Effects of Southern Thai Traditional Massage with Warm Compression on Lactation and Breast Engorgement: A Randomized Controlled Trial

Chudanut Khoonphet, Sopen Chunuan, Sasitorn Phumdoung*

Abstract: Lactation problems including delayed onset of lactation, insufficient milk volume, and breast engorgement are important barriers for primiparous mothers because these lead to their early stopping of exclusive breastfeeding. Therefore, a randomized controlled trial was conducted with primiparous mothers to investigate the effects of Southern Thai traditional massage with warm compression on onset of lactation, milk volume, and breast engorgement. A minimized randomization program was used to assign the participants into either 1) Southern Thai traditional massage with warm compression group (n = 21), 2) Southern Thai traditional massage group (n = 21), or 3) control group (n = 21) who received usual care. The instruments used for data collection consisted of a Demographic Data Form, the Onset of Lactation Form, the Milk Volume Recording Form, and the Six-Point Engorgement Scale. Descriptive and inferential statistics were used to analyze the data.

The results showed that the onset of lactation was significantly earlier and milk volume was significantly higher in the Southern Thai traditional massage with warm compression group than those in the Southern Thai traditional massage and control groups. Breast engorgement in the Southern Thai traditional massage with warm compression group was significantly lower than those in the Southern Thai traditional massage and control groups. Therefore, the Southern Thai traditional massage with warm compression intervention is effective in improving lactation and breast engorgement. Thus, nurses can use this intervention by teaching nurse-midwife, pregnant women, and relatives to promote the onset of lactation, increase milk volume, and prevent breast engorgement. Further testing with different groups is required before this can be extended to other population groups.

Pacific Rim Int J Nurs Res 2022; 26(3) 390-403

Keywords: Breast engorgement, Milk volume, Onset of lactation, Randomized controlled trial, Southern Thai traditional massage, Warm compression

Thai Clinical Trials Registry: http://thaiclinicaltrila.org/ (TCTR20210514005)

Received 25 December 2021; Revised 27 February 2022; Accepted 2 March 2022

Chudanut Khoonphet, *RN, PhD (Candidate), Faculty of Nursing, Prince of Songkla University, Songkhla, Thailand.*
E-mail: chudanut_khoonphet@hotmail.com
Correspondence to: Sopen Chunuan, *RN, PhD, Associate Professor, Faculty of Nursing, Prince of Songkla University, Songkhla, Thailand.*
E-mail: sophen.c@psu.ac.th
Sasitorn Phumdoung, *RN, PhD, Professor, Faculty of Nursing, Prince of Songkla University, Songkhla, Thailand. E-mail: sasitorn.ph@psu.ac.th*

Introduction

Typically, the mechanism of milk production and secretion occurs after the delivery of the placenta due to the rapid decrease in levels of estrogen and

progesterone hormones and consequent loss of inhibition of prolactin function.[1] However, primiparous mothers have a high risk of delayed onset of lactation because they are establishing prolactin receptors for the first time.[2] Mothers with a delayed onset of lactogenesis have a lower milk volume.[3] Primiparous mothers with insufficient milk volume are more likely to stop breastfeeding and resort to formula milk to feed their newborn.[4]

In addition, breast engorgement is an important cause of discontinuing exclusive breastfeeding among postpartum mothers.[5] Mothers with breast engorgement face pain and feel discomfort.[6] In addition, breast engorgement is also the cause of inhibitory milk production because when breast milk volume is full, the prolactin-inhibitor factor (PIF) inhibits milk production.[1] This may result in insufficient milk volume. Therefore, delayed onset of lactation, insufficient milk volume, and breast engorgement are common problems in breastfeeding postpartum mothers that influence unsuccessful breastfeeding.

Unsuccessful breastfeeding has a negative impact on infants, mothers, and the nation's health. The effects of using formula milk on infants include developing an allergy to the protein in cow's milk if using a cow's milk-based formula,[7] obesity,[8] as well as having low immunity to prevent allergies and asthma.[9] The impact of the mothers not breastfeeding includes an increased risk of breast cancer and ovarian cancer.[10] Moreover, the cost of buying formula milk can be a financial burden on families.[10] The impacts on the nation are the higher health expenditure due to the cognitive loss and lower cognition level of such babies.[11] Therefore, interventions to promote the onset of lactation, increase milk volume, and prevent breast engorgement in primiparous mothers are needed.

Several studies suggest that massage with warm compresses is an appropriate strategy to promote milk production with respect to the onset of lactation or milk volume,[12,13] and to reduce breast engorgement.[14] However, the methods in previous studies were either massage or warm compression, not combined techniques, and most of them were performed in other countries, with possible differences in effect from social belief, culture and practice. In addition, the previous studies had limitations, including no randomized controlled trial design,[12] and no study investigating the prevention of breast engorgement.[14]

In Thailand, there is the specific Southern Thai traditional massage (STM), which is used by the traditional midwife. In this specific massage technique, the hands are used to pick or poke the milk line[15,16] in the axilla, which contains muscle, lymph nodes, vessels, and nerves.[17] Therefore, this massage helps stimulate blood circulation and sends a signal to the sensory receptor stimulating the pituitary gland to increase secretion of prolactin and oxytocin hormones to promote lactation.[1]

At present, the effects of STM have not been examined objectively. Previous studies have only explained the method but have not applied the method to actual postpartum mothers.[15,16] In addition, warm compression helps to stimulate blood circulation.[18] The application of warm compression is useful to increase the productivity of milk,[19] increase the secretion of milk by activating the letdown reflex, and increase the effectiveness of milk removal.[20] Moreover, warm compression reduces breast engorgement.[21] Therefore, this study examined the combination of Southern traditional massage with warm compression (STMW) in the early postpartum period on speeding the onset of lactation, increasing milk volume, and preventing breast engorgement. The findings of this study may help to solve the problems related to delayed onset of lactation, insufficient milk volume and breast engorgement.

Review of Literature

There are many methods of breast massage, such as Oketani massage, which consists of eight techniques on each breast.[22] Self-mamma control method massage[23] involves pressing the breast with the hands in a straight

line toward the other breast, obliquely upward toward the opposite shoulder, and in a straight line upward, and Woolwich massage is performed on the lactiferous sinus above the areola area.[24]

The STM is a method of using the hands to pick or poke at the axillary area and to squeeze or press over the breasts.[15,16] The axillary and breast area consists of the milk line, coracobrachialis, pectoralis major muscle, lymph nodes, veins, artery, and the thoracic intercostal nerve.[17] Picking or poking in the axillary area and squeezing or pressing at the pectoralis major muscle in the breasts helps stimulate blood circulation and the thoracic intercostal nerve. It sends a signal to the sensory receptors on the nipple and areolar, which stimulates the anterior and posterior pituitary glands and causes the release of prolactin and oxytocin, leading to effective milk production and expulsion.[1] In addition, STM is a method based on the structure of the lymphatic system,[16] and helps to drain the fluid to normal lymph channels, which is an appropriate way to prevent and reduce breast engorgement.[25]

Warm compression helps to stimulate blood circulation and make vasodilation of blood vessels, so that they facilitate milk ejection. In addition, warm compression helps to provoke lactocytes, which are prolactin receptor sites. It increases the transport of prolactin into the blood and the penetration of prolactin into the milk-producing cells. The warm compression has the effect of stimulating the process of production and secretion of milk effectively.[18] Warm compression is useful in increasing the efficiency of milk removal, activating the letdown reflex, and reducing breast engorgement.[20] It can be expected that STM combined with warm compression in the early postpartum period would promote onset of lactation, increase milk volume, and prevent breast engorgement.

Study Aim and Hypothesis

The aim of this study was to compare the onset of lactation, the milk volume, and breast engorgement among primiparous mothers who received 1) STMW, 2) STM, or 3) routine care as a control group. The hypotheses were 1) the onset of lactation is earlier in the STMW group than in the STM and control groups; 2) the milk volume is higher in the STMW group than in the STM and control groups and 3) the breast engorgement is lower in the STMW group than in the STM and control groups.

Methods

Design: A randomized controlled trial (RCT) with no blinding. This report followed CONSORT 2010 checklist of information to include when reporting a RCT.[26]

Sample and Setting: The participants were primiparous mothers who had given birth in one regional hospital in the Southern part of Thailand and were currently in the postpartum ward. Inclusion criteria were primiparous mothers who had normal labor, were 19 to 34 years old, had no medical contraindications to breastfeeding, experienced no health complications in themselves or their newborn during labor and the postpartum period, had normal breasts and nipples, had never breast surgery, had not received drugs that stimulate breast milk, had newborn with Apgar scores >7, no tongue-tie, and birth weight between 2,500 and 3,900 grams. Postpartum mothers were excluded if they had any health complications during the postpartum period, could not attend 4 time points of the intervention, received a drug that stimulates breast milk, or if their newborn had any health complications during the postpartum period requiring them to be separated from the mother.

The sample size was calculated using power analysis. The effect size in a previous study on breast massage on the severity of breast engorgement was 0.80,[27] the power 0.80 and alpha 0.05 were used to calculate the sample size. The sample size was determined as 20 per group. The researcher accounted for any dropout of participants by adding more 5% participants per group. Therefore, the total number of participants required for this study was 63 (21 participants per group).

Minimized randomization was used to assign the participants into the STMW, STM or control groups for controlling the potential confounding

variables, which were birth weight of the newborn[28] and the body mass index (BMI) of the mother before pregnancy,[29] both of which may be associated with a delayed onset of lactation and insufficient milk volume.

Of the 236 eligible cases, 172 primiparous mothers did not meet the inclusion criteria., so 64 participants were recruited. During data collection, one participant in the STMW group was excluded because the newborn had health complications and needed to be separated from the mother. Finally, each group comprised 21 participants. The diagram of the selection process is shown in **Figure 1.**

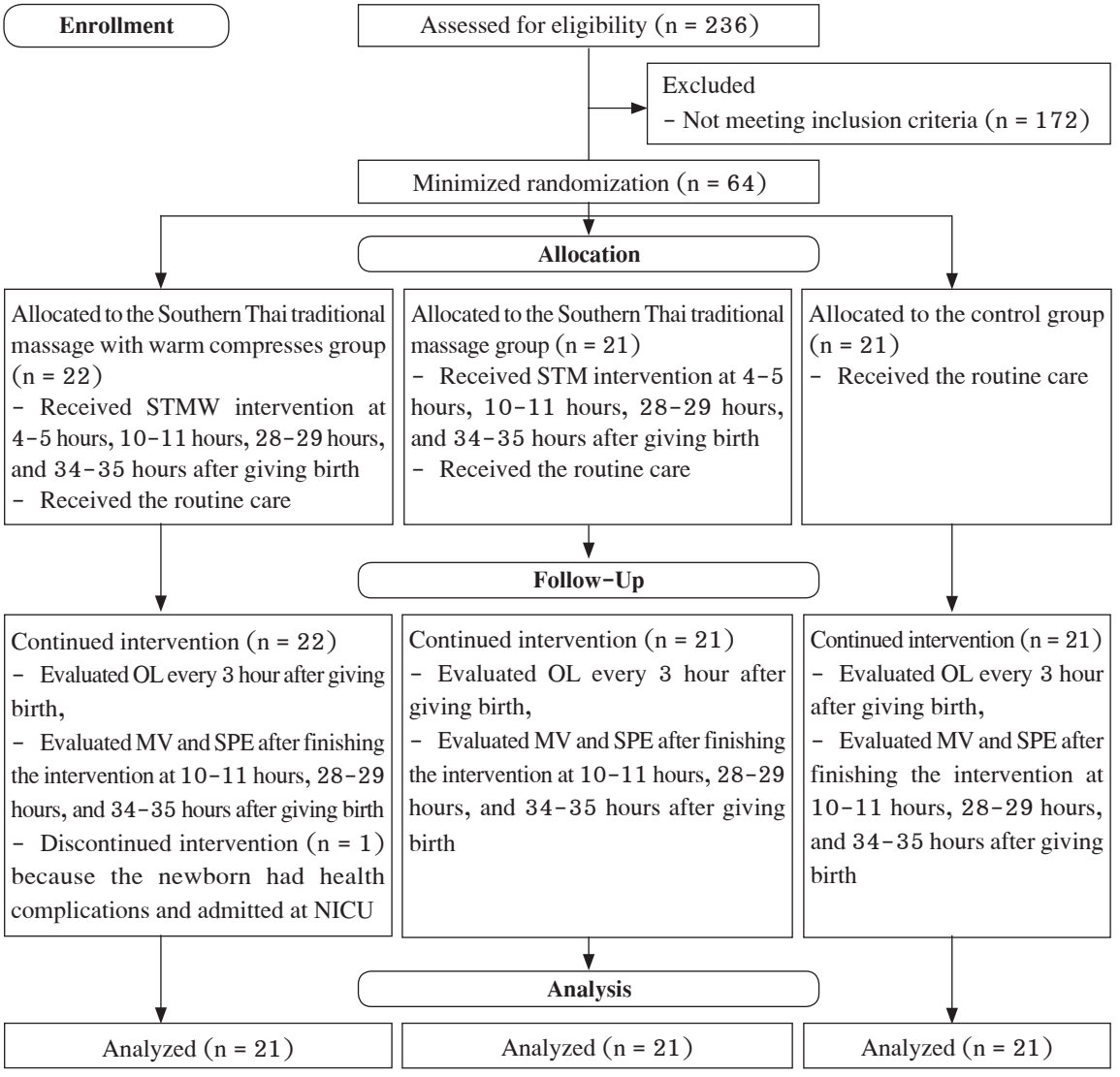

Figure 1 Diagram of the selection process

Note. STMW = Southern Thai traditional massage with warm compression, STM = Southern Thai traditional massage, NICU = neonatal intensive care unit, OL = onset of lactation, MV = milk volume, SPE = six-point engorgement.

Ethical Considerations: This research was approved by the Center for Health Science-The Human Research Ethics Committee, Prince of Songkla University (Code: HSc-HREC-63-042-1-3), and the hospital in Thailand (Code: HYH EC 048-64-02). Before data collection, the researcher explained the objectives, details of the data collection, and the rights of participants in both verbal and written form. All information obtained from the research was kept confidential. The results were presented generally, and participants' individual names were not shown. The participants had the right to cancel or withdraw from the study at any time, as required. All participants gave written informed consent.

Instruments: Four instruments were used for data collection, comprising a Demographic Data Form and the outcome measure record forms, which included the Onset of Lactation Form, the Milk Volume Recording Form, and the Six-Point Engorgement Scale.

A Demographic Data Form was created by the primary investigator (PI) and used to collect 1) age, religion, marital status, education level, occupation, and BMI before pregnancy, and 2) obstetrical history during the first, second, and third phases of labor, the quantity of oxytocin received, Apgar score and birth weight of the newborn, and the time of first breastfeeding.

The Onset of Lactation Form was used to evaluate the onset of lactation in postpartum mothers. This form was developed by PI and consists of four criteria: 1) the mother feels breast enlargement, swelling, stiffness, and heaviness, including tingling in the breast, 2) milk flow, 3) milk flow from the newborn's mouth during breastfeeding, and 4) hearing the newborn swallow milk. When the mother exhibited any of the above signs and symptoms, it was considered the onset of lactation. This was assessed by participants and by the PI by asking how the mother felt during the day every 3 hours after giving birth. A previous study determined that the instrument's reliability coefficient was .80.[13] The period of time from giving birth to occurring onset of lactation was recorded.

The Milk Volume Recording Form measures the amount of breast milk received by the newborn as determined by test weighing. This form records the newborn's weight gain before and after breastfeeding using a digital scale that has been previously calibrated with a standard for testing measurement stability and then subtracted from the newborn's weight before breastfeeding (in grams). The form also records the length of time the newborn sucks on the mother's breast. However, the PI and the mother must encourage the newborn to suck continuously at each breast for at least 15 minutes.

The Six-Point Engorgement Scale was used to assess participants' breast engorgement (firmness and tenderness). It was developed in English by Hill and Humenick[30] to measure the occurrence of breast engorgement in postpartum mother. It is widely accepted and was used by Srichandon[31] in Thai for measuring breast engorgement in postpartum mothers. Lactating mothers are asked to rate the degree of their breast changes. This scale has a 6-point response option as follows: 1 = soft, no change, 2 = slight change, 3 = firm, non-tender, 4 = firm, beginning tenderness, 5 = firm, tender, and 6 = very firm and very tender.

Intervention Program: The STM intervention of this study was modified from the method used by Southern traditional midwives. The PI participated in a 300-hour massage and postpartum mothers' care training course to acquire certification from the Thai Medical Health School in Hat Yai, Songkhla province, and trained in the STM according to traditional midwifery from a traditional midwife who had more than six years' experience of giving breast massage of postpartum mothers.

In the STM group, the mother was in a lying position and the milk line at the axillary process was massaged by picking or poking three times per breast. The massage was continued from the first step by using the fingers to squeeze or press all over the breasts for 5 minutes per each breast. This program was provided at 4 time points after giving birth.

In the STMW group, the intervention started with massage as in the STM group. After that, the PI soaked towels in room temperature water and twisted them until damp and then steamed them in an electric steamer at temperature 43 to 46 ˚C for ten minutes. Then, the towels were used to cover the breasts using one towel per breast for 2 minutes. The towel was then replaced with another towel. This process was continued for 15 minutes. This program was provided at the same 4 points as in the STM group.

The content validity of the STMW intervention and the 4 data collection instruments was reviewed by three experts, a nursing lecturer specializing in breastfeeding from the Faculty of Nursing, Prince of Songkla University, and 2 traditional Thai medicine lecturers who are specialists in Southern traditional massage, Faculty of Traditional Thai Medicine, Prince of Songkla University to verify the appropriateness, adequacy, and ease of use. The validity of intervention yielded an index of 0.80. The PI further improved and corrected this intervention according to the recommendations of the experts, and the intervention was applied in 12 primiparous mothers who had characteristics similar to sample to assess the feasibility of implementing it. In addition, due to the use of existing instruments and recording forms, no pilot test was conducted to test the reliability of the instruments.

Routine care: Normally, routine care in the postpartum ward consists only of caring for mothers and newborns, teaching them about breastfeeding, including feeding skills, and so on. Only mothers who have problems with breastfeeding, such as no milk flow or breast engorgement, are given breast massage (pressing on the breast area with fingers) or warm compression (pressing on the breasts with a towel soaked in warm water) by a nurse who specializes in breastfeeding.

Data Collection: The study was conducted during the period April to September 2021. The nurses in the postpartum ward checked for eligible mothers then asked the mothers for permission for the researcher to recruit them as participants. Mothers who met the inclusion criteria and agreed were included as participants in the study at the postpartum ward. The PI collected data during the postpartum period in the day time at the postpartum ward. The STMW intervention was provided for the STMW group, and STM was provided for the STM group at 4 time points: 4-5, 10-11, 28-29, and 34-35 hours after birth. The onset of lactation was measured by the primiparous mothers who were observed and interviewed every 3 hours after giving birth in the daytime. Milk volume and breast engorgement data were collected after finishing the intervention at 10-11, 28-29, and 34-35 hours after giving birth.

Data Analysis: Descriptive statistics were used to analyze the characteristics of the sample. Chi-square test was used to analyze the differences of nominal data. One-way ANOVA was used to analyze the differences of the sample for the continuous data and compare the duration after giving birth until the onset of lactation among the three groups. Repeated-measures ANOVA was used to compare milk volume and breast engorgement across three data points of time among three groups. Before testing the hypotheses, the data were tested for the assumption of normal distribution.

Results

Demographic data related to age, religion, marital status, and occupations among STMW, STM, and control groups were not significantly different. For the mothers, the mean body mass index before pregnancy and oxytocin received were not significantly different among the three groups. For the newborn, Apgar score, birth weight, and first time breastfeeding also were not significantly different among the three groups (**Table 1**).

Table 1 Comparisons of the demographic and obstetrical of participants among the STMW, the STM, and the control groups

Demographic data	STMW group (n = 21)		STM group (n = 21)		Control group (n = 21)		F/χ^2	p-value
	n	%	n	%	n	%		
Age (years), mean (SD)	24.48	(4.45)	23.48	(4.17)	24.24	(4.54)	.29[c]	.74
Religion								
Buddhism	14	66.7	10	47.6	9	42.9	2.67[a]	.26
Islam	7	33.3	11	52.4	12	57.1		
Marital status								
Married	21	100.0	21	100.0	21	100.0	-	-
Education level								
Less/equal grade 6	3	14.3	3	14.3	1	4.8	4.17[b]	.65
Grade 7 to grade 9	4	19.0	5	23.8	6	28.5		
Grade 10-12	9	42.9	5	23.8	9	42.9		
Bachelor or higher	5	23.8	8	38.1	5	23.8		
Occupations								
Employee	5	23.8	5	23.8	5	23.8	6.48[b]	.77
Self-employed	1	4.8	1	4.8	0	0		
Trader	2	9.5	6	28.5	3	14.3		
Agriculturist	1	4.8	0	0	1	4.8		
Housewife	10	47.6	8	38.1	11	52.3		
Student	2	9.5	1	4.8	1	4.8		
BMI before pregnancy (kg/m^2), mean (SD)	21.89	(4.79)	21.58	(5.09)	20.99	(3.76)	0.20[c]	.81
Quantity of oxytocin received (Unit), mean (SD)	22.38	(6.24)	20.29	(5.07)	20.95	(8.89)	0.50[c]	.60
Apgar score, mean (SD)								
1st min	8.95	(0.21)	9	(0.00)	9	(0.00)	1.00[c]	.37
5th min	9	(0.00)	9	(0.00)	9	(0.00)	-	-
Birth weight (gram), mean (SD)	3,013.81	(300.56)	3,030.71	(334.85)	3,086.67	(332.18)	0.29[c]	.74
First time BF	0	0	1	4.8	0	0	2.74[b]	.84
Within 30 min	5	23.8	3	14.3	4	19.1		
31 min to 1 hr	1	4.8	1	4.8	1	4.8		
1 hr 1 min to 2 hr	15	71.4	16	76.1	16	76.1		
After 2 hr								

Note. [a] Pearson chi-square, [b] Likelihood ratio, [c] One-way ANOVA, BMI = body mass index, Apgar = appearance, pulse, grimace, activity, and respiration, BF = breastfeeding, STMW = Southern Thai traditional massage and warm compression, STM = Southern Thai traditional massage.

There was a statistically significant difference in the mean time of onset of lactation among the three groups ($p < .001$). The LSD post hoc test showed that the onset of lactation in the STMW group was significantly earlier than those in the STM, and control groups, and the onset of lactation in the STM group was significantly earlier than that in the control group ($p < .001$) (**Table 2**). These results supported Hypothesis 1.

Table 2 Multiple comparisons of duration of time after giving birth until onset of lactation among the STMW, the STM, and the control groups

Group comparison	Mean (*SD*)			Mean difference	*SE*	*F*	*p-value*
	STMW group	STM group	Control group				
STMW with STM	37.00 (2.56)	40.57 (2.94)		-3.57	0.82	56.30	< .001
STMW with control	37.00 (2.56)		45.71 (2.49)	-8.71	0.82		< .001
STM with control		40.57 (2.94)	45.71 (2.49)	-5.14	0.82		< .001

There was a statistically significant difference in the mean score of milk volume among the STMW, STM, and control groups ($p < .001$). In addition, there were statistically significant changes in mean milk volume within the STMW group, the STM group, and the control group over the three time points (Time 1, Time 2, and Time 3) ($p < .001$). The interaction between treatment and time showed that these changes differed significantly across the groups ($p < .001$) (**Table 3**).

Table 3 Repeated-measures ANOVA for comparison of the milk volume, breast engorgement between subjects and within subjects among the STMW, the STM, and the control groups

Source of Variation	*SS*	*df*	*MS*	*F*	*p-value*
Milk volume					
Between subject					
Error	1,784.92	60	29.74		
Group	1,351.05	2	675.52	22.70	< .001
Within subject					
Error Time	646.03	120	5.38		
Time	4,527.24	2	2,263.00	420.46	< .001
Group x time	610.05	4	152.51	28.32	< .001
Breast engorgement					
Between subject					
Error	25.49	60	0.42		
Group	9.74	2	4.87	11.46	< .001
Within subject					
Error Time	20.50	120	0.17		
Time	71.65	2	35.82	209.62	< .001
Group x time	5.84	4	1.46	8.54	< .001

Pairwise comparison presented that there were significant differences in milk volume between each time point within the STMW, STM, and control groups ($p < .001$). In the STMW group, the mean milk volume measured at Time 3 was significantly higher than that at Time 1 and Time 2; Time 2 was significantly higher than that at Time 1 ($p < .001$). In the STM group, the mean milk volume measured at Time 3 was significantly higher than that at Time 1 and Time 2 ($p < .001$). The mean milk volume measured at Time 2 was significantly

higher than that of Time 1 ($p < .001$). In the control group, the mean milk volume measured at Time 3 was significantly higher than that at Time 1 and Time 2 ($p < .001$). The mean milk volume measured at Time 2 was significantly higher than that Time 1 ($p < .001$) (**Table 4** and **Figure 2**). These results supported hypothesis 2.

There were significant differences of the mean scores of breast engorgement among the STMW group, STM group, and control groups ($p < .001$). Moreover, there was a significant difference of the changes in mean score of breast engorgement over Times 1, 2, and 3 time points ($p < .001$). The interaction between treatment and time was also significant ($p < .001$). Details can be seen in **Table 3**. There were significant differences among all three pairwise comparisons of breast engorgement within the STMW, STM, and control groups ($p < .001$). In the STMW group, the mean of breast engorgement measured at Time 1 was significantly lower than that at Time 2 ($p = .005$) and Time 3 ($p < .001$); Time 2 was significantly lower than that at Time 3 ($p < .001$). In the STM group, the mean of breast engorgement measured at Time 1 was significantly lower than that at Time 2 ($p = .001$) and Time 3 ($p < .001$); Time 2 was significantly lower than that at Time 3 ($p < .001$). In the control group, the mean of breast engorgement measured at Time 1 was significantly lower than that at Time 2 and Time 3 ($p < .001$). The mean of breast engorgement measured at Time 2 was significantly lower than that at Time 3 ($p < .001$) (**Table 4** and **Figure 3**). These results supported hypothesis 3.

Table 4 Pairwise comparison of milk volume and breast engorgement within the STMW, STM, and control groups

Comparison	Mean (SD)			Mean difference	*SE*	*p-value*
	Time 1	Time 2	Time 3			
Milk volume						
STMW group						
T3 and T1	3.33 (3.98)	-	20.95 (4.07)	17.61	0.74	< .001
T3 and T2	-	12.14 (3.73)	20.95 (4.07)	8.81	0.68	< .001
T2 and T1	3.33 (3.98)	12.14 (3.73)	-	8.81	0.76	< .001
STM group						
T3 and T1	2.62 (2.56)	-	14.05 (3.40)	11.42	0.61	< .001
T3 and T2	-	8.10 (3.70)	14.05 (3.40)	5.95	0.81	< .001
T2 and T1	2.62 (2.56)	8.10 (3.70)	-	5.47	0.76	< .001
Control group						
T3 and T1	2.38 (3.40)	-	9.29 (3.96)	6.90	0.54	< .001
T3 and T2	-	5.24 (4.02)	9.29 (3.96)	4.04	0.81	< .001
T2 and T1	2.38 (3.40)	5.24 (4.02)	-	2.85	0.65	< .001
Breast engorgement						
STMW group						
T1 and T2	1.24 (0.44)	1.57 (0.51)	-	-0.33	0.10	.005
T1 and T3	1.24 (0.44)	-	2.19 (0.51)	-0.95	0.11	< .001
T2 and T3	-	1.57 (0.51)	2.19 (0.51)	-0.61	0.11	< .001
STM group						
T1 and T2	1.24 (0.44)	1.76 (0.54)	-	-0.52	0.13	.001
T1 and T3	1.24 (0.44)	-	2.76 (0.44)	-1.52	0.13	< .001
T2 and T3	-	1.76 (0.54)	2.76 (0.44)	-1.00	0.15	< .001
Control group						
T1 and T2	1.29 (0.46)	2.10 (0.43)	-	-0.81	0.11	< .001
T1 and T3	1.29 (0.46)	-	3.29 (0.72)	-2.00	0.13	< .001
T2 and T3	-	2.10 (0.43)	3.29 (0.72)	-1.19	0.14	< .001

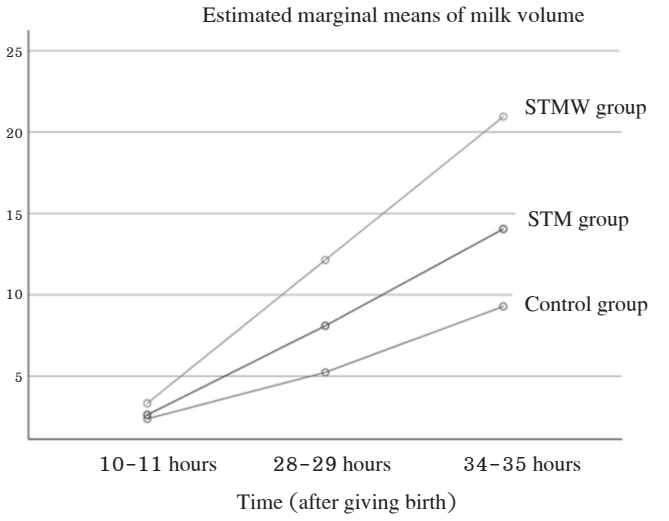

Figure 2 Comparisons of the mean score of the milk volume among STMW, STM, and control groups

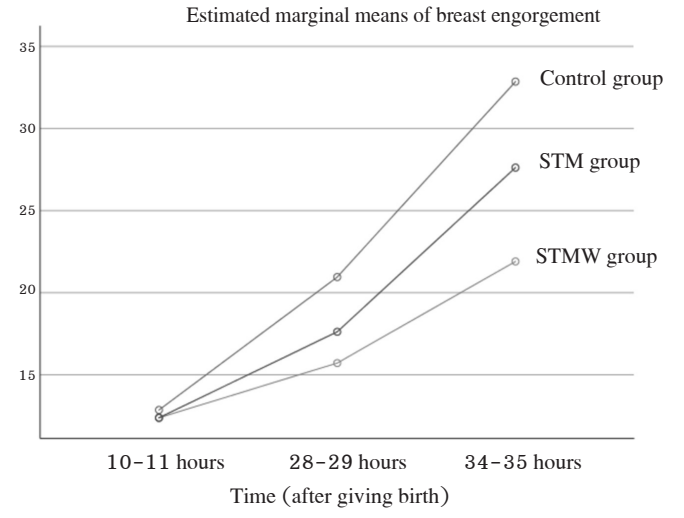

Figure 3 Comparisons of the mean score of the breast engorgement among STMW, STM, and control groups

Discussion

The STMW and the STM program were tested with primiparous mothers in this study. STMW involved the application of the specific technique of breast massage of a traditional midwife combined with warm compression. The STMW intervention was able to promote rapid onset of lactation, increase milk volume, and prevent breast engorgement, which can be explained by the characteristics of STMW and the early implementation and number of STMW sessions. In the STMW, using the hands to pick or poke at the axillary process area three times per breast and to squeeze or press all over the pectoralis major

muscle of the breasts area can stimulate the anterior and posterior pituitary gland to secrete oxytocin and prolactin because the axillary process and the breast areas comprising the pectoralis major muscle, lymph nodes, veins, an artery, and the thoracic intercostal nerve.[17] Therefore, when the participants were massaged, this stimulated the thoracic intercostal nerve to send a signal to the posterior pituitary gland causing the excretion of oxytocin. This signal stimulated the muscles around the mammary glands to contract and secrete breast milk[1] as well as stimulate the anterior pituitary gland to increase prolactin levels promoting lactation,[17] which causes rapid onset of lactation and increase milk volume. In addition, the STMW method is based on the structure of the lymphatic system. This helps to drain the fluid to normal lymph channels, which is an appropriate way to prevent and reduce breast engorgement.

Application of warm compression on the breast area stimulated participants' blood circulation and caused vasodilation of blood vessels, so that it helped milk ejection effectively. Moreover, warm compression helps to stimulate lactocytes, which are prolactin receptor sites and increases the transport of prolactin into the blood and the penetration of prolactin into the milk-producing cells.[18,32] The warm compression is useful in increasing the efficiency of milk removal, and activating the letdown reflex.[20] The result of a systematic review showed that breast massage is a technique to increase milk production.[33] Thus, using both breast massage and warm compression were applied to promote the onset of lactation and milk volume.[12,13]

This result is consistent with prior studies that warm compression helps to stimulate the onset of lactation.[18,19] In addition, the application of warm compression at breast areas helps to prevent or reduce breast engorgement.[21] Breast massage helps to reduce engorgement.[34] Warm compression combined with breast massage were effective in reducing breast engorgement.[14] Therefore, application of warm compression has the effect of stimulating the process of production, secretion of milk and prevention of breast engorgement effectively.

Regarding the early implementation and number of times of receiving the STMW, the participants received STMW in the early postpartum period. This intervention stimulated milk production and milk secretion, as well as the newborn's suckling. Therefore, STMW uses the same principle as initial rapid breastfeeding. Moreover, receiving this intervention four times helps promote lactation. The findings of using this strategy were consistent with previous studies in which repeated breast massaging (four times over two days) was able to stimulate milk ejection,[23] and repeated breast massaging (two times over three days) was able to promote milk volume.[35] Moreover, warm compression applied three times a day for two days[21] or two times a day for three days was able to reduce breast engorgement.[36] Warm compression combined with breast massage three times a day and continued for two days helped to reduce breast engorgement significantly.[14]

Limitations

A limitation of this study is that it was conducted in a single site; hence generalization is limited. In addition, the use of STMW intervention takes a considerable number of times, each taking at approximately 25 minutes. This may limit its use in routine care. Nurses who plan to use the STM need to be trained in using this massage before providing care. A second limitation is that only the researcher applied the intervention and collected the data. This may result in unconscious bias and might affect the reliability of the obtained data.

Conclusion and Implications for Nursing Practice

Using five minutes per breast of the STM and 15 minutes of the warm compression intervention is an alternative technique to apply for stimulating the onset of lactation, milk volume, and preventing breast engorgement effectively. Nurses are able to use the STMW intervention for nursing care. However, the

nurses should be trained in the STM. For further studies, the invention should be modified so that the researcher trains the mothers or significant others (husband, mother, female relatives) to perform the STMW. In addition, the STMW intervention should be conducted in the late third trimester pregnant women or in postpartum mothers after receiving cesarean section, or mothers with insufficient breast milk to promote lactation and reduce breast engorgement.

Acknowledgments

Appreciation is given for scholarship awarded by the Faculty of Nursing, and the Graduate School, Prince of Songkla University. In addition, grateful thanks to all participants in this study.

References

1. Lawrence RA. Physiology of lactation. In: Lawrence RA, Lawrence RM, editors. Breastfeeding: a guide for the medical profession. 9th ed. Philadelphia: Elsevier; 2022. pp. 58-92.
2. Hoover KL, Marasco L. Low milk production and infant weight. In: Campbell SS, Lauwers J, Mannel R, Spencer B, editors. Core curriculum for interdisciplinary lactation care. Burlington, MA: Jones & Bartlett Learning; 2019. pp. 341-64.
3. Yu X, Li J, Lin X, Luan D. Association between delayed lactogenesis II and early milk volume among mothers of preterm infants. Asian Nurs Res. 2019;13:93-8. doi: 10.1016/j.anr.2019.02.001.
4. Chang PC, Li SF, Yang HY, Wang LC, Weng CY, Chen KF, Chen W, Fan SY. Factors associated with cessation of exclusive breastfeeding at 1 and 2 months postpartum in Taiwan. Int Breastfeed J. 2019;14(18):1-7. doi: 10.1186/s13006-019-0213-1.
5. Gianni ML, Bettinell ME, Manfra P, Sorrentino G, Bezze E, Plevani L, Cavallaro G, Raffaeli G, Crippa BL, Colombo L, Morniroli D, Liotto N, Roggero P, Villamor E, Marchisio P, Mosca F. Breastfeeding difficulties and risk for early breastfeeding cessation. Nutrients. 2019;11(10):2266-76. doi: 10.3390/nu11102266.
6. Mitchell KB, John HM. Breast conditions in the breastfeeding mother. In: Lawrence RA, Lawrence RM, editors. Breastfeeding: a guide for the medical profession. 9th ed. Philadelphia: Elsevier; 2022. pp. 572-93.
7. Kipfer S, Goldman RD. Formula choices in infants with cow's milk allergy. Can Fam Physician. 2021;67:180-92. doi: 10.46747/cfp.6703180.
8. Huang J, Zhang Z, Wu Y, Wang Y, Wang J, Zhou L, Ni Z, Hao L, Yang N, Yang X. Early feeding of larger volumes of formula milk is associated with greater body weight or overweight in later infancy. Nutr J. 2018;17(1):12-20. doi: 10.1186/s12937-018-0322-5.
9. Dekker HT, Sonnenschein-van der Voort AMM, Jaddoe VWV, Reiss IK, Jongste JC, Duijts L. Breastfeeding and asthma outcomes at the age of 6 years: the generation R study. Pediatr Allergy Immunol. 2016;27:486-92. doi: 10.1111/pai.12576.
10. Stuebe AM. Population health and informed feeding decisions. In: Lawrence RA, Lawrence RM, editors. Breastfeeding: a guide for the medical profession. 9th ed. Philadelphia: Elsevier; 2022. pp. 193-205.
11. Walters D, Horton S, Manogar Siregar AY, Pitriyan P, Hajeebhoy N, Mathisen R, et al. The cost of not breastfeeding in Southeast Asia. Health Policy Plan. 2016;31:1107-16. doi: 10.1093/heapol/czw044.
12. Punturat P, Boonruen S. Effects of the Royal massage and the herbal compress with applying breast combing on the lactation level of mothers after laboring, Chiangrai Prachanukroh hospital, Chiangrai Province, Thailand: Paper presented at the 5th Academic Science and Technology Conference; 2017 May 25.
13. Khotsang K, Sangin S, Chuahorm U. The effects of lactational program on milk secretion time, onset of lactation and breastfeeding self-efficacy in mothers after cesarean section. JFONUBUU. 2016;24(1):13-26 (in Thai).
14. Thakur S, Gomathi B, Bala K. Effectiveness of hot application with breast engorgement among the postnatal mothers. IJTSRD. 2018;2(6):1149-53. Available from: https://www.ijtsrd. com/papers/ijtsrd18801.pdf
15. Jejaroj S, Khamphu T, Wirat A, Nilea C, Phatkaja S. Local wisdom in health care for pregnant women and infants in the Muslim community in Thepha district, Songkhla. Songkhla: Thai Health Promotion Foundation; 2006 (in Thai).

16. Thongsong W. The role and traditional knowledge of traditional birth attendants in Phatthalung province [master's thesis]. [Songkhla]: Prince of Songkla University; 2016. 108 p (in Thai).
17. Graham GA, Montgomery A. Breast anatomy and milk production. 2019. In: Campbell SS, Lauwers J, Mannel R, Spencer B, editors. Core curriculum for interdisciplinary lactation care. Burlington, MA: Jones & Bartlett Learning; 2019. pp. 83-99.
18. Phon-ngam K, Mankong R. The effects of hot moist gel pack breast compression combined with nipple stimulation on the onset of milk ejection and milk flow among cesarean section mothers with sick babies. TRCNJ. 2021;14(1): 156-69 (in Thai).
19. Wahyuningsih M, Liliana A. The effectiveness of warm compress on breast milk production among postpartum mothers in Tegalrejo Health Center. IRHC. 2019;736-40.
20. Walker M. Breastfeeding management for the clinician using the evidence. 4th ed. Burlington, MA: Jones & Bartlett Leaning; 2017. 738 p.
21. Eittah HFA, Ashour ESS. Comparing warm compresses application vs. chilled cabbage leaves for relieving breast engorgement among post-natal mothers. Clin Nurs Stud. 2019;7(3):58-67. doi: 10.5430/cns.v7n3p58.
22. Dehghani M, Babazadeh R, Khadivzadeh T, Pourhoseini SA, Esmaeili H. Effect of breast Oketani-massage on neonatal weight gain: a randomized controlled clinical trial. Evid Based Care J. 2018;8(3):57-63.
23. Masae M, Kala S, Chatchawet W. Effect of self-breast massage program on milk ejection of first-time mothers. PNUJR. 2019;11(3):1-14 (in Thai).
24. Nurvitasari S, Pujiastuti R, Arfiana A. Effectiveness of Woolwich massage to meet adequacy of breast milk in newborns. Nurs Midwifery Res J. 2019;1(1):57-62. doi: 10.31983/manr.v1i1.4067.
25. Lauwers J, Swisher A. Counseling the nursing mother: a lactation consultant's guide. 6th ed. Burlington, MA: Jones & Bartlett Leaning; 2016. 810 p.
26. CONSORT Transparent Reporting of Trials: Consort 2010 [Internet]. Ontario (Canada): Consort group; [cited 2022 Feb 8]. Available form: http://www.consort-statement.org/consort-2010
27. Krishnaveni P. Effectiveness of breast massage on reduction of breast engorgement among mothers undergone caesarean section admitted in selected hospital at Tirunelveli. [master's thesis]. [Tirunelveli]: Sri K Ramachandran Naidu College of Nursing; 2014. 108 p.
28. Salahudeen MS, Koshy AM, Sen S. A study of the factors affecting time to onset of lactogenesis-II after parturition. J Pharm Res. 2013;6:68-72.
29. Chaingm N, Yusamran C, Pahuwattanakorn W. Factors predicting the onset of lactation in breastfeeding mothers. J Nurs Health. 2019;37(1):52-9 (in Thai).
30. Hill PD, Humenick SS. The occurrence of breast engorgement. J Hum Lact. 1994;10:79-86. doi: 10.1177/089033449401000212.
31. Srichandon P. Effectiveness of implementing clinical practice guidelines for prevention and management of breast engorgement among lactating mothers, Nakornping Hospital, Chiang Mai Province [master's thesis]. [Chiang Mai]: Chiang Mai University; 2010. 99 p (in Thai).
32. Panngam N, Theerasopo P, Ungpansattawon S. The effect of warm moist polymer gel pack compression on the onset of milk production in primiparous mothers. JPNC. 2015; 27(1):28-38 (in Thai).
33. Nuampa S, Payakkaraung S. Effectiveness of different massage techniques for breastfeeding mothers to increase milk production: a systematic review. Pacific Rim Int J Nurs Res. 2021;25(1):114-30.
34. Witt AM, Bolman M, Kredit S, Vanic A. Therapeutic breast massage in lactation for the management of engorgement, plugged ducts, and mastitis. J Hum Lact. 2016;32(1): 123-31. doi: 10.1177/0890334415619439.
35. Yuliati ND, Hadi H, Rahayu S, Pramono N, Mulyantoro DK. The impact of combination of rolling and Oketani massage on prolactin level and breast milk production in post-cesarean section mothers. BNJ. 2017;3(4):329-36. doi: 10.33546/bnj.150.
36. Kaur H, Priyadarshani. Quasi experimental study to evaluate the effectiveness of lukewarm water compress on breast engorgement among postpartum mothers admitted in selected maternity hospitals, Jaipur. IJRTI. 2017;3(5): 282-9.

ผลของการนวดพื้นบ้านไทยภาคใต้และการประคบอุ่นต่อการหลั่งน้ำนมและการคัดตึงเต้านม: การทดลองแบบสุ่มและมีกลุ่มควบคุม

ชุดาณัฏฐ์ ขุนเพชร โสเพ็ญ ชูนวล ศศิธร พุมดวง*

บทคัดย่อ: ปัญหาการหลั่งน้ำนมประกอบด้วยการมีน้ำนมเต็มเต้าล่าช้า ปริมาณน้ำนมไม่เพียงพอ และการคัดตึงเต้านมเป็นอุปสรรคสำคัญที่ทำให้มารดาครรภ์แรกหยุดเลี้ยงลูกด้วยนมแม่อย่างเดียวเร็วขึ้น การวิจัยเชิงทดลองแบบสุ่มและมีกลุ่มควบคุมครั้งนี้มีวัตถุประสงค์เพื่อศึกษาผลของการนวดพื้นบ้านไทยภาคใต้และการประคบอุ่นต่อการหลั่งน้ำนมและการคัดตึงเต้านมในมารดาครรภ์แรก ใช้โปรแกรมมินิไมแรนดอมไมเซชั่น (minimized randomization) ในการสุ่มกลุ่มตัวอย่างเข้ากลุ่ม 1) กลุ่มการนวดพื้นบ้านไทยภาคใต้และการประคบอุ่นจำนวน 21 ราย 2) กลุ่มการนวดพื้นบ้านไทยภาคใต้จำนวน 21 ราย หรือ 3) กลุ่มควบคุมได้รับการดูแลตามปกติ จำนวน 21 ราย เครื่องมือที่ใช้ในการเก็บรวบรวมข้อมูลประกอบด้วย แบบบันทึกข้อมูลทั่วไป แบบบันทึกการมีน้ำนมเต็มเต้า แบบบันทึกปริมาณน้ำนม และแบบวัดระดับอาการคัดตึงเต้านม วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนาและสถิติอ้างอิง

ผลการวิจัยพบว่า การมีน้ำนมเต็มเต้าในกลุ่มที่ได้รับการนวดพื้นบ้านไทยภาคใต้และการประคบอุ่นเกิดขึ้นเร็วกว่ากลุ่มที่ได้รับการนวดพื้นบ้านไทยภาคใต้และกลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ปริมาณน้ำนมในกลุ่มที่ได้รับการนวดพื้นบ้านไทยภาคใต้และการประคบอุ่นมากกว่ากลุ่มที่ได้รับการนวดพื้นบ้านไทยภาคใต้และกลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ การคัดตึงเต้านมของกลุ่มที่ได้รับการนวดพื้นบ้านไทยภาคใต้และการประคบอุ่นน้อยกว่ากลุ่มที่ได้รับการนวดพื้นบ้านไทยภาคใต้และกลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ดังนั้นการนวดพื้นบ้านไทยภาคใต้และการประคบอุ่นสามารถนำไปใช้ในการปฏิบัติการพยาบาลหรือสอนญาติเพื่อส่งเสริมการมีน้ำนมเต็มเต้าเร็วขึ้น เพิ่มปริมาณน้ำนม และป้องกันการคัดตึงเต้านม

Pacific Rim Int J Nurs Res 2022; 26(3) 390-403

คำสำคัญ: การคัดตึงเต้านม ปริมาณน้ำนม การมีน้ำนมเต็มเต้า การนวดพื้นบ้านไทยภาคใต้ การประคบอุ่น

ทะเบียนการทดลองทางคลินิกของประทศไทย: http://thaiclinicaltrila.org/ (TCTR20210514005)

ชุดาณัฏฐ์ ขุนเพชร *นักศึกษาหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์ จังหวัดสงขลา E-mail: chudanut_khoonphet@hotmail.com*

ติดต่อที่ : โสเพ็ญ ชูนวล *รองศาสตราจารย์ คณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์ จังหวัดสงขลา E-mail: sophen.c@psu.ac.th*

ศศิธร พุมดวง *ศาสตราจารย์ คณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์ จังหวัดสงขลา E-mail: sasitorn.ph@psu.ac.th*