rapaport revealed that if massage was performed one time per week it can cause differences in oxytocin. But if it is done twice a week it will further increase oxytocin. Massage repetition is associated with changes in oxytocin levels. The massage group has an average stable oxytocin level and a decrease in adrenocorticotropin hormone. The average of oxytocin levels in the group was 27.6 + SD 35.5 pg/ml, while in the group by soft massage had an average of oxytocin level of 80.1 + SD 42 pg/ml.[14]

This study shows that there is a significant influence on the combination group. This proves that the combination of oxytocin massage and endorphin massage in primiparous mothers can help speed up the process of uterine involution. However, due to the number of sample size in each group, the findings might not be able for generalization to all primiparous mothers in Indonesia.

CONCLUSION

Based on the results of this study, it can be concluded that the combination of oxytocin and endorphin massage had a significant effect on the process of uterine involution. It is suggested for midwives to apply this combined massage in accelerating the process of uterine involution. Socialization and training for health personnel are also needed to perform an effective intervention. Further research is needed with bigger sample size, and controlling the variables of early and psychological mobilization, and assessing the involution of the uterus in a longer time.

Declaration of Conflicting Interest
None declared.

Funding
This study was supported by Magister Applied Midwifery, Poltekkes Kemenkes Semarang, Indonesia.

Authorship Contribution
All authors have equal contribution in this study.

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Cite this article as: Sari N, Soejoenoes A, Wahyuni S, Setiani O, Anwar C. The effectiveness of combination of oxytocin and endorphin massage on uterine involution in primiparous mothers. *Belitung Nursing Journal.* 2017;3(5):569-576. https://doi.org/10.33546/bnj.193