

Original Article

Effects of the Therapeutic Breast Massage on the Milk Ejection of Postpartum Mothers: A Randomized Controlled Trial

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Abstract

Breast massage is one of alternative therapy on milk ejection of postpartum mothers. This randomized controlled trial study aims to evaluate the effect of the therapeutic breast massage on the milk ejection of postpartum mothers in 24 hours. The samples consisted of 80 postpartum mothers who were randomly divided into the experimental group and the control group. The experimental group receive 30-minute Thai breast massage program by Thai traditional medical doctor within 24 hours after delivery. While the control group received a health education program and standard care for postpartum mothers. The primary outcome was the amount of breast milk after each feeding measured by the test weighing method on the second day of postpartum. Moreover, the secondary outcomes were also collected including breast milk score, frequency of the newborn's stool and urine, and the side effects of the therapeutic breast massage. The mean amount of breast milk between groups was compared using independent t-test with a p-value<0.05 considering statistically significant. The results showed that the amount of breast milk on the second day of postpartum between therapeutic breast massage and routine care group was not significant difference (mean difference= -13.37; 95% CI: -0.15 to 26.68; p-value =0.052). Likewise, breast milk scores in the therapeutic breast massage group were not significantly higher than in this routine care group difference (mean difference on day 2=0.25; 95% CI: -0.63 to 0.13; p-value=0.198, on day 3=0.15; 95% CI: -0.51 to 0.21; p-value=0.413). Newborns had no significant difference in defecation and urination frequency (mean difference= -0.57; 95% CI: -0.73 to 1.88; p-value=0.384 and 0.47; 95% CI: -1.76 to 0.81; p-value=0.465, respectively). Furthermore, no side effects were found in the intervention group. Among postpartum women, the single therapeutic breast massage within 24 hours after delivery could be not effective for augmenting breast milk volume when compared with non-massage postpartum women. We suggested that the studies on the effective and practical time of the therapeutic breast massage session for the improvement of breast milk production should be further conducted.

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คำสำคัญ: Therapeutic Breast Massage, Milk Ejection, Postpartum Women

นิพนธ์ต้นฉบับ

ผลของการนวดเต้านมเพื่อการรักษาต่อการไหลของน้ำนมในหญิงหลังคลอด:
การทดลองสุ่มแบบมีกลุ่มควบคุมสร้อยสนา ดิษกร⁽¹⁾, เอี่ยมพร สุ่มมาตย์^{(2)*}, ศรีสุดา ทรงธรรมวัฒน์⁽¹⁾, เมธา ทรงธรรมวัฒน์⁽¹⁾

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บทคัดย่อ

การนวดเต้านมเพื่อการรักษาเป็นหนึ่งในแพทย์แผนไทยเพื่อช่วยในการกระตุ้นน้ำนมมารดาหลังคลอด การศึกษาเชิงทดลองแบบสุ่มครั้งนี้มีวัตถุประสงค์เพื่อศึกษาผลของการนวดเต้านมต่อปริมาณน้ำนมของมารดาในระยะ 24 ชั่วโมงหลังคลอด กลุ่มตัวอย่างคือมารดาหลังคลอดจำนวน 80 คน ถูกสุ่มเข้ากลุ่มทดลองและกลุ่มควบคุมกลุ่มละ 40 คน กลุ่มทดลอง ได้รับการนวดกระตุ้นเต้านมโดยแพทย์แผนไทย เป็นเวลา 30 นาที ภายใน 24 ชั่วโมงหลังคลอด กลุ่มควบคุม ได้รับการพยาบาลและสุศึกษาสำหรับหญิงหลังคลอดตามปกติ ผลลัพธ์หลักคือ ปริมาณน้ำนมในแต่ละครั้งของการให้นมวัดโดย test weight method ในวันที่ 2 หลังคลอด ผลลัพธ์รองคือ breast milk score จำนวนครั้งของการถ่ายอุจจาระและปัสสาวะของทารก และอาการไม่พึงประสงค์จากการนวดเต้านม เปรียบเทียบค่าเฉลี่ยของปริมาณน้ำนมระหว่างกลุ่มโดยใช้สถิติ Independent t-test ผลการศึกษาพบว่า ปริมาณน้ำนมในวันที่ 2 หลังคลอดระหว่างกลุ่มทดลองและกลุ่มควบคุมแตกต่างกันอย่างไม่มีนัยสำคัญทางสถิติ ($p\text{-value}=0.052$) (mean difference=13.37; 95% CI: -0.15 to 26.68; $p\text{-value}=0.052$) ในทำนองเดียวกัน breast milk score ในวันที่ 2 และ 3 และจำนวนครั้งของการถ่ายอุจจาระและปัสสาวะของทารกทั้ง 2 กลุ่มแตกต่างกันอย่างไม่มีนัยสำคัญทางสถิติ (mean difference=0.25; 95% CI: -0.63 to 0.13; $p\text{-value}=0.198$, 0.15; 95% CI: -0.51 to 0.21; $p\text{-value}=0.413$ และ -0.57; 95% CI: -0.73 to 1.88; $p\text{-value}=0.384$, 0.47; 95% CI: -1.76 to 0.81; $p\text{-value}=0.465$ ตามลำดับ) ไม่พบอาการไม่พึงประสงค์จากการนวดเต้านมในกลุ่มทดลอง สรุปผลการศึกษานี้หญิงหลังคลอดการนวดเต้านมครั้งเดียวในระยะ 24 ชั่วโมงหลังคลอดไม่มีประสิทธิผลต่อปริมาณน้ำนมเมื่อเปรียบเทียบกับหญิงหลังคลอดที่ไม่ได้รับการนวดเต้านม ข้อเสนอแนะควรมีการศึกษาจำนวนครั้งของการนวดเต้านม ที่มีประสิทธิผลต่อการส่งเสริมปริมาณการไหลของน้ำนมหญิงหลังคลอดและทำได้สะดวกในทางปฏิบัติ

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มหาวิทยาลัยราชภัฏร้อยเอ็ด จังหวัดร้อยเอ็ด**Keywords:** การนวดเต้านม, การไหลของน้ำนม, มารดาหลังคลอด

Introduction

Breastfeeding is the most effective way to promote a newborn's health because maternal breast milk is the best dietary source and provides plenty of immunization which protects the baby from illnesses such as respiratory infections and gastroenteritis. There is essential nutrition for the first six months to two years of baby life. Moreover, the children who get breastfed achieve intelligent development as well as have lower risk of diabetes mellitus (World Health Organization, 2017).

The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life that means no other foods or liquids are provided, including water. Infants should be breastfed on demand. However, in 2017, there are only 41 percent of neonates around the world that receive exclusive breastfeeding. WHO set the target to be accomplished which is increasing exclusive breastfeeding among infants younger than 6 months to 50% by the year 2025 (World Health Organization, 2018).

Lactation insufficiency is an important problem regarding the failure of exclusive breastfeeding. One common cause is plugged milk ducts that lead to local milk stasis and painful breast (Munsittikul et al., 2022). There are many non-pharmacological methods to promote breast milk such as encouraging mother, warm compression, and breast massage. Therapeutic breast massage, which consists of gentle breast massage and warm compression, slates blood circulation, facilitates the resolution of plugged

milk ducts and increases breast milk production. This massage is helpful for the reduction of acute breast pain associated with engorgement, plugged ducts, and mastitis (Witt et al., 2016). There are few studies in postpartum women without acute breast pain that the therapeutic breast massage may increase breast milk volume.

The recommended guideline from previous studies suggested multiple times per day, for many days course of breast massage. Normally, postpartum mothers have been admitted only about two days postpartum, therefore they were received breast massage by Thai traditional medical doctors only one time due to this limitation and the most important time of breast milk successions is dependent on the early days of life. Therefore, this study aimed to compare the effect of therapeutic breast massage and routine breast care on the amount of breast milk among postpartum periods.

Objective

1. To compare the amount of breast milk after each feeding measuring by the test weighing method on the second day of postpartum between the therapeutic breast massage and control group.

2. To compare the breast milk scores on the second and third day of postpartum between therapeutic breast massage and control group.

Materials and Methods

● Study design and setting

The study was a randomized controlled trial conducted in the Department of Obstetrics and Gynecology, Udon Thani Hospital, Udon Thani, Thailand, from May to July 2022.

● Study samples and data collection

There were eighty postpartum mothers aged 18 years and above, who delivered a late preterm to term newborn (>34 weeks of gestational age) without maternal complications (e.g. Postpartum hemorrhage or postpartum sepsis) in the hospital and aimed to exclusively breastfeed, were enrolled in the study. All participants had no contraindication for breastfeeding and no neonatal complications that separated mother and baby. The exclusion criteria included having history of breast surgery, receiving pharmacological galactagogues and having neonatal conditions that needed phototherapy.

After informed consent was obtained from all participants, they were randomized into two groups which were experimental group (n=40) and routine care group (n=40). The randomization sequence generated by the computer using a block of four methods. The researcher, assistants, and participants were not blinded to group allocation. All eligible women were counseled, by the trained nurses, on the advantages of breastfeeding, correct milk expression techniques and frequency of expression (at least 20-30 minutes per time and every 2-4 hours in a day) (Centers for Disease Control and Prevention, 2022).

The sample size was calculated by the N4studies application (Ngamjarus, 2016) using the formula for compare the two independence means with the data from a previous study by Saputri et al. (2020) we set a mean of control group=16.13 with standard deviation 5.06, the mean difference of 20% between the therapeutic breast massage and normal breastfeeding groups was used for the clinically significance difference. An α error of 0.05 and β of 0.2 and an additional 10% for dropout samples were used. The calculated sample size was 40 participants in each group.

● Interventions

The participants in the experimental group received a therapeutic breast massage for one time within 24 hours after delivery by Thai traditional medical doctor, while those in the control group received the standard care of breastfeeding to their baby. In an experimental group, there were three steps. Firstly, women were in the proper position. Then, Thai traditional medical doctors gently touched and rolled around the areola of both breasts with 10 seconds each point for 15 minutes. Then, wet warm small towels were applied to compress with massage on the breast area with nipple sparing for 15 minutes. The total treatment session duration was 30 minutes (Development of Applied Thai Traditional Medical Education, 2005). This procedure was standardized by a course for all participating Thai traditional medical doctors. Both groups received the health education program about benefit of breast milk and proper breast-feeding technique, rooming in

policy and encouraged the early and frequent suckling.

● Outcome measurements

The breastfeeding frequency and LATCH score (including latch, audible, type of nipple, comfort of mother, and help required) (Riordan et al., 2001) at 24 hours postpartum were evaluated by the trained nurses in both groups. We also measured the breast milk volume on the second day postpartum (24-48 hours after delivery), breast milk scores (compressing around the nipple and evaluating quantity of breast milk by a nurse) that ranged from a score of 0 to 4, 0 is no any breast milk, 1 is few breast milk with oozing, 2 is breast milk with 1-2 drops, 3 is moderate breast milk with more than 3 drops, and 4 is plenty of breast milk with spouting (Trainapakul, 2010), and frequency of the newborn's stool and urine. Additionally, the side effects were noted in a group of therapeutic breast massage.

On the second day, breast milk volume was measured by a nurse using the test weighing method in both groups. We started the first newborn weighing at 24 hours postpartum in all participants. Then, the babies were weighed by the same clothes with unchanged diapers before and after feeding with the same electronic weight scale (Seca 354, accurate to 5 g) for 3 times in the 24 hours period. The differences of weight were calculated, then the sum of them in grams was converted to breast milk volume in milliliters (1 g =1 ml) (Butte et al., 1988; Haase et al., 2009). This method was used instead of direct measurement

of breast milk volume because we considered mother-baby interaction by feeding directly from the maternal breast.

● Statistical analysis

The normality test was done by Kurtosis and Skewness test. Demographic data were reported in mean with standard deviation or median with interquartile range for continuous data depended on the normality test's result, and in number and percentage for categorical data. The mean amount of breast milk between groups was compared using independent t-test or Mann Whitney U test depended on the characteristic of data. The Pearson Chi-square test was used for the comparison of categorical data. A p-value <0.05 considering statistically significant. All analyses were performed using Stata version 13.0. (StataCorp, 2013).

● Ethical approval

The protocol was approved by the Ethical Review Committee for Research in Human Subjects Udon Thani Hospital (I001/2565). This clinical trial was registered to Thailand Clinical Trial Registration (TCTR20221010005).

Results

A total of 290 postpartum women were assessed for eligibility. There were 145 women who not met inclusion criteria and 65 women declined to be participants. Remaining of 80 women were enrolled in the study and 40 were randomized into each group. Finally, the number of participants was 40 in each group who

completed the assessment of the outcomes as shown in Figure 1.

The general characteristics of the participants including age, pregestational BMI, parity, gestational age, route of delivery, estimated blood loss, latch score, frequency of breastfeeding, breast milk score at first day, birth weight of newborn and sex of newborn, were similar between two groups (Table 1).

The primary outcome was the amount of breast milk. The mean volume on the second day postpartum was 21.88 (± 18.42) ml in the therapeutic breast group and 35.25 (± 38.81) ml in the routine care group. Routine care group was higher in the breast milk volume than the therapeutic breast massage group, but no statistic significant (mean difference= -13.37; 95% CI: -0.15 to 26.68; p-value=0.052). Breast milk scores in the therapeutic breast massage group were not significantly higher than in the routine care group (mean difference on day 2=0.25; 95% CI: -0.63 to 0.13; p-value=0.198, on day 3=0.15; 95% CI: -0.51 to 0.21; p-value=0.413). Newborns had no significant difference in defecation and urination frequency. (mean difference= -0.57; 95% CI: -0.73 to 1.88; p-value=0.384 and 0.47; 95% CI: -1.76 to 0.81; p-value=0.465, respectively). Furthermore, no side effects, such as skin rash, burning sensation, irritation, or itchiness, were found in the intervention group. (Table 2)

Conclusions and Discussion

Breast massage is a method for the augmentation of breast milk volume in postpartum

women which is usually used in many centers. The present study investigated the amount of breast milk not only in mothers who had breast milk deficiency, but also in those who had normal lactation. The results of this study showed that the therapeutic breast massage did not significantly increase breast milk volume in women who delivered babies at late preterm or term. However, there were no adverse effects of the breast massage.

Therapeutic breast massage with warm compression was considered to promote breast milk volume due to facilitating the resolution of plugged milk ducts and stimulating lymphatic and blood circulation that increases breast milk production. (Munsittikul et al., 2022) This method was utilized in several hospitals in Thailand. In this study, the therapeutic breast massage was designed as only a time within 24 hours postpartum based on routinely practice in our center that the Thai traditional medical doctors usually do the daily massage on the first or second day postpartum. From this study data, we found no significant difference in breast milk volume and breast milk scores in the therapeutic breast massage group when compared with no massage group which was contrast with some previous studies reported the effectiveness of breast massage on lactation (Dehghani et al., 2018; Raju, Thomas, & Rao, 2018). This might be caused by the different types and frequency of breast massage. A previous study by Nuchanat et al. (2022) reported that the traditional breast massage was required daily for up to four days

to resolve plugged milk ducts. Raju, Thomas, & Rao (2018) study reported the effectiveness of breast massage on lactation when administered three times per day for three days which improved the post breastfeed weight gain and the number of urinations passed by newborn in massage group for all three days. The number of stools was significantly higher on the third day. Additionally, a study conducted by Dehghani et al. (2018) compared the breast Oketani-massage to routine care and used neonatal weight gain as an outcome measure for milk supply in 14-and 28-days post-intervention. The results indicated a statistically significant difference in neonatal weight gain.

Normally, the postpartum women were admitted in the postpartum ward for two or three days. The therapeutic breast massage class has been set for only one or two times for normal postpartum women. The most important time for success breast feeding is the first few days. Therefore, even the evidence from this study showed that the single time of breast massage course could not improve the milk outcome, the frequency of urination and defecation. The proper number and days of breast massage treatment still needs further studies for evaluation.

Regarding the method of massage, our therapeutic breast massage was a traditional breast massage that included gently touching and rolling around the areola, then compressing with wet warm towels. In another recent study, there was discovered a new method of breast massage called integrated breast massage for

lactating women with plugged milk ducts. They changed the steps in the method. For example, apply continuous pressure to the breast while moving along the base of the breast from the medial side to lateral side as the first step (Munsittikul et al., 2022). This new method might improve the outcomes. Moreover, all study participants included postpartum women with either normal or lactation deficiency, so we assumed that study in only women with plugged milk ducts might be found in the difference results.

In the present study, some factors might be considered. We supposed that clothes or diapers may be changed during breastfeeding by some participants even if we informed the practice before the experiment started. Breast milk scores were evaluated by several nurses as well as breast milk volume was indirectly measured by the test weighing method. We suggested that evaluating the scores by the same nurse and collecting breast milk directly by an electric breast pump might be more accurate for the study.

Limitations

The study was a non-blind trial established at a single center. The duration of the study was a shorter period, and the outcomes were evaluated by several nurses. Although the same electronic weight scale was used for measuring the baby's weight before and after feeding and the outcome was objective as the number of weights, if the baby moved on the weight scale,

then the nurse may have recorded the wrong number of weights.

the therapeutic breast massage may improve breast milk production.

Conclusion

Among postpartum women, the single daily therapeutic breast massage for a day could be not effective for augmenting breast milk volume when compared with non-massage. However, there were no complications after the massage. We suppose that more than one times

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Table 1 Demographic and clinical characteristics of all participants and compared between the therapeutic breast massage and control groups. (n=80)

Variables	Experimental group (n=40)	Control group (n=40)	p-value *
Age (year), mean ($\pm$ SD)	27.70 $\pm$ 6.13	28.25 $\pm$ 5.78	0.681
Pregestational BMI (kg/m ²), mean ($\pm$ SD)	22.45 $\pm$ 4.50	22.80 $\pm$ 4.50	0.725
Parity, n (%)			0.245
Primiparous	12 (30.00)	17 (42.50)	
Multiparous	28 (70.00)	23 (57.50)	
Gestational age at delivery (week)	38.60 $\pm$ 1.26	38.30 $\pm$ 1.18	0.275
Route of delivery, n (%)			1.000
Vaginal	22 (55.00)	22 (55.00)	
Cesarean section	18 (45.00)	18 (45.00)	
Estimated blood loss (ml)	183.00 $\pm$ 103.51	198.75 $\pm$ 95.73	0.482
LATCH score, mean ($\pm$ SD), assessed at 24 hours of delivery	8.13 $\pm$ 1.44	7.80 $\pm$ 1.32	0.296
Frequency of breast feeding (times/24 hours), mean ($\pm$ SD), assessed on day 1 and 2 of life	9.95 $\pm$ 2.72	10.34 $\pm$ 2.64	0.520
Breast milk score at day 1 of delivery (min=0, max=3)	0.93 $\pm$ 0.66	0.78 $\pm$ 0.66	0.311
Birth weight of newborn (gram), mean($\pm$ SD)	3099.00 $\pm$ 395.72	3115.50 $\pm$ 405.74	0.854
Male newborn, n (%)	16 (40.00)	22 (55.00)	0.179

* Pearson Chi-square test

Table 2 Comparison of mean amount of breast milk, breast milk score, frequency of defecation and urination in two groups of the therapeutic breast massage and control

Outcome	Experimental group	Control group	Mean difference, 95% CI	p-value
Primary outcome				
Amount of breast milk (ml)	21.88 $\pm$ 18.42	35.25 $\pm$ 38.81	-13.37, -0.15 to 26.68	0.052
Secondary outcomes				
Breast milk score				
at day 2 of delivery	1.88 $\pm$ 0.85	1.63 $\pm$ 0.87	0.25, -0.63 to 0.13	0.198
at day 3 of delivery	2.43 $\pm$ 0.78	2.28 $\pm$ 0.85	0.15, -0.51 to 0.21	0.413

Defecation of newborn, times per day	4.38 ± 2.73	4.95 ± 3.13	-0.57, -0.73 to 1.88	0.384
urination of newborn, times per day	6.15 ± 2.90	5.68 ± 2.88	0.47, -1.76 to 0.81	0.465

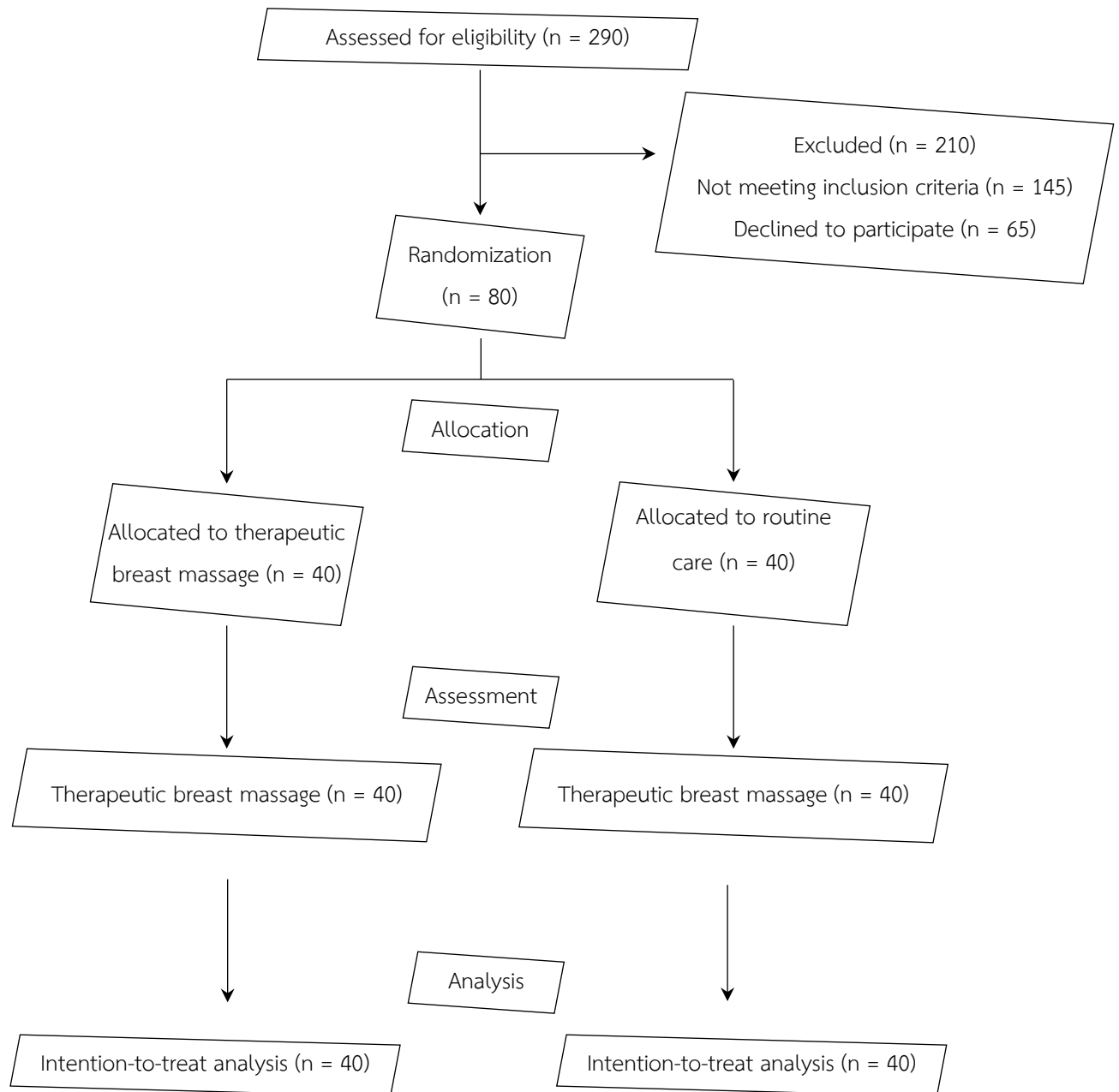


Figure 1 CONSORT flow diagram of participants through the study