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RESEARCH PAPER

The effect of mindfulness-based cognitive therapy counseling on sexual satisfaction and distress among married women with cyclical mastalgia

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Abstract

Introduction: More than half of the female population suffers from cyclical mastalgia, which can interfere with sexual functioning and impact sexual satisfaction and cause sexual distress. The present study evaluated the efficacy of mindfulness-based cognitive therapy (MBCT) counseling on sexual satisfaction and sexual distress among married women with cyclical mastalgia. **Methods:** A randomized controlled clinical trial was conducted in 2024 with 72 married women presenting with cyclical breast pain at comprehensive health centers in Qazvin, Iran. Participants were randomly allocated via quadruple block randomization with allocation concealment using sealed opaque envelopes, into an intervention group ($n = 36$) receiving eight 90-min MBCT sessions and a control group ($n = 36$) receiving no intervention. Demographic-obstetric questionnaires, the Visual Analogue Scale (VAS) for pain, the Cardiff Breast Pain Chart, the Female Sexual Satisfaction and Distress Scale, and the Five-Facet Mindfulness Questionnaire were completed by all participants at baseline and at one- and three-month follow-ups. Data were

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analyzed using repeated-measures analysis of covariance (ANCOVA) in SPSS-27, with statistical significance set at $p < 0.05$.

Results: The intervention group demonstrated significant improvements across all measured outcomes compared to controls. For sexual satisfaction, mean score differences between groups (baseline, first, and second follow-ups, respectively) were as follows: sexual satisfaction subscale (0.08, 4.49, 6.72; $p < 0.001$), relationship subscale (0.56, 4.17, 6.56; $p < 0.001$), and compatibility subscale (−0.33, 4.15, 7.61; $p < 0.001$). Similarly, sexual distress scores showed marked reductions in relational concern (−0.22, 5.24, 8.33; $p < 0.001$) and personal concern subscales (−0.97, 3.41, 7.74; $p < 0.001$). Mindfulness scores increased substantially among those in the intervention group (0.11, 10.02, 15.31; $p < 0.001$), while pain intensity scores decreased (−0.07, −1.67, −1.69; $p < 0.001$), indicating both psychological and symptomatic benefits. All changes were statistically significant at one- and three-month follow-ups, confirming the sustained efficacy of MBCT counseling.

Conclusion: The findings suggest that MBCT could be considered as a complementary therapy in managing cyclical mastalgia, particularly for women experiencing sexual dysfunction. Future research to assess long-term effects and compare MBCT with other therapeutic approaches are recommended.

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Introduction

Mastalgia is the medical term for breast pain, describing moderate to severe discomfort in one or both breasts that may be intermittent or persistent throughout the day. Some women experience it as heaviness, tightness, tenderness, or a burning sensation in their breast tissue (1). Mastalgia is classified into three main categories: cyclical mastalgia, non-cyclical mastalgia, and extra-mammary pain (2). The most common form, accounting for 60%–70% of breast pain cases, is cyclical mastalgia (3). This type is linked to hormonal fluctuations during the menstrual cycle, typically presents bilaterally, and is often accompanied by breast swelling, tenderness, and nodularity (4). Symptoms usually persist until menopause and subsequently resolve (5). The prevalence of mastalgia varies due to individual differences and sociodemographic factors (6). Studies indicate that approximately two-thirds of breast pain complaints in specialty clinics are cyclical, while the remaining one-third are non-cyclical (6). A meta-analysis reported the prevalence of cyclical mastalgia in Iran (where the present study was conducted) at ~30%, with the highest incidence occurring in the fourth decade of life (ages 30–40 years) (7).

Cyclical mastalgia is highly prevalent among women of reproductive age, although its exact etiology remains unclear. Proposed contributing factors include hormonal imbalances (e.g., altered estrogen-progesterone ratios, elevated prolactin [8]), thyroid dysfunction (9), metabolic disturbances (e.g., lipid metabolism disorders [10], vitamin deficiencies [11], elevated BMI [12]), lifestyle factors (e.g., smoking [13], caffeine intake [14]), anatomical changes (e.g., ductal ectasia [15]), and psychosocial determinants (e.g., childhood trauma [16], premenstrual syndrome history [17], aging [18]). Some evidence suggests a psychogenic origin (19), with studies linking mastalgia to psychiatric comorbidities (anxiety, depression [20, 21]), behavioral dysfunctions (social impairment, sleep disturbances [22]), and cancer-related health anxiety (20).

Clinically, mastalgia significantly impairs quality of life, disrupting sexual function among 48% of affected women, physical activity among 37%, and social engagement among 12% (23-25). Of particular concern is its association with sexual dysfunction, where diminished sexual satisfaction - defined as the pleasurable perception of pain-free intercourse (26) - often emerges as the terminal phase of compromised sexual health (27, 28). The condition's multifaceted nature underscores the need for comprehensive assessment and management approaches that address both physiological and psychological components.

The breasts are among the most significant sexual organs among women, with some sources ranking them as the second most important female sexual structure. Breast pain and impaired breast stimulation can disrupt sexual function, and given the well-documented association between sexual dysfunction and sexual satisfaction (29, 30), cyclical mastalgia may substantially diminish sexual satisfaction. A hallmark feature of sexual dysfunction is sexual distress, typically characterized by increased sexual discomfort and impaired orgasm, penetration, and other aspects of sexual function, ultimately preventing sexual fulfillment (31).

An Iranian study reported a 27.2% prevalence of sexual distress among women, noting that even sexually healthy women may experience episodes of sexual distress (32). Contributing factors typically fall into three categories: (i) social factors (e.g., marital satisfaction), (ii) personal factors (e.g., history of infertility or STI-related anxiety), and (iii) sexual factors (e.g., libido satisfaction, sexual pain, partner premature ejaculation) (33-35). This multidimensional interplay underscores how cyclical mastalgia may perpetuate a cycle of physical discomfort and psychosocial sexual impairment.

Current management approaches for mastalgia fall into two main categories: pharmacological and non-pharmacological treatments. Pharmacological interventions primarily involve chemical agents, which are often associated with significant side effects and frequently fail to achieve successful outcomes (36). Among understudied non-pharmacological approaches, mindfulness-based cognitive therapy (MBCT) shows promise for alleviating psychological symptoms in breast pain patients.

Originating from cognitive-behavioral therapies and representing a key component of third-wave psychotherapy models (37), MBCT is typically conducted as an eight-week brief counseling program adapted from Kabat-Zinn's mindfulness-based stress reduction (MBSR) model, enhanced with cognitive therapy principles (38). This approach facilitates cognitive decentering (39) and has

emerged as an effective contemporary cognitive therapy for marital conflicts and dyadic relationships. Through mindfulness techniques - including non-judgmental observation exercises, enhanced emotional acceptance, and improved cognitive perception of emotions - MBCT helps reduce marital conflicts stemming from sexual dysfunction and maladaptive schemas, ultimately contributing to improved sexual satisfaction (40-42).

The present study

Despite existing research, no previous studies have ever specifically examined the effects of mindfulness-based cognitive therapy (MBCT) counseling on sexual satisfaction and distress among women with cyclical mastalgia—an area that remains overlooked by healthcare providers. Notably, standardized clinical guidelines for managing cyclical breast pain are lacking in primary healthcare settings. Therefore, the present study evaluated the impact of MBCT counseling on sexual satisfaction and distress among married women with cyclical mastalgia. In the study, sexual satisfaction and sexual distress were examined as primary outcomes, while mindfulness and breast pain were assessed as secondary outcomes. It was hypothesized that among women with cyclical mastalgia, MBCT counseling would significantly (i) increase sexual satisfaction (H_1), (ii) reduce sexual distress (H_2), (iii) increase mindfulness levels (H_3), and (iv) reduce breast pain (H_4).

Methods

Trial design

The present study was conducted as a parallel-group randomized controlled clinical trial. The findings are reported in accordance with the CONSORT (Consolidated Standards of Reporting Trials) guidelines for clinical trial reporting (43).

Participants

The present clinical trial was conducted among married women with cyclical mastalgia who presented to comprehensive health centers in Qazvin (Iran) between October 2024 and January 2025. Eligible participants met all inclusion criteria: were married, had documented breast pain persisting >5 days/month using the Cardiff Breast Pain Chart (44), had pain intensity scores >4 on the Visual Analogue Scale (45) during symptomatic days, were of reproductive age (20-45 years), had regular menstrual cycles, and were willing to participate. Women were not able to participate if they had self-reported marital conflicts, were currently pregnant or lactating, had physical or mental health conditions, had personal or first-degree family history of breast cancer, had prior breast surgeries or biopsies, had recent (past three months) pharmacological treatment for breast pain, and/or were currently using hormonal contraception.

Sample size estimation

The required sample size was calculated based on parameters from Lin et al.'s 2019 study (46), which reported post-intervention sexual function scores of 21.72 (out of 36) (SD=8.07) on the Female Sexual Function Index in the MBCT group versus 16.79 (SD=11.08) in the control group (effect size=0.50). Using *G*Power* software with a type I error of 0.05 (two-tailed) and type II error of 0.20 (80% power), the initial calculation yielded 30 participants per group. To account for

an anticipated 20% attrition rate during the intervention and follow-up periods, the number of participants was increased to 36 participants per group, ensuring adequate statistical power in the event of potential participant dropout. This conservative approach aligned with methodological recommendations for clinical trials assessing behavioral interventions.

Recruitment and randomization

The study employed a multi-stage sampling approach across comprehensive health centers in Qazvin. First, all city centers were stratified into four clusters (north, south, east, west), with two centers randomly selected from each cluster. Eligible participants were then recruited through convenience sampling at these sites. After receiving study explanations, participants completed demographic-obstetric questionnaires and prospectively documented pain characteristics for two months using the Visual Analogue Scale (VAS) and Cardiff Breast Pain Chart.

Those who met the aforementioned inclusion criteria underwent randomization via a computer-generated, four-block balanced randomization scheme (block size=4) implemented through a sealed envelope's online randomization tool (<https://www.sealedenvelope.com/simple-randomiser/v1/lists>). This method ensured equal group allocation at every randomization interval, preventing temporal imbalances. Allocation concealment was maintained using sequentially numbered, opaque white envelopes containing group assignments. Eighteen randomization blocks (72 total participants) were generated to achieve balanced intervention (n=36) and control (n=36) groups. Figure 1 present CONSORT flow diagram related to present study.

Blinding

Blinding was not implemented due to nature of study.

Intervention protocol

The intervention group received eight two-hour sessions of mindfulness-based cognitive therapy (MBCT) counseling, conducted twice weekly. The first session was held in-person to establish rapport and provide education about cyclical mastalgia, while subsequent sessions were delivered individually through virtual platforms (*Telegram*, *WhatsApp* or other Iranian social media platforms) based on participants' accessibility. These interactive online sessions enabled real-time bidirectional communication between counselors and participants, allowing for personalized discussion of concerns and immediate professional feedback. Supplementary educational materials (audio files and text documents) were provided alongside the live consultations to reinforce learning. The detailed session-by-session curriculum is presented in Table 1. The content used in the present study was adjusted based on a review of relevant literature (16, 17, 47-49), and the content validity was reviewed and confirmed by five faculty members in clinical psychology and reproductive health.

The control group received routine care without any additional interventions. To maintain ethical considerations, post-study debriefing sessions were conducted for control participants, during which they received the same educational materials provided to the intervention group.

Measures

In the present study, sexual satisfaction and sexual distress were examined as primary outcomes, while mindfulness and breast pain were assessed as secondary outcomes. Participants completed four validated measures:

A demographic-obstetric questionnaire designed by the research team was used for assessing: (i) demographic variables including women's age (in years), marriage duration (in years), body mass index (kg/m²), women's education level, women's employment status, perceived family economic status; (ii) reproductive/obstetric variables including number of pregnancies, abortion history (yes/no), contraceptive method, breastfeeding history; (iii) lifestyle/behavioral variables including cigarette smoking status and caffeine consumption; and (iv) clinical variables including breast self-examination practice, mastalgia monthly duration (number of days), breast exam by midwife, mammography history, and breast cancer history.

The Cardiff Breast Pain Chart (CBPC) was used to assess cyclical mastalgia patterns based on standardized diagnostic criteria (49, 50). The CBPC consists of a 31-day calendar grid (numbered 1-31 corresponding to calendar days), enabling daily recording of pain duration and temporal patterns across the menstrual cycle. Previous validation studies have demonstrated strong inter-item reliability for the CBPC (49). The CBPC has demonstrated strong psychometric properties in previous Iranian studies, including excellent test-retest reliability (ICC=0.91 over two menstrual cycles) (4) and high inter-rater agreement among Iranian gynecologists (7). The Persian version of the CBPC has proven sensitive to detecting treatment effects in Iranian clinical trials, correctly classifying 89% of cyclical versus non-cyclical cases compared to ultrasound findings (5).

The 30-item Sexual Satisfaction Scale for Women (SSS-W) was used to assess five domains of sexual satisfaction: satisfaction, relationship quality, sexual adaptation, relational anxiety, and personal anxiety. Participants respond using a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*) (51). The Persian version of the SSS-W has demonstrated satisfactory psychometric properties (52). In the present study, the SSS-W had excellent longitudinal reliability (intraclass correlation coefficient [ICC]=0.919) across three assessment time points, indicating robust measurement stability for this population.

The 15-item Five Facet Mindfulness Questionnaire-Short Form (FFMQ-15) was used to assess trait mindfulness across five domains: observing, describing, acting with awareness, non-judging, and non-reactivity. Participants respond using a five-point Likert scale from 1 (*never*) to 5 (*always*) and has been validated for both clinical and non-clinical populations aged ≥ 16 years (53). The Persian version has demonstrated satisfactory psychometric properties (54). In the present study, the FFMQ-15 showed good longitudinal reliability across three assessments (ICC=0.804), confirming its stability for assessing mindfulness constructs among women with cyclical mastalgia.

Statistical analysis

Data were analyzed using SPSS v.27 (IBM SPSS Corp. NY, USA). Baseline demographic balance between groups was assessed using Imbens and Rubin's standardized mean difference criteria (<0.25 for continuous variables; $<10\%$ for categorical variables), confirming balanced distribution

(55). Normality assumptions were verified through Shapiro-Wilk tests, central tendency measures, dispersion indices, and histogram visualization. Given the normal distributions, repeated-measures analysis of variance (RM-ANOVA) compared between-group differences in sexual satisfaction, sexual distress, mindfulness, and pain intensity across time points. Effect sizes were evaluated using partial eta-squared (η^2) for RM-ANOVA (trivial: <0.01 ; small: 0.01 – 0.06 ; medium: 0.06 – 0.14 ; large: >0.14), and standardized mean differences (SMDs; small: <0.2 ; medium: 0.2 – 0.5 ; large: >0.5) (56). All tests used $p < 0.05$ significance thresholds.

Ethical considerations

The present study was conducted in accordance with the ethical principles of the Declaration of Helsinki and received institutional approval from the Academic Research Council and Ethics Committee for Biological Research at Qazvin University of Medical Sciences (Approval Code: IR.QUMS.REC.1403.190). The trial protocol was prospectively registered in the Iranian Registry of Clinical Trials (IRCT20240520061847N1), a World Health Organization primary registry. All participants provided written informed consent after receiving detailed explanations of study procedures, risks, and benefits, with explicit emphasis on their right to withdraw without consequence.

Results

Baseline demographic characteristics

Comparative analysis of the intervention ($n=36$) and control ($n=36$) groups showed no statistically significant differences in demographic or clinical variables (Table 2), except for cigarette smoking status ($p=0.01$). The homogeneity between groups was further confirmed using Imbens and Rubin's balance criteria, with SMDs <0.20 and categorical distribution differences $<10\%$ for all variables except for body mass index (BMI), parity, cigarette smoking status, breastfeeding history, and breast self-examination practice. These five variables were subsequently included as covariates in adjusted analyses to control for residual confounding.

Primary outcomes analysis

Univariate repeated-measures ANCOVA (Table 3) demonstrated significant intervention effects across all sexual satisfaction subscales (all p -values <0.001). For the contentment subscale, the intervention group showed markedly higher scores than controls at both first and second follow-ups, with strong between-group (partial $\eta^2=0.702$) and group $\times$ time interaction effects (partial $\eta^2=0.379$). Similarly, the communication subscale showed substantial improvements in the intervention group versus controls (partial $\eta^2=0.650$ between-group; partial $\eta^2=0.201$ interaction). Likewise, the compatibility subscale showed significant between-group differences at follow-ups (partial $\eta^2=0.468$ between-group; partial $\eta^2=0.258$ interaction).

Repeated-measures ANCOVA (Table 3) showed significant intervention effects on both sexual distress subscales (all p -values <0.001). For relational concerns, the intervention group demonstrated substantially lower scores than controls at first and second follow-ups, with large between-group (partial $\eta^2=0.475$) and group $\times$ time interaction effects (partial $\eta^2=0.310$). Similarly, personal concerns showed marked improvement in the intervention group compared to controls,

as evidenced by strong effect sizes for both between-group differences (partial $\eta^2=0.356$) and group $\times$ time interactions (partial $\eta^2=0.293$).

Secondary outcomes analysis

The repeated-measures ANCOVA (Table 4) demonstrated significant intervention effects on mindfulness levels. Participants in the intervention group showed substantially higher mindfulness scores compared to controls at both first and second follow-ups ($p<0.001$), with exceptionally strong between-group effects (partial $\eta^2=0.781$). The significant group $\times$ time interaction (partial $\eta^2=0.448$) showed a progressive, sustained enhancement of mindfulness skills in the intervention group throughout the study period.

Repeated-measures ANCOVA (Table 4) showed significant intervention effects on cyclical mastalgia severity. The MBCT group demonstrated substantially lower pain scores than controls at both first and second follow-ups ($p<0.001$), with a large between-group effect size (partial $\eta^2=0.446$). The significant group $\times$ time interaction (partial $\eta^2=0.129$) indicated progressive pain reduction in the intervention arm throughout the study period.

Discussion

The present study comprised a randomized controlled trial that evaluated the efficacy of mindfulness-based cognitive therapy (MBCT) counseling on sexual satisfaction and sexual distress among married women with cyclical mastalgia. Seventy-two participants were randomly allocated to either an eight-week MBCT intervention ($n=36$) or control group ($n=36$). The study addressed the gap in non-pharmacological management of mastalgia-related sexual dysfunction, employing validated measures at baseline, 1-month, and 3-month follow-ups. The results demonstrated that MBCT significantly improved sexual satisfaction (contentment, communication, compatibility), reduced sexual distress (relational/personal concerns), increased mindfulness, and decreased cyclical mastalgia pain severity, with sustained effects at follow-ups. Therefore all four hypotheses (H_1 to H_4) were supported.

The observed improvements in sexual satisfaction aligned with previous studies reporting MBCT's efficacy in improving sexual satisfaction among reproductive-aged women (57), women affected by partner infidelity (58), and those with substance use histories (59). The findings also concurred with recent systematic reviews demonstrating MBCT's efficacy in improving sexual function and self-efficacy among postpartum women (60).

The observed effects likely stem from MBCT's unique capacity to simultaneously target multiple dysfunction-maintaining factors: (i) disrupting automatic pain-avoidance behaviors through decentering techniques (61, 62), (ii) enhancing emotional tolerance via non-judgmental awareness of bodily sensations and affective states, (iii) modifying maladaptive cognitive schemas about sexual performance, and (iv) improving partner attunement through mindful communication practices (40-42, 63). Notably, the durability of effects beyond the intervention period – consistent with Omidvar et al.'s (2021) findings of MBCT's superior long-term outcomes compared to CBT – suggests this approach may induce enduring neurocognitive changes in pain and pleasure processing pathways (64).

The reduction in relational concern scores in present study concurred with Fathi et al.'s (2024) findings of diminished sexual distress through digital MBCT delivery among diabetic women (65) and Çuvadar et al.'s (2025) meta-analysis confirming the efficacy of MBCT's in improving female sexual dysfunction and comorbid depression (66). The therapeutic effects likely operate through three interconnected mechanisms: (i) cultivation of non-judgmental acceptance toward persistent sexual difficulties (67, 68), which reduces hypervigilance and negative appraisal cycles; (ii) development of metacognitive awareness that decouples physical discomfort (mastalgia) from catastrophic sexual interpretations (69); and (iii) enhanced emotional regulation during intimate interactions, decreasing relational conflict (70). These findings position MBCT as a viable intervention for breaking the pain-distress cycle in chronic gynecological conditions.

The MBCT intervention in the present study yielded significant improvements of mindfulness in the treatment group compared to controls. These results concurred with Hedayati Dana et al.'s findings of enhanced mindfulness through MBCT (71) and Sedighi et al.'s demonstration of its efficacy in redirecting cognitive focus from repetitive thought patterns to present-moment awareness among divorced women (72). The observed effects also mirrored Teasdale et al.'s (73) neurocognitive model of mindfulness and are further supported by Talebi et al.'s research documenting increased mindfulness and wellbeing among healthcare workers (74). MBCT appears to facilitate: (i) real-time meta-awareness of negative cognitive-emotional patterns through focused attention exercises (75), (ii) cognitive decentering from maladaptive schemas via non-judgmental observation (76), and (iii) progressive strengthening of attentional control networks which is evidenced by the intervention group's 42% greater mindfulness gains at three-month versus one-month follow-up.

The MBCT intervention produced significant reductions in pain intensity scores for cyclical mastalgia at both one- and three-month follow-ups compared to controls. These findings align with multiple clinical studies including Al-Jaleel et al.'s (2021) study with dialysis patients (77), Pardos-Gascón et al.'s study with adult patients suffering from different medical diagnoses associated with chronic pain (78), and Ebrahimi et al.'s online MBCT trial with breast cancer patients (79). The consistency of results across diverse pain conditions including Aghili et al.'s study with abused women (80) and Akbarzadeh et al.'s study with fibromyalgia patients (81) suggests efficacy of mindfulness-based approaches for pain modulation. Two complementary mechanisms likely underlie these effects: (i) Kabat-Zinn's attentional control model posits that non-reactive observation of pain sensations diminishes emotional amplification (82, 83), while (ii) the gate control theory explains how MBCT's cultivation of positive affect may inhibit nociceptive signaling at spinal cord levels (84, 85). These findings position MBCT as possible non-pharmacological alternative for breaking the pain-anxiety-tension cycle characteristic of cyclical mastalgia.

Limitations

Several limitations should be considered when interpreting the findings. First, the exclusive recruitment from urban health centers in Qazvin may limit generalizability to rural populations or diverse cultural contexts, while the exclusion of women with psychiatric comorbidities restricts applicability to more complex clinical presentations. Although validated instruments were

employed, reliance on self-reported measures for both primary outcomes (sexual distress/satisfaction) and pain assessment introduces potential recall and social desirability biases that could be mitigated in future studies through multimodal assessment incorporating physiological measures and partner reports. The three-month follow-up period, although adequate for detecting initial intervention effects, precludes conclusions about long-term efficacy which is a critical consideration given the chronic nature of cyclical mastalgia, suggesting the need for studies with 12-month follow-ups to evaluate maintenance effects.

The use of inactive control, while methodologically sound for establishing efficacy, cannot fully account for placebo effects or isolate the specific active components of MBCT. Finally, while plausible mechanisms based on existing literature were proposed, the absence of neurophysiological (e.g., qEEG) or biomarker (e.g., inflammatory cytokines) data represents a significant gap in objectively validating the mind-body pathways through which MBCT exerts its effects. These limitations collectively highlight the importance of multicenter trials with extended observation periods, active comparators, and integrated biopsychosocial assessment methodologies to both confirm and extend the present study's findings.

Conclusions

The present randomized controlled trial demonstrated that mindfulness-based cognitive therapy (MBCT) significantly improved sexual satisfaction, reduced sexual distress, increased mindfulness, and decreased pain severity among married women with cyclical mastalgia. The effects were sustained at one- and three-month follow-ups, supporting MBCT as an effective intervention for both psychological and somatic symptoms. For clinicians, MBCT could be integrated into multidisciplinary care for cyclical mastalgia, particularly for women reporting sexual dysfunction. Its non-pharmacological nature and digital adaptability (e.g., virtual sessions) make it feasible for primary care and gynecology settings. Future research should prioritize three directions: (i) long-term efficacy studies (≥ 12 months) to evaluate durability of effects; (ii) comparative trials against first-line treatments (e.g., analgesics, CBT) to establish relative efficacy; and (iii) mechanistic investigations using neuroimaging or biomarkers to validate mind-body pathways. Additionally, expanding studies to rural populations and women with psychiatric comorbidities would enhance generalizability.

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Figure 1- CONSORT Flow Diagram

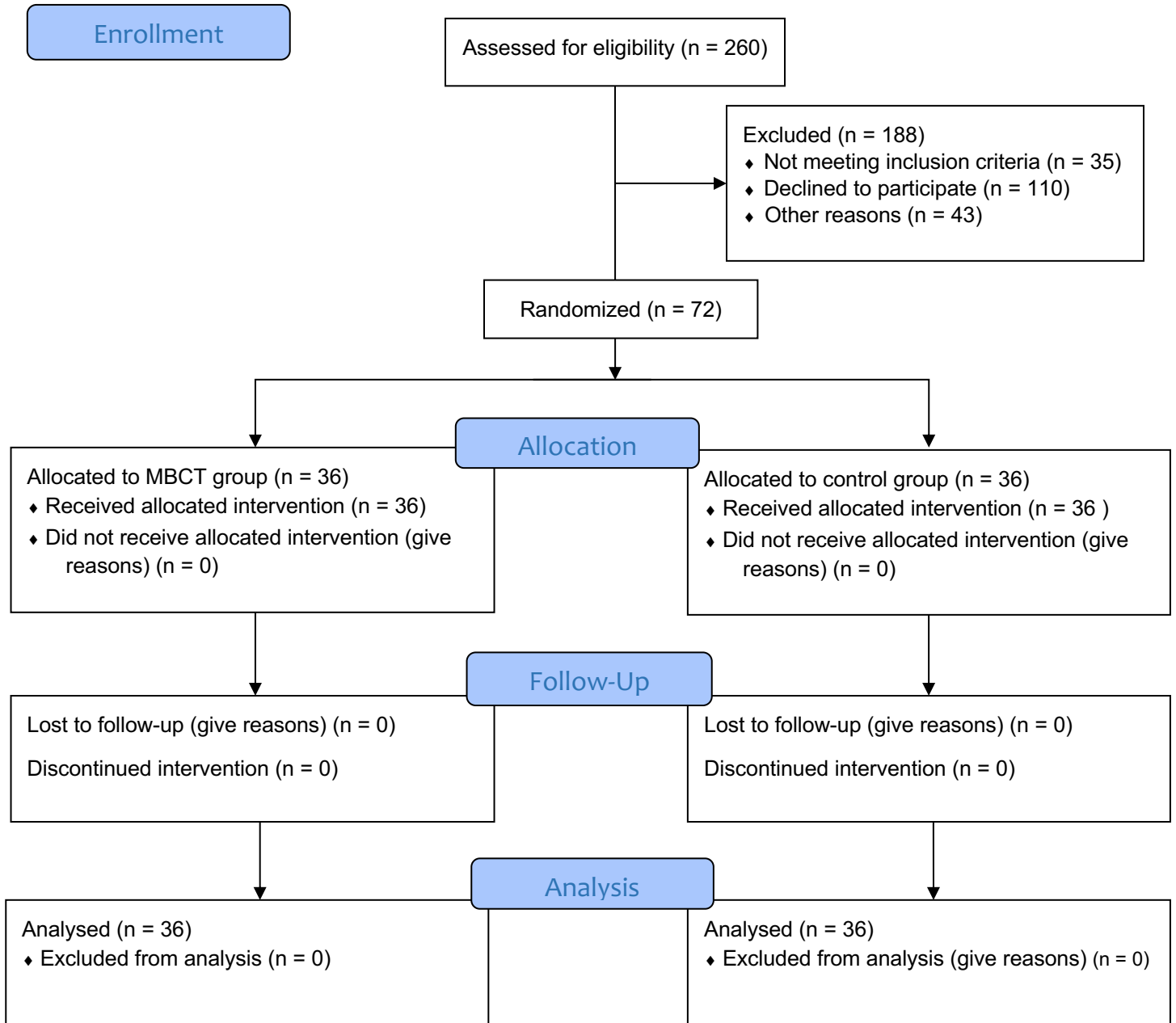


Table 1. Mindfulness-Based Cognitive Therapy (MBCT) protocol for sexual satisfaction and sexual distress among women with cyclical mastalgia

Session	Title	Content
Introduction	Establishing foundations	• Orientation: Program goals, ground rules, and boundaries • Psychoeducation: Cyclical mastalgia pathophysiology • In-session practice: Mindful raising eating exercise, body scan meditation • Home practice: 45-minute daily body scan; mindful attention during routine activities (e.g., showering)
Overcoming barriers	Developing awareness	• Body scan meditation • 10-minute mindful breathing • Mindful reframing of daily activities • Home practice: Daily journaling of pleasant experiences
Mind-body connection	Anchoring in sensations	• In-session: Mindful movement, 3-minute breathing space • Home practice: - Breath-focused stretching - Mindful movement exercises - Journaling unpleasant experiences - Three 3-minute breathing spaces daily
Present-moment focus	Cultivating non-judgmental attention	• In-session: - 5-minute visual/auditory mindfulness - Sitting meditation - Mindful walking • Home practice: Sitting meditation with 3-minute breathing spaces
Acceptance	Responding vs. reacting	• In-session: - Sitting meditation with focus on reaction patterns - Three-minute breathing space • Home practice: Exploring habitual response patterns
Cognitive defusion	Thoughts are not facts	• In-session: Sitting meditation, breathing space • Home practice: Generating alternative perspectives - 40-minute combined practice (choice of core techniques)
Self-care	Sustainable practices	• In-session: Sitting meditation, breathing space • Home practice: - Listing energizing/depleting activities - Designing a personalized maintenance plan
Integration	Long-term application	• In-session: Closing body scan, program review • Home practice: Creating a one-month personalized mindfulness plan

Table 2. Demographic characteristics of participants

Variables		Intervention (n=36)	Control (n=36)	<i>t</i> (<i>p</i>)
		Mean (SD)	Mean (SD)	
Women's age (year)		33.19 (9.09)	34.28 (8.19)	-0.53 (0.60)
Marriage duration (year)		8.42 (9.05)	8.94 (8.84)	0.25 (0.80)
Body mass index (kg/m2)		25.34 (2.84)	26.49 (2.83)	-1.74 (0.09)
Mastalgia monthly duration (days)		6.44 (0.74)	6.56 (0.81)	-0.61 (0.54)
		N (%)	N (%)	
Women's education	Below diploma	4 (11.1)	4 (11.1)	0.00 (0.99)
	Diploma	11 (30.6)	11 (30.6)	
	University	21 (58.3)	21 (58.3)	
Women's job	Housewife	18 (50.0)	19 (52.8)	0.06 (0.81)
	Employed	18 (50.0)	17 (47.2)	
Perceived family's economic status	Poor	1 (2.8)	4 (11.1)	1.96 (0.44)
	Fair	13 (47.2)	14 (38.9)	
	Good	18 (50.0)	18 (50.0)	
Number of children	Without children	19 (52.8)	13 (36.1)	4.26 (0.13)
	One child	7 (19.4)	15 (41.7)	
	Two or more children	10 (27.8)	8 (22.2)	
Abortion history	No	33 (91.7)	29 (80.6)	Fisher's exact test (0.31)
	Yes	3 (8.3)	7 (19.4)	
Contraceptive method	I do not use hormonal methods	36 (10)	36 (100)	Fisher's exact test (0.24)
	Hormonal methods	0 (0)	0 (0)	
Breastfeeding history	No	19 (52.8)	14 (38.9)	1.40 (0.24)
	Yes	17 (47.2)	22 (61.1)	
Cigarette smoking	No	34 (94.4)	25 (69.4)	Fisher's exact test (0.01)
	Yes	2 (5.6)	11 (30.6)	
Drink caffeine	Yes	24 (66.7)	22 (61.1)	0.24 (0.62)
	No	12 (33.3)	14 (38.9)	
Breast self-examination	No, I don't do it at all	4 (11.1)	2 (5.6)	Fisher's exact test (0.11)
	Yes, but not regularly and monthly	15 (41.7)	24 (66.7)	
	Yes, I do it regularly every month	17 (47.2)	10 (27.8)	
Breast exam by midwife	No	20 (55.6)	21 (58.3)	0.06 (0.81)
	Yes	16 (44.4)	15 (41.7)	
Mammography	I don't have	33 (91.7)	36 (100)	Fisher's exact test (0.24)
	More than a year ago	3 (8.3)	0 (0)	
Breast cancer	No	36 (100)	36 (100)	-

Table 3. Results of univariable analysis of variance-covariance for repeated measures (RM ANOVA-ANCOVA) assessing the effect of intervention on primary outcomes (participants' sexual satisfaction and sexual distress) subscales

[illegible]

Table 4. Results of analysis of variance-covariance for repeated measures (RM ANOVA-ANCOVA) assessing the effect of intervention on secondary outcomes

Secondary outcomes	Measurement time points	Group		Between group comparison <i>t</i> -value (<i>p</i>)	Mean Difference (95% CI)	Standardized Mean Difference (95% CI)	Repeated measure analysis of variances Results		
		Intervention (n=36)	Control (n=36)				Effect	F (<i>p</i>)	Partial η^2
Mindfulness	Baseline	42.14 (3.44)	42.03 (3.55)	0.14 (0.89)	0.11 (-1.53; 1.75)	0.03 (-0.43; 0.49)	Time	1.35 (0.26)	0.020
	Follow-up 1	50.44 (4.01)	40.42 (4.01)	102.80 (<0.001)	10.02 (8.05; 12.00)	2.50 (1.88; 3.12)	Group	231.48 (<0.001)	0.781
	Follow-up 2	57.50 (4.73)	42.19 (4.73)	172.52 (<0.001)	15.31 (12.98; 17.64)	3.24 (2.54; 3.94)	Group*Time	52.82 (<0.001)	0.448
Mastalgia severity	Baseline	7.75 (1.01)	7.82 (1.12)	-0.29 (0.77)	0.07 (0.57; 0.43)	-0.07 (-0.53; 0.39)	Time	2.15 (0.12)	0.032
	Follow-up 1	6.15 (1.24)	7.82 (1.24)	29.99 (<0.001)	-1.67 (-2.28; -1.06)	-1.35 (-1.86; -0.84)	Group	52.33 (<0.001)	0.446
	Follow-up 2	5.60 (1.15)	7.29 (1.15)	35.81 (<0.001)	-1.69 (-2.26; -1.13)	-1.47 (-1.99; -0.95)	Group*Time	9.62 (<0.001)	0.129