

# Effectiveness of Oketani Breast Massage for Reducing Pain and Depression in Perimenopausal Women with Cyclical Mastalgia: A One-group Pre-test and Post-test Study

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**Background:** Cyclical mastalgia is common among perimenopausal women and often coexists with depressive symptoms, significantly impairing quality of life. Pharmacological treatments offer limited relief and may cause side effects. Oketani breast massage (OBM), a non-invasive technique targeting retro-mammary tissues, has shown benefits in lactating women but remains unexplored in perimenopausal women with cyclical mastalgia. This study aimed to assess its effectiveness in reducing breast pain and depressive symptoms.

**Materials and methods:** A single-group pre-test and post-test quasi-experimental design was used. Thirty-eight perimenopausal women aged 45–55 years with cyclical mastalgia were recruited. Participants received OBM twice weekly for 4 weeks, delivered by a trained therapist. Breast pain and depressive symptoms were measured before and after the intervention using the Breast Pain Questionnaire (BPQ) and the Hamilton Depression Rating Scale (HDRS). Due to non-normal data distribution, the Wilcoxon signed-rank test was used for analysis.

**Results:** Post-intervention analysis showed significant reductions in BPQ (mean difference = 5.00,  $p < 0.001$ ) and HDRS scores (mean difference = 10.00,  $p < 0.001$ ). Both outcomes had large effect sizes (1.00), indicating notable clinical improvements. No adverse effects were reported by any participants.

**Conclusion:** OBM appears to be a safe and effective non-pharmacological

intervention for managing cyclical mastalgia and associated depressive symptoms in perimenopausal women. Its simplicity, non-invasive nature, and dual benefits make it a valuable component of integrative women's health care. Further randomized controlled trials with larger samples are recommended to confirm these findings.

**KEYWORDS:** Oketani massage; cyclical mastalgia; breast pain; depression; manual therapy

## INTRODUCTION

Mastalgia, commonly known as breast pain, is a widespread issue affecting up to 70% of women at some point. Fortunately, in the vast majority of cases, the pain is not related to serious conditions such as breast cancer. Cyclical mastalgia is the most common form of breast pain. It is driven by hormonal changes during the menstrual cycle. In most cases, discomfort arises during the luteal phase and diminishes after the onset of menstruation. Broader epidemiological research acknowledges that the prevalence of breast pain varies significantly by region and ethnicity, reflecting diverse genetic, environmental, and lifestyle factors.<sup>(1)</sup>

Prevalence data on cyclical breast pain primarily derive from a study involving 874 women aged 18–44 years in Virginia, where 68% reported experiencing cyclical

breast symptoms and approximately 22% reported moderate to severe cyclical mastalgia.<sup>(2)</sup> This study collected data through phone interviews, providing detailed insights into symptom frequency within this cohort. Cyclical breast pain typically occurs 1–2 weeks before menstruation, feeling diffuse and bilateral with possible radiation to the upper arm and axilla. Symptoms often subside after the menstrual phase. Women aged 30–40 years are commonly affected. While symptoms resolve spontaneously in some cases (22%) or with hormonal changes such as pregnancy or menopause, they can persist in many (65%) despite treatment. For some women, this issue may persist until menopause.<sup>(3)</sup>

Recent studies have highlighted the significant health-related consequences of mastalgia, revealing its detrimental impact on daily activities and overall quality of life. Research indicates that women experiencing mastalgia report reduced quality of life, decreased sexual engagement, poorer sleep quality, and diminished work–life balance.<sup>(4)</sup>

Mastalgia can have a significant impact on women's mental health, often leading to anxiety and depression. The fear of cancer, despite its rare association with breast pain, can exacerbate these psychological symptoms. Studies have shown that women with mastalgia, particularly those with prolonged cyclical pain and poor coping strategies, are more likely to experience elevated depression scores. This highlights the importance of addressing the emotional and psychological aspects of mastalgia, in addition to managing physical symptoms.<sup>(5)</sup>

Mastalgia often prompts women to seek medical attention due to cancer concerns, but the risk of underlying malignancy is low (0.5%) if clinical and mammographic evaluations are normal. Most women (78–85%) are reassured with normal findings and do not need treatment, while 10–22% experience severe pain and seek relief. Treatment approaches vary, with hormonally active medications being more effective for cyclical mastalgia. However, assessing treatment effectiveness is challenging due to the subjective nature of pain and varying definitions of therapeutic response.<sup>(6)</sup>

Non-pharmacological interventions for breast pain include physical measures such as wearing properly fitted brassieres, wearing sports bras during exercise, applying

heat or cold packs, and performing gentle massage. Relaxation techniques, such as progressive muscular relaxation, have shown promise with 61% of women experiencing substantial relief. Dietary changes such as low-fat diet have been associated with improved mastalgia symptoms, while methylxanthine restriction (caffeine reduction) has yielded mixed results. These interventions are low risk and may benefit women with cyclical or intermittent breast pain.<sup>(7)</sup>

Massage therapy is part of complementary medicine that families increasingly use due to its simple practice and accessibility. A pilot study on breast massage therapy found several physical and psychological benefits among non-cancer patients, including reduced breast pain and swelling, improved physical and psychological health, and enhanced overall well-being. Most patients reported an increase in breast size and firmness. The therapy may work by stimulating pressure receptors, reducing cortisol levels, and increasing serotonin and dopamine, thereby promoting relaxation and reducing stress. Potential benefits may extend to alleviating negative emotions, reducing pain in breastfeeding women, and preventing mastitis; however, further research is needed to fully understand its effects.<sup>(8)</sup>

The Oketani breast massage (OBM) technique, developed in Japan, targets the retro-mammary connective tissue to relieve congestion, ease pain, and enhance breast pliability. Oketani massage has been shown to benefit postpartum women, particularly in breastfeeding. Studies have demonstrated significant pain relief, increased breast milk pH, and improved breastfeeding outcomes. Additional research has found that Oketani massage improves breastfeeding success rates, increases maternal confidence, reduces engorgement, and enhances milk production while reducing nipple pain. These findings suggest that Oketani massage is a valuable tool for supporting breastfeeding women, with benefits applicable to various postpartum scenarios, including cesarean deliveries.<sup>(9–11)</sup>

According to gate control theory, mechanical stimulation from massage may activate A-beta fibers, which inhibit nociceptive stimulus transmission at the spinal level. When the body is under stress, triggering the relaxation response (RR) can help decrease the stress level. Massage

therapy can promote this RR in the body, which facilitates healing. Physiological changes that happen during the RR include reduced blood pressure, decreased oxygen consumption and muscle tension, and lower systemic cortisol and noradrenaline levels, which can reduce pain and improve individual well-being.<sup>(12)</sup>

While evidence supports Oketani massage for postpartum breast discomfort, no published studies have evaluated its impact on cyclical mastalgia in non-lactating perimenopausal women. Given the overlapping pathophysiological features such as hormone-induced vascular stasis, stromal edema, and tissue tightness, Oketani massage may plausibly relieve breast pain in this demographic.

While Oketani massage, traditional breast massage, and manual lymphatic drainage (MLD) share goals such as relieving congestion, easing pain, and improving tissue pliability, OBM specifically targets the deeper retro-mammary connective tissue and fascia through specialized manual mobilization. Unlike general massage or MLD, which primarily stimulates superficial lymphatics and skin layers, OBM focuses on separating adhesions and improving elasticity in the underlying connective structures that support the breast, aiming for lasting relief of vascular stasis and tissue tightness characteristic of cyclical mastalgia.

The technique's non-invasive nature, ease of standardization, and favorable safety profile position it as an attractive non-pharmacological option for women seeking integrative care. By addressing both physical pain and associated depressive symptoms, this approach aligns with the objectives of holistic women's health treatment.

The aim of this study is to evaluate the effectiveness of OBM for reducing breast pain and depressive symptoms among perimenopausal women with cyclical mastalgia, utilizing a single-group pre-test–post-test quasi-experimental design.

The intervention consists of twice-weekly standardized OBM sessions administered over a period of 4 weeks by therapists who had over 3 years of clinical experience in women's health physiotherapy and held certification in lactation counseling from a recognized institution. This technique involves specific manual manipulation targeting the retro-mammary connective tissues with the goal of promoting lymphatic

drainage, relieving tissue congestion, and alleviating pain.

The study's primary outcomes are measured using two validated tools: the Breast Pain Questionnaire (BPQ) and the Hamilton Depression Rating Scale (HDRS). The BPQ is a validated instrument for assessing mastalgia, designed to capture the intensity, frequency, and impact of breast pain. Its reliability and construct validity have been demonstrated in clinical settings, making it suitable for guiding management and evaluating interventions in breast clinics.<sup>(13)</sup> The HDRS is a reliable, gold-standard tool for evaluating depression severity and treatment outcomes. It exhibits strong internal consistency and inter-rater reliability, with demonstrated construct validity across diverse populations, supporting its widespread use in both clinical research and psychiatric practice.<sup>(14)</sup>

The BPQ and HDRS assess breast pain and depressive symptoms, respectively, which may arise concurrently or secondary to breast pain. Both tools provide complementary insights into the physical and psychological impact of breast conditions, aiding comprehensive patient evaluation and management. Outcome assessments were scheduled with baseline data collected and follow-up data gathered after the 4-week massage protocol.

## METHODOLOGY

### Study Design

A single-group pre-test–post-test design was used in this study to assess the initial effectiveness of OBM in perimenopausal women with cyclical mastalgia. This design allowed participants to serve as their own control, enhancing sensitivity to change. It was appropriate for early-phase research where comparative data are limited. All participants received the same intervention, and outcome measures were recorded before and after the intervention. Table 1 presents the baseline demographic and clinical characteristics of the study participants (N = 38).

### Subjects

Perimenopausal women aged 45–55 years presenting with complaints of cyclical mastalgia were recruited from the

TABLE 1. Descriptive Statistical Analysis of Participants

| <i>Variable</i>                                                | <i>Statistical Data</i> |
|----------------------------------------------------------------|-------------------------|
| Age, years (mean $\pm$ SD)                                     | 47.7 $\pm$ 1.82         |
| Age range, years                                               | 45–55                   |
| Marital status                                                 |                         |
| Married                                                        | 37 (97.37%)             |
| Parity                                                         |                         |
| Nulliparous                                                    | 12 (32%)                |
| Multiparous                                                    | 26 (68%)                |
| BMI, kg/m <sup>2</sup> (mean $\pm$ SD)                         | 25.7 $\pm$ 2.8          |
| BMI range                                                      |                         |
| Normal (<25 kg/m <sup>2</sup> )                                | 16 (42%)                |
| Overweight (25–29.9 kg/m <sup>2</sup> )                        | 18 (47%)                |
| Obese ( $\geq$ 30 kg/m <sup>2</sup> )                          | 4 (11%)                 |
| Duration of cyclical mastalgia symptoms, weeks (mean $\pm$ SD) | 6.2 $\pm$ 1.62          |
| Symptom pattern                                                |                         |
| Unilateral                                                     | 4 (10.53%)              |
| Bilateral                                                      | 34 (89.47%)             |

BMI = body mass index; SD = standard deviation.

outpatient gynecology department of a tertiary care hospital in Chennai. Due to preliminary nature and feasibility constraints, randomization was not implemented; this is acknowledged as a limitation, and future studies are proposed to include randomization with control groups. The single-group pre-test–post-test design was selected to initially explore treatment effects, with awareness of potential participant bias. The mean body mass index of participants was 25.7  $\pm$  2.8 kg/m<sup>2</sup>, with 42% (n = 16) classified as normal (<25 kg/m<sup>2</sup>), 47% (n = 18) as overweight (25–29.9 kg/m<sup>2</sup>), and 11% (n = 4) as obese ( $\geq$ 30 kg/m<sup>2</sup>). This study was carried out in accordance with the principles of the Declaration of Helsinki and all participants signed written informed consent before the planned therapeutic intervention. Formal ethical approval was granted by the study settings for conducting this study (Institutional Scientific Review Board No.: 02/033/ISRB/PGSR/SCPT).

The sample size was estimated using G\*Power 3.1 software for a paired-sample *t*-test, as the study employed a one-group

pre-test–post-test design. In the absence of prior studies evaluating the effect of OBM on cyclical mastalgia in perimenopausal women, a moderate effect size (Cohen's *d* = 0.5) was assumed based on convention. According to this, the minimum required sample size was 34 participants. To account for an estimated 10% dropout or attrition rate, a total of 38 participants were recruited for the study.

Purposive sampling technique was used. Participants were included in the study if they met the following criteria: a history of diagnosed cyclical mastalgia for at least the past 3 months and willingness to sign the consent form. Exclusion criteria include participants who had a history of breast cancer or surgery, current use of hormonal therapy or psychiatric medications, and the presence of non-cyclical or extra-mammary breast pain (Figure 1).

## Intervention

Oketani massage is a manual technique used to remove adhesion formation, retain breast tissue elasticity, and soften the structures.

The breast was systematically divided into specific sections for the application of the Oketani technique, with the division pattern differing between the right and left breasts. Initially, a perpendicular line was drawn from the nipple to the breast line to serve as the baseline reference. Using this line, an area of 105° was measured on both sides and labeled as sections B and C. Section A represented the remaining 150° located at the upper portion of both breasts. For orientation, section B corresponded to the inner side of the right breast and the outer side of the left breast, while section C denoted the outer side of the right breast and the inner side of the left breast.

Each of the A, B, and C sections was further subdivided into three equal parts. In both breasts, section A was divided clockwise into parts 1, 2, and 3, whereas sections B and C were divided vertically from top to bottom into parts (1), (2), and (3). Notably, B-(3) and C-(3) lie adjacent to one another at the central boundary between the two sections. These areas, B-(3) and C-(3), align along the breast axis, providing structural support when the individual is in an upright position (Figure 2).

Therapists perform seven manual mobilization techniques (pushing, pulling,

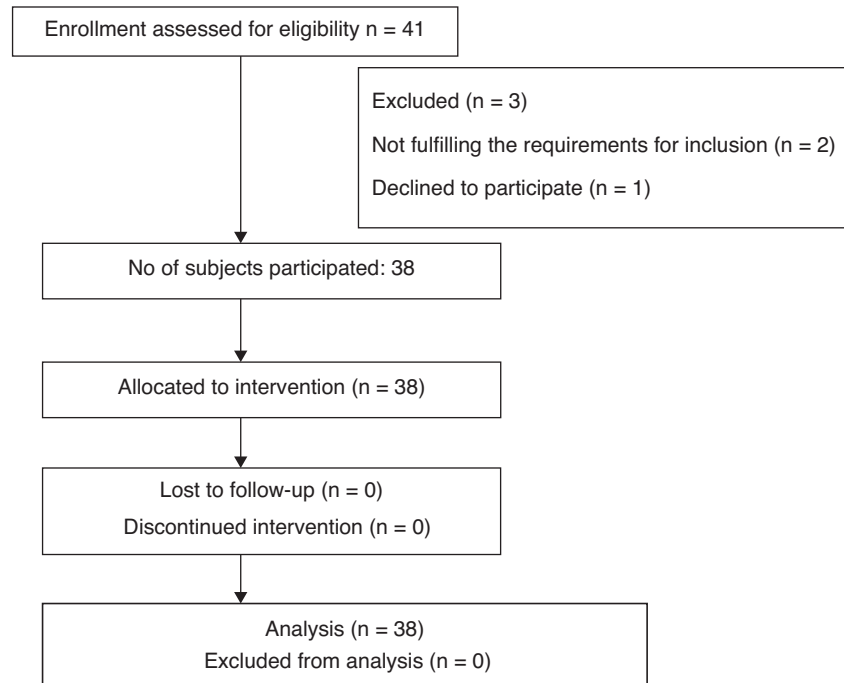


FIGURE 1. CONSORT flow chart. CONSORT = Consolidated Standards of Reporting Trials.

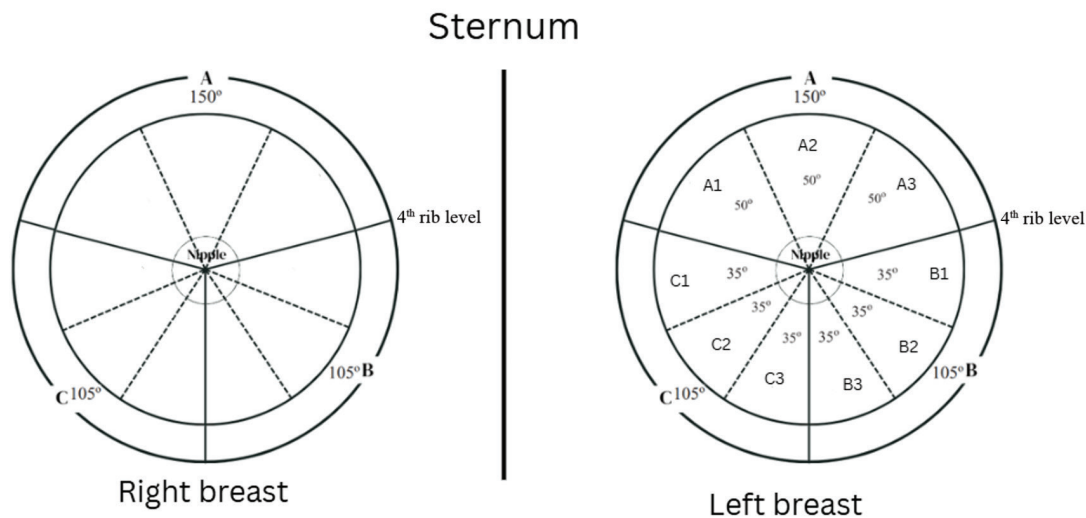


FIGURE 2. Representation of breast anatomy in relation to Oketani.

twisting, and rotational movements) to treat the retro-mammary connective tissue and fascia adjacent to the pectoralis major muscle, with the aim of resolving adhesions, promoting lymphatic drainage, and enhancing tissue elasticity. The intervention excludes direct manipulation of the nipple, respecting regional clinical practice guidelines such as those followed by registered massage therapists in Ontario.

There are eight manual techniques used in this massage. The first seven techniques are mobilization methods, while the eighth technique involves milk expression. Since the goal of this study is to reduce pain, only the first seven techniques were applied to participants for the treatment of cyclical mastalgia. This seven-technique procedure was performed over a duration of 15 min. It was administered by trained therapists with more than 3 years of clinical experience

in women's health physiotherapy and certification in lactation counseling from a recognized institution.

Manipulation technique 1: Pushing up C-(1) and pulling up A-(1) and B-(2) using the third finger of the right hand and the little finger of the left hand toward the left shoulder.

Manipulation technique 2: Pushing up C-(1-2) and pulling up the central portion of A-(1-2) and B-(1-2) using the third finger of both hands toward the left axilla.

Manipulation technique 3: Pushing up C-(2) and pulling up A-(3) and B-(1) using the third finger and thumb of the right hand and the third finger of the left hand placing the thumb above the second joint of the right thumb. Here, pushing and pulling will be parallel to the opposite breast. Pushing and pulling numbered (1), (2), and (3) are the manipulations used to separate the hard portions of the breast from the fascia of the pectoralis major.

Manipulation technique 4: Pushing down the whole breast toward the umbilicus placing the right thumb on C-(1), the middle, third, and little fingers on side B, and the left thumb on C-(1), with the middle, third, and little fingers on side A.

Manipulation technique 5: Pulling down the breast toward the direction of the practitioner using the right hand while gently twisting it from the upper periphery to the lower margin, holding the breast like manipulation 4.

Manipulation technique 6: Pulling down the breast toward the direction of the practitioner using the left hand while gently twisting it from the upper periphery to the lower margin, holding the breast like manipulation 5. It is a procedure opposite to operation (5).

Manual procedures (5) and (6) are techniques used to isolate the hard basal portions of the breast from C-(2) to C-(1) from the pectoralis major fascia.

Manipulation technique 7: Slowly rotating the breast in a clockwise direction and noting the elasticity of the base of the breast (Figure 3).

These techniques were adapted from the study by Kabir and Tasnim.<sup>(15)</sup> These techniques are performed rhythmically and gently throughout the therapy session and participant's comfort is maintained.

Therapy sessions were conducted in the outpatient physiotherapy unit in the tertiary health-care sector; sessions were planned twice weekly for 4 weeks. In

addition, participants were instructed to perform deep-breathing exercises 10 times twice daily.

## Outcome Measures

The BPQ and the HDRS were used to assess the pain and mental health of participants. Both questionnaires were explained to participants, and a copy was distributed to them before the study began to record the baseline data, and the same was repeated after 2 months of the study to analyze the effects of the intervention.

## Statistical Analysis

Statistical analysis was conducted using Jamovi (Version 2.6). Descriptive data for the BPQ and the HDRS are presented in Tables 2 and 3. A Shapiro–Wilk test indicated a significant departure from normality in the post-intervention scores on both the BPQ and HDRS, indicating that the normality assumption was violated. Therefore, the non-parametric Wilcoxon signed-rank test was used to analyze

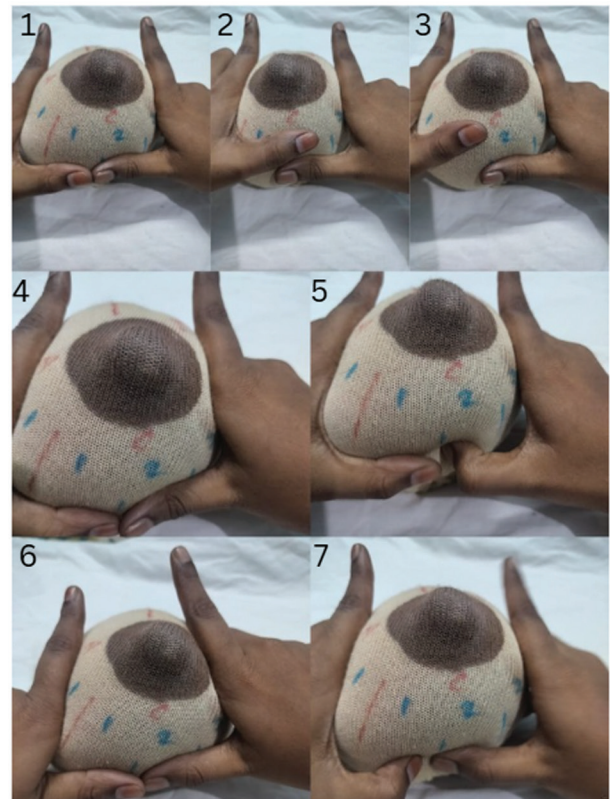


FIGURE 3. Oketani massage technique for the right breast.

paired differences in scores before and after the intervention.

All outcomes are reported as medians with interquartile ranges to maintain consistency with the non-parametric approach. Means were not reported due to violations of the normality assumptions.

## RESULTS

For the BPQ, the Wilcoxon signed-rank test indicated a significant reduction in symptoms after the intervention, with a median score of 2.37 before and 2.00 after

TABLE 2. Descriptive Statistics for the Breast Pain Questionnaire (BPQ) Score Before and After the Intervention

| BPQ                 | N  | Median | SD    | SE    |
|---------------------|----|--------|-------|-------|
| Before intervention | 38 | 7.00   | 1.125 | 0.183 |
| After intervention  | 38 | 2.00   | 0.913 | 0.148 |

SD = standard deviation; SE = standard error.

TABLE 3. Descriptive Statistics for the Hamilton Depression Rating Scale (HDRS) Before and After the Intervention

| HDRS                | N  | Median | SD   | SE    |
|---------------------|----|--------|------|-------|
| Before intervention | 38 | 17.00  | 1.55 | 0.252 |
| After intervention  | 38 | 7.00   | 1.72 | 0.279 |

SD = standard deviation; SE = standard error.

the intervention (Table 2). The calculated effect size was 1.00, determined using the rank-biserial correlation, signifying a large effect (Table 4).

For the HDRS, a significant improvement was also observed following the intervention, with median scores of 17.00 before and 7.00 after the intervention (Table 3). The computed rank-biserial correlation again represented a large effect (Table 5). Data comparison is represented in Figure 4.

These findings collectively confirm that the intervention effectively reduced both breast pain and depressive symptoms, demonstrating robust effect sizes and consistent improvement across both clinical scales.

## DISCUSSION

This study investigated the effects of OBM on breast pain severity and depressive symptoms in perimenopausal women suffering from cyclical mastalgia. The findings revealed a statistically significant reduction in both BPQ and the HDRS scores after 4 weeks of twice-weekly massage sessions. These results suggest that OBM may be an effective non-pharmacological intervention for alleviating cyclical breast pain and associated depressive symptoms in this population.

A narrative review conducted by Jaiswal and Thakur in 2021 examined the role of yoga in alleviating psychological factors such as anxiety, stress, and depression associated with breast pain through

TABLE 4. Wilcoxon Signed-rank Test for the Breast Pain Questionnaire (BPQ)

| Wilcoxon W | p      | Mean Difference | SE Difference | Effect Size |
|------------|--------|-----------------|---------------|-------------|
| 741        | <0.001 | 5.00            | 0.204         | 1.00        |

Note:  $H_a: \mu_{\text{Measure 1}} - \mu_{\text{Measure 2}} \neq 0$

SE = standard error.

TABLE 5. Wilcoxon Signed-rank Test for the Hamilton Depression Rating Scale (HDRS)

| Wilcoxon W | p      | Mean Difference | SE Difference | Effect Size |
|------------|--------|-----------------|---------------|-------------|
| 741        | <0.001 | 10.00           | 0.352         | 1.00        |

Note:  $H_a: \mu_{\text{Measure 1}} - \mu_{\text{Measure 2}} \neq 0$

SE = standard error.

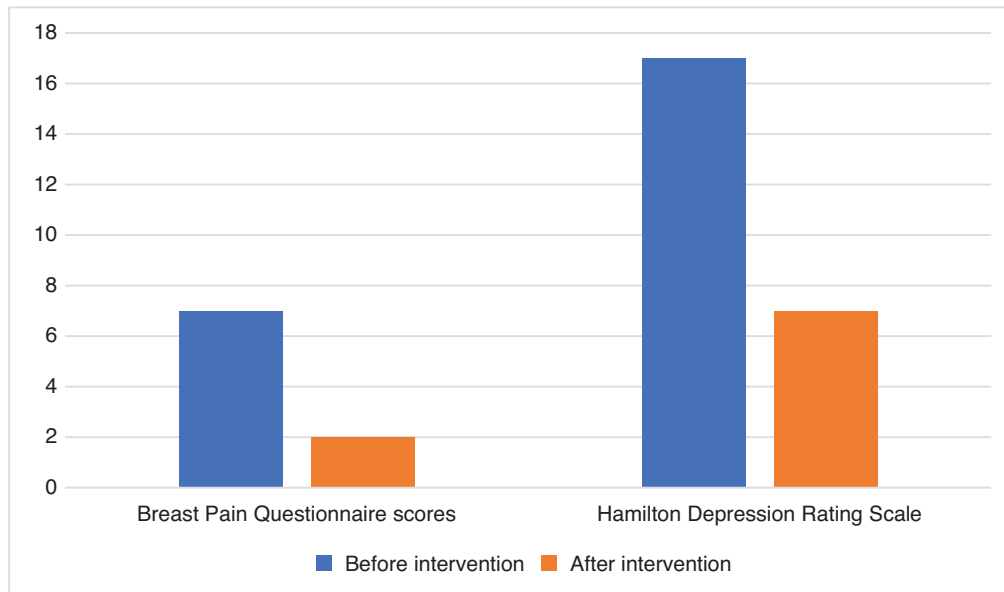


FIGURE 4. Comparison of median scores before and after intervention on the Breast Pain Questionnaire (BPQ) and the Hamilton Depression Rating Scale (HDRS).

holistic mind–body practices. While yoga appears to be effective in reducing pain and psychological distress, more high-quality trials are needed.<sup>(16)</sup> The authors suggested a conventional treatment for cyclical mastalgia through a psychosomatic approach; similarly, this study builds on the gap in conventional treatment through physical manipulation.

The exercise study in obese women conducted by Bhojwani et al. in 2021 reported decreased breast tenderness and improved quality of life, likely through hormonal regulation and enhanced circulation.<sup>(17)</sup> The 2024 study by Ramalingam et al. comparing structured exercise and aerobic exercise in women with cyclical mastalgia found that both interventions reduced breast pain significantly, but structured exercise was more effective in decreasing pain severity and duration.<sup>(18)</sup> This massage technique reduces tissue congestion, activates neurophysiological pain-relief mechanisms, and promotes pain relief. These interventions are safe and beneficial, targeting different aspects of mastalgia—local tissue relief versus systemic health improvements. Collectively, the study suggests the effectiveness of non-pharmacological approaches for cyclical mastalgia.

The large effect sizes found for both pain and depression outcomes further underscore the clinical relevance of the interven-

tion. Given the low risk and non-invasive nature of OBM, it presents an appealing complementary therapy for women seeking alternatives to pharmacological treatments.

### Limitations and Recommendations

The study's single-group pre-test–post-test design, lacking a control group, limits the ability to definitively attribute symptom improvements to Oketani massage. Objective outcome measures are limited for analyzing aspects of cyclical mastalgia. This study was conducted as a preliminary step to explore an alternative physical treatment approach using a small sample size. Future research with a larger sample and inclusion of a control group would enhance the validity and research value of the findings. Additionally, combining Oketani massage with complementary therapies such as yoga or structured exercise could be explored for an integrative approach to the management of cyclical mastalgia.

In conclusion, the study provides preliminary evidence supporting OBM as an effective and safe intervention for reducing breast pain and depressive symptoms in perimenopausal women with cyclical mastalgia. This technique may be a valuable addition to integrative women's health approaches, addressing

both physical and psychological aspects of cyclical breast pain.

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## CONFLICT OF INTEREST NOTIFICATION

The authors declare there are no conflicts of interest.

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## AUTHOR CONTRIBUTIONS

Geethapriya Vadamalai: conceptualized the study, contributed to methodology, collected data, performed statistical analysis, and drafted the manuscript. Nithyadarshini Nadar and Keerthana Ravi: assisted with project administration, ethical approval, and literature support. S. Senthilkumar, Karthika Ramalingam, and M. Kamalakannan: served as research guides and provided supervision, critical revisions, and intellectual input throughout the study. All authors reviewed and approved the final manuscript.

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