Mindfulness-based cognitive therapy for sexuality (MBCT-S) improves sexual functioning and intimacy among older women with epilepsy: A multicenter randomized controlled trial

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ABSTRACT

Purpose: Women with epilepsy (WWE) frequently experience sexual problems, including sexual dysfunction and sexual distress. Therefore, this study aimed to examine the efficacy of a mindfulness-based cognitive therapy for sexuality (MBCT-S) on sexual function and intimacy among older adult WWE in Iran.

Methods: A multicenter randomized controlled trial was conducted at 15 neurology clinics in three Iranian cities. WWE together with their partners and healthcare providers were randomly assigned in patient and partner (PP; n = 220), patient, partner, and healthcare provider (PPHP; n = 220), or treatment as usual (TAU; n = 220) group. WWE and their partners in both the PP and PPHP groups received eight weeks of MBCT-S sessions. In the PPHP group, three individual sessions on sexual counseling were added for healthcare providers. Self-assessment scales were used at baseline, one month and six months after completing the intervention. Mixed linear regression models were developed to determine differences among the three groups. Multilevel mediation analyses were conducted to understand the mediating effects of mindfulness, intimacy, patient-physicians relationship and sexual counseling barriers.

Results: Improvements in sexual function, sexual distress, and intimacy were found in both the PP and PPHP groups at one-month and six-month follow-ups. The PPHP group compared with the PP group had greater improvement in intimacy at both follow-ups. Regarding sexual function, the PPHP group performed better than the PP group at the six-month follow-up.

Conclusions: The MBCT-S appears efficacious in enhancing sexual function and reducing sex-related distress in Iranian older adult WWE. Future studies should examine its efficacy in other populations.

1. Introduction

Women with epilepsy (WWE) as compared with the general female population have higher estimates of sexual dysfunction (75.3% vs. 12.0%) [1,2]. Different reasons for sexual dysfunction among WWE have been proposed, including decreased libido, problems with arousal and infrequent orgasms, earlier onset of menopause, adverse effects of certain antiepileptic drugs (AEDs), anxiety, and stigmatization [3–7]. Given that sexuality is an important component of quality of life (QoL) [8] and is viewed as a central part of an individual's life [9], the consideration of healthy sexual functioning in WWE should be emphasized. In other words, WWE may have impaired health quality if their sexual functioning concerns are not identified, assessed and addressed with evidenced-based treatments.

Recently, a program (a mindfulness-based cognitive therapy for sexuality; MBCT-S) has been developed to improve sexual health in women who reported having concerns regarding sexual desire and/or arousal [10]. The MBCT-S stems from Jon Kabat-Zinn's mindfulness-based stress reduction (MBSR) program for chronic pain [11], which has been further developed into mindfulness-based cognitive therapy (MBCT) [12]. MBCT has demonstrated efficacy in reducing risk of relapse to depression and depressive symptomatology [12]. Given overlaps in psychological processing and the mechanisms of depression and reduced sexual desire, Paterson et al. [10] adapted the MBCT protocol for depression to target difficulties in sexual desire and arousal, incorporating sex therapy exercises with mindfulness, such as imagination of self-touch, to generate MBCT-S. Although the MBCT-S has promising effects, these findings may not generalize to other populations because they have been derived from samples of women from the general population who reported having sexual desire and/or arousal concerns. As such, while preliminary data support the efficacy of MBCT-S in samples from the general population, its efficacy in specific clinical populations chronic diseases, such as epilepsy, has not been systematically examined [10].

WWE have characteristics that differ from those of individuals in the general community. First, most WWE regularly take AEDs, and these may have adverse effects on sexual functioning [3–7]. Some possible adverse effects of AEDs (e.g., on cognition) may influence both sexual functioning and MBCT-S effects. Second, WWE may worry about their symptoms (i.e., having a seizure) during sexual activities. In other words, they may have seizure worries, and these may impact QoL in WWE. As such, WWE may have lower sexual motivations and poorer QoL. Third, epilepsy is correlated with other disorders that may affect sexual satisfaction. For example, cerebrovascular disease (especially for older adult WWE) is a risk factor for adult-onset epilepsy and may affect sexual health. Fourth, not only may patients worry about symptoms, but their partners may as well. As such, there exists a strong rationale to include partners in treatment of sexual concerns, especially for WWE. Fifth, WWE seen in treatment centers are often older than those reported in the study by Paterson et al. [10]. Given that sexual functioning and desires may differ in older versus younger adults, the extent to which MBCT-S may be efficacious in older adult WWE warrants direct examination.

The efficacies of behavioral therapies may be enhanced by the active involvement of healthcare providers. For example, cognitive-behavioral therapy for individuals with gambling disorder is more efficacious when delivered by a therapist than when provided as a workbook, as individuals are more likely to complete homework assignments when engaging with a therapist [13,14]. More generally, having healthcare providers aware of specific concerns (including sexual concerns) and feeling confident regarding their abilities to help patients with these concerns may bolster provider-patient relationships and give confidence to patients about the relevance of their concerns and the ability to address them within clinical settings [15]. As such, assessing the involvement of healthcare providers in examinations of the efficacies of behavioral therapies, especially those targeting sexual

concerns, is important.

A main aim of the current study was to examine whether MBCT-S (adapted according to age and the disease of epilepsy) may improve sexual health and functioning among older adult WWE. We hypothesized that MBCT-S would be superior to treatment as usual (TAU) in improving sexual functioning, reducing sexual distress and increasing intimacy. Moreover, we proposed that involving healthcare providers in the MBCT-S for WWE would have additional benefits on these outcomes. We further hypothesized that mindfulness would mediate changes in sexual functioning in the MBCT-S groups.

2. Methods

2.1. Design and study population

This multicenter prospective cluster randomized controlled trial was conducted between February 2018 and March 2019 among 15 neurology clinics in three Iranian cities (Tehran, Karaj, and Qazvin). This trial was registered at Clinicaltrials.gov (NCT03427918) and was approved by the Ethics Committee at Qazvin University of Medical Sciences (QUMS) before enrolling the first patient. All participants signed written informed consent before enrolment. The study sample was older WWE who had been referred to neurology clinics for routine examinations by physicians. All WWE were consecutively assessed for eligibility in all 15 centers. Specifically, the physicians first assessed the eligibility of the WWE; when there was a candidate WWE, the physicians referred her to our team, and a research assistant further checked her eligibility and clearly explained the study to her and her husband.

The inclusion criteria for the participants were: (1) a confirmed diagnosis of epilepsy according to the criteria of International League Against Epilepsy (ILAE; as determined by a physician specializing in neurology); (2) an age of 65 years or older; (3) a formal diagnosis of sexual dysfunction according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders-5 (as determined by clinical interview by a psychologist or sex therapist), and (4) being in a partnered relationship longer than one year. Additionally, both patients and their husbands/partners needed to communicate in Persian, and both needed to provide signed consent forms to participate in the study. The exclusion criteria were: (1) serious cognitive or psychiatric problems (e.g., depression, alcohol dependency, psychotic disorders) as verified by the Mini International Neuropsychiatric Interview [16]; (2) suicidal ideation or attempt within the past three months; (3) participation in a concurrent mindfulness program for other psychological concerns; and, (4) participation in another trial investigating problems with sexuality/intimacy. WWE together with their partners (or husbands) and healthcare providers were randomly assigned into three groups based on different types of interventions/care: 1) patient and partner; 2), patient, partner, and healthcare provider; or 3) treatment as usual.

All participants completed measurements at baseline (before randomization) and one month and six months after completing the interventions. We did not assess the outcomes immediately after the end of intervention because sexual issues in Iran are very sensitive, complicating possible collection of the data immediately after the intervention. Thus, we intended to give the participants and their husbands/partners some additional time before assessing possible improvement, although future studies could incorporate more assessment points to obtain a better understanding of the time course of clinical changes.

2.2. Interventions

2.2.1. Patient and partner (PP) group

Participants in the PP group received an eight-week MBCT-S described in previous studies [10,17–19]. Moreover, the MBCT-S in our study was adapted based on the characteristics of older adult WWE. A group of facilitators (four trained sex therapists, physicians and psychologists) delivered the treatment to the WWE and their partners/

husbands. The intervention was delivered in a group setting (four to seven couples per group) with a 90-min session once a week. All sessions were held in a small meeting room in the clinics. Detailed information on the intervention is provided in the online Supplementary Materials (Appendix A).

2.2.2. Patient, partners, and healthcare providers (PPHP) group

All PPHP participants and their partners received the same sessions as did the PP group. Additionally, their healthcare providers (including neurologists, neurosurgeons and nurses, who were not the facilitators in the mindfulness-based cognitive therapy) in five neurology clinics received a three-session sexual counseling program. The three sessions of the sexual counseling program were in addition to the patients' intervention; that is, healthcare providers received the counseling program separately from the patients and their partners.

2.2.3. Treatment as usual (TAU) group

Participants in the TAU group received standard care for epilepsy including routine clinic visits based on the individual patients' needs, drug consultations, adverse-effect assessments, and disease monitoring. In other words, the participants in the TAU condition received no treatment beyond usual medical care.

2.3. Randomization and masking

In order to minimize contamination and to limit interaction between the PP, PPHP, and TAU groups, randomization was performed at a cluster level. We aimed to have 15 clusters with five clusters in each arm. Neurology clinics were randomly allocated (1:1:1) with stratification for cluster size (large vs. small) in PP, PPHP, and TAU groups. Randomization and allocation were performed by an independent statistician who was blinded to participants' clinical histories. Due to the nature of the intervention, the participants were not blinded to intervention-group allocation. Outcome assessors and data analysts were, however, blinded to the intervention-group allocation status of participants. Specifically, the healthcare providers were blinded to intervention-group allocation of their patients.

2.4. Integrity/fidelity

All facilitators had considerable experience with mindfulness practices and treating sexual problems with either pharmacological/medical or psychological techniques. Potential facilitators needed to read the treatment manual prior to being considered for study involvement. High interrater reliability has been established with facilitators after reading the treatment manual. During weekly sessions, the corresponding author monitored treatment fidelity by monitoring treatment adherence and competence using the viewing of video recordings of classes. Treatment fidelity was measured using the Mindfulness-Based Interventions - Teachers Assessment Criteria (MBI-TAC) [20]. Two videotapes of sessions from each facilitator were selected randomly and examined by two independent expert raters. The results showed that all facilitators met level four (competence) of the MBI-TAC (Mean = 4.8; SD = 1.01). Their level of competence suggests that they were capable and could deliver the intervention with high levels of competence. That is, the facilitators demonstrated considerable skill in key features of the intervention. While the level of competence suggests that the interventions may have been delivered with considerable competence and fidelity across sites and over 80% of participants and partners reported completing homework assignments, there may have been differences with respect to aspects of treatment adherence (e.g., the degree to which participants incorporated and utilized the interventions) that could be investigated more fully in future studies.

2.5. Primary outcome

The participant-rated self-assessment Female Sexual Function Index (FSFI) was used as the primary outcome. All data were collected at baseline and at one month and six months after completing the interventions. The self-assessment was administered at the hospitals using pen and paper.

2.5.1. Female sexual function index (FSFI)

The FSFI, a 19-item self-report scale, is a previously validated scale that assesses sexual function (or sexual dysfunction) in women. The 19 items are distributed in six domains relating to sexual desire (two items), arousal (four items), lubrication (four items), orgasm (three items), satisfaction (three items), and pain (three items). All items are rated using a six-point Likert scale ranging from 0 to 5, except for two items relating to desire and another two to satisfaction. The four items mentioned above are rated using a five-point Likert scale (ranging from 1 to 5). A higher domain score or a FSFI total score indicates better sexual functioning. The FSFI has been translated into Persian with satisfactory internal consistencies (α = 0.72 to 0.90) and high test-retest reliability (intraclass correlation coefficient = 0.73 to 0.86) [21]. Additionally, the Persian FSFI has been applied to WWE in Iran [5,6].

2.6. Secondary outcomes

In the secondary outcomes, all questionnaires were self-reported by participants, except for the International Index of Erectile Function (IIEF, self-reported by participants' partners), Personal Assessment of Intimacy in Relationships Scale (PAIRS, self-reported by both participants and their partners) and the Sexual Attitudes and Beliefs Survey (SABS, reported by healthcare providers). All data were collected at baseline and one month and six months after completing the interventions. The self-assessments were administered at the hospitals using pen and paper.

2.6.1. Female sexual distress scale revised version (FSDS)

The FSDS, a 13-item self-report, is widely used to assess female sexual activities. The 13 items are rated on a five-point Likert scale (ranging from 0 to 4), with higher scores indicating more sexual distress [22]. The FSDS has been translated into Persian with satisfactory internal consistency (α = 0.81) [23] and good known-group validity (i.e., the Persian FSDS can distinguish sexual distress among healthy women, women with hypoactive sexual desire disorder, and women with other types of female sexual dysfunction) [24].

2.6.2. Personal assessment of intimacy in relationships scale (PAIRS)

The PAIRS, a 36-item self-report scale, is widely used to assess intimacy in relationships [25]. The 36 items are distributed in the following six domains: emotional intimacy, social intimacy, sexual intimacy, intellectual intimacy, recreational intimacy, and conventionality subscales. Each domain contains six items rated using a 5-point Likert scale (ranging from 1 to 5). Higher scores indicate greater intimacy. The Persian PAIRS has been used for Iranian first-time parents [26]. Additionally, only emotional intimacy and sexual intimacy were assessed in this present study because other domains of intimacy were considered less relevant to the study aims.

2.6.3. Sexual five-facet mindfulness questionnaire (FFMQ-S)

The FFMQ-S, a 19-item self-report questionnaire, is used to assess levels of mindfulness in daily life [27]. The FFMQ-S includes five facets of mindfulness, including observing (four items), describing (four items), acting with awareness (four items), nonjudging of inner experiences (four items), and non-reacting to inner experiences (three items). All items are rated on a five-point Likert scale (ranging from 1 to 5), and higher scores indicate greater mindfulness in sexual activities. The original FFMQ-S has satisfactory internal consistency (α = 0.94)

[27]. Given that the FFMQ-S has no Persian version, we used standard translation processes [28] to translate the FFMQ-S into Persian with satisfactory linguistic validity.

2.6.4. International index of erectile function (IIEF)

The IIEF is commonly used to assess male erectile function. All five items are rated on a five-point Likert scale (ranging from 1 to 5), and higher scores indicate poorer erectile function. The IIEF has been translated into Persian with satisfactory reliability (item separation reliability = 0.99) [29] and good known-group validity (i.e., the Persian IIEF can distinguish male patients with sexual problems from those without) [30].

2.6.5. Hospital anxiety and depression scale (HADS)

The HADS is commonly used to assess anxiety and depression. The 14-item self-report questionnaire includes two domains, anxiety and depression, and each domain has seven items. All items are rated on a four-point Likert scale (ranging from 0 to 3), and higher scores indicate higher levels of anxiety or depression. The HADS has been translated into Persian with satisfactory internal consistency (α = 0.79 and 0.82) for people with epilepsy [31].

2.6.6. Quality of life in epilepsy inventory (QOLIE-31)

The 31-item self-report QOLIE-31 is commonly to assess QoL in people with epilepsy [32,33]. The QOLIE-31 assesses seven domains: seizure worry (five items), cognitive function (six items), energy/fatigue (four items), emotional well-being (five items), social function (five items), medication effects (three items), and overall QoL (two items). All items are rated on a six-point Likert-type scale and then converted into a 0–100 scale, where higher scores indicate better QoL. The QOLIE-31 has been translated into Persian with satisfactory internal consistency (α = 0.90) for people with epilepsy [34].

2.6.7. Patient-Doctor relationship questionnaire (PDRQ-9)

The PDRQ-9, a nine-item self-report scale, assesses relationships between patients and doctors from patients' perspectives. All items are rated on a four-point Likert-type scale (ranging from 1 to 4), where higher scores indicate better patient-doctor relationships. The PDRQ-9 has been translated into Persian with satisfactory internal consistency (α = 0.78) [35].

2.6.8. Sexual attitudes and beliefs survey (SABS)

The SABS, a 12-item self-report, assesses barriers to discussing sexual problems for healthcare providers. All items are rated on a six-point Likert-type scale (ranging from 1 to 6), where higher scores indicate fewer barriers for healthcare providers in discussing sexual problems with patients. The original FFMQ-S has satisfactory internal consistency (α = 0.75) [36]. Given that the FFMQ-S has no Persian version, we used standard translation processes [28] to translate the FFMQ-S into Persian with satisfactory linguistic validity.

2.7. Sample size calculation

Based on the initial findings from our pilot MBCT-S study on WWE (unpublished data) and the results from a meta-analysis of mindfulness-based therapies for the treatment of female sexual dysfunction [36], we estimated a change in FSFI scores of 4 (SD = 6.2) in the intervention group. Using a two-sided alpha of 0.05, a power of 80%, an intracluster correlation coefficient of 0.05, a mean cluster size of 80, and a 15% dropout rate, 220 participants in each group were calculated to be needed.

2.8. Data analysis

In order to estimate the impact of the MBCT-S on primary and secondary outcomes, intention-to-treat (ITT) analysis controlling for the

clustering effect was performed. A mixed linear regression model was developed to detect differences between the three groups (PP, PPHP, and TAU). A multilevel modeling approach was fitted using a three-level model: neurology clinics at level three, patients at level two, and repeated follow-up measurements at level one. Models were estimated by restricted iterative generalized least square (RIGLS) estimation to estimate the random parameters; this approach was selected as it generates unbiased estimates [37]. All analyses controlled for potential confounders of age, duration of illness and partners' age, where confounding was assigned when > 10% change occurred in the univariate regression coefficient.

A multilevel mediation analysis was then conducted to examine mediating effects of mindfulness, intimacy, patient-physician relationships and sexual counseling barriers. Specifically, according to recommendations from Krull and Mackinnon [38], multilevel mediation may be established when the following criteria are considered: (1) direct effect of interventions on the sexual outcomes (sexual functioning and sexual distress) (path "C"); (2) the effect of the interventions on the hypothesized mediators (i.e., mindfulness, intimacy, patient-physician relationship and sexual counseling barriers) in a multilevel model (path "A"); (3) the effects of the change score of the mediators on the sexual outcomes (path "AB"). The MLwiN software was used for multilevel modeling [39].

3. Results

Fig. 1 shows that the PPHP group had the most dropouts (15 in first-month follow-up and 21 in six-month follow-up; total dropout rate = 16.4%), followed by the PP group (11 in first-month follow-up and 18 in six-month follow-up; total dropout rate = 13.2%) and TAU group (5 in first-month follow-up and 12 in six-month follow-up; total dropout rate = 7.7%). All participants who discontinued treatment were paired dropouts; that is, no single participant remained in a group without her accompanying husband/partner or vice versa. Moreover, no participants dropped out at study onset. The dropout rates were largely as anticipated as we had estimated 15% of dropout rate in sample size calculation. Furthermore, 2 participants (and their partners) from the PP group and 3 participants (and their partners) from the PPHP group dropped out during the intervention. While not precisely known, reasons for discontinuation may have involved extra burden experienced by participants, their partners and their healthcare providers (as they needed to put additional time and effort into the practices as compared to the TAU group). Future studies should directly examine reasons for discontinuation. Regarding adherence to treatment sessions and assigned homework, 334 attended all sessions and more than 80% of participants (together with their partners) reported that they practiced the assigned homework.

About 10% of items in the self-assessments were missing at random. Therefore, mean scale scores were used for those scales with missing item scores. Additionally, the mixed linear regression models provided unbiased estimation which take into account missing values if they were in the scale level.

Table 1 demonstrates demographic and clinical characteristics for all participants (n = 220 for TAU, PP, and PPHP each). In brief, participants (mean ± SD age = 72.37 ± 2.10 for TAU; 71.31 ± 18.92 for PP; 70.60 ± 24.86 for PPHP) had their epilepsy onset at older ages (mean duration of illness = 7.91 ± 3.80 years for TAU; 6.29 ± 3.23 for PP; 7.06 ± 4.29 for PPHP). Most participants were diagnosed with focal epilepsy (n = 174 for TAU; 179 for PP; 171 for PPHP). Approximately half of participants had antiepileptic monotherapy (n = 118 for TAU; 108 for PP; 130 for PPHP) and had not had any seizures in the past six months (n = 105 for TAU; 106 for PP; 108 for PPHP).

Table 2 shows the outcome measures as descriptive statistics for the TAU, PP, and PPHP groups across three time points. In the TAU group, all outcome measures were unchanged or worsened; in the PP group, all outcome measures, except for the SABS and PDRQ-9 scores, improved;
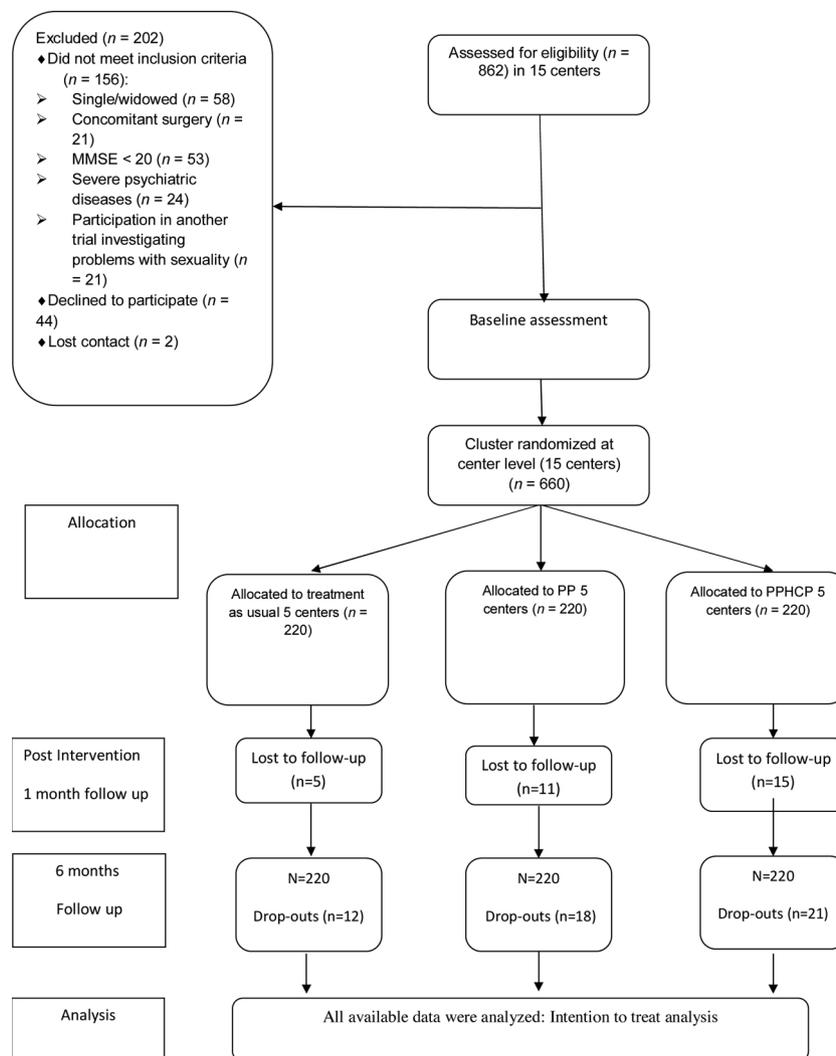
Fig. 1. CONSORT trial flow chart.

and, in the PPHP group, all outcome measures improved.

After controlling for confounder and cluster effects, mixed linear regressions indicated improvements at the one-month follow-up in the primary outcome for the PP and PPHP groups as compared with the TAU group (Table 3 and Appendix Table 1). Improvements were also observed at the six-month follow-up. The PPHP group relative to the PP group showed greater improvement in patients' sexual intimacy, partners' sexual intimacy, and partners' emotional intimacy at the one-month follow-up and greater improvement in patients' sexual intimacy, partners' sexual intimacy, and FSFI scores at the six-month follow-up (Table 3). Although it is a common sense that sexual function and interest may change with age, our results (Table 3) show that age was not significantly related to sexual function (p = 0.617 for FSFI and 0.318 for FSDS).

After controlling for potential confounding and cluster effects, mixed linear regressions indicated improvements at one-month follow-up on all secondary outcomes for the PP and PPHP groups as compared with the TAU group, except for the QOLIE-31, SABS, and PDQR-9 scores (Table 4 and Appendix Table 2).

Mediation analyses further demonstrated that improvements related to FSFI and FSDS scores in the PP and PPHP groups as compared with the TAU group were mediated by mindfulness for sexual functioning, patients' sexual intimacy, and patients' emotional intimacy (Table 5).

4. Discussion

To the best of our knowledge, this is the first study to examine the efficacy of MBCT-S on sexual health and other outcome measures among WWE. Our findings generally agree with open-label data from Paterson et al. [10] that women who with sexual problems may benefits from MBCT-S, with gains in sexual function and decrements in sexual distress. Our findings further demonstrate that MBCT-S may impact other outcomes, including intimacy among both WWE and their partners, erectile function among partners of WWE, and anxiety, depression, QoL, and mindfulness among WWE.

Previous studies have demonstrated that different mindfulness-based interventions may improve sexual health among different populations, such as women with gynecologic cancer [40], men with situational erectile dysfunction [41], and women with sexual desire/arousal difficulties [42]. Our study extends the findings from the aforementioned results to WWE, a population that also suffers from sexual dysfunction with specific characteristics including epileptic symptoms and adverse effects of AEDs [3–7]. Mediation analyses suggest potential mechanisms of action by which MBCT-S may improve sexual health. The findings suggest that better mindfulness leads to the higher sexual function and lower sexual distress.

Secondary outcomes also reveal important findings. Our findings suggest that MBCT-S may also improve QoL (as shown by increased QOLIE-31 scores) and reduce psychological distress (as shown by

Table 1
Demographic and clinical characteristics of the participants in different groups.

	Group		
	TAU (*n* = 220)	PP (*n* = 220)	PPHP (*n* = 220)
Age (year); M ± SD	72.37 ± 20.10	71.32 ± 18.92	70.60 ± 24.86
Years of education; M ± SD	8.72 (5.27)	9.07 ± 5.15	8.31 ± 5.19
Duration of illness (year) ; M ± SD	7.91 ± 3.80	6.29 ± 3.23	7.06 ± 4.29
Employment status; *n* (%)			
Retired	127 (57.7%)	125 (56.8%)	141 (64.1%)
Employed	11 (5.0%)	11 (5.0 %)	6 (2.7%)
Housekeeper	82 (37.3%)	84 (38.2%)	73 (33.2%)
Type of epilepsy; *n* (%)			
Generalized	46 (20.9%)	41 (18.6%)	49 (22.3%)
Focal	174 (79.1%)	179 (81.4%)	171 (77.7%)
Age at the seizure onset; M ± SD	62.14 ± 6.37	64.38 ± 5.91	61.83 ± 6.44
Surgical intervention (yes); *n* (%)	44 (20.0%)	39 (17.7%)	41 (18.6%)
Type of antiepileptic drug			
Monotherapy	118 (53.6%)	108 (49.1%)	130 (58.9%)
Polytherapy	102 (46.4%)	112 (50.9%)	90 (41.1%)
Seizures in the past 6 months; *n* (%)			
No Seizures	105 (47.7%)	106 (48.2%)	108 (49.1%)
< 1 seizure per month	92 (41.8%)	92 (41.8%)	85 (38.6%)
≥1 seizure per month	23 (10.5%)	22 (10.0%)	27 (12.3%)

Note. SD = standard deviation; TAU = treatment as usual; PP = patient and partner; PPHP = patient, partner, and healthcare provider.

decreased HADS scores) for WWE. Thus, the clinical utility of using MBCT-S in WWE may be widespread because healthcare providers have demonstrated interest in understanding how to improve QoL and decrease psychological distress in WWE [5,33,43,44]. As such, the interest in using MBCT-S in WWE may be widespread and it clinical utility may be considerable. After participating in MBCT-S, WWE may obtain benefits beyond the domain of sexual problems, such as improved QoL overall. Furthermore, partners of WWE may also gain benefits through improved erectile function. Thus, MBCT-S may impact multiple domains of health and functioning.

Mechanisms underlying the efficacy of MBCT-S may involve changes in cognitive processes. The mediation analyses suggested that improvements related to sexual functioning and diminished sexual distress operated through mindfulness for sexual functioning and sexual and emotional intimacy. Mechanisms underlying mindfulness-based interventions in general have been proposed and may involve shifts in awareness and attitudes in approaching life experiences that are underpinned by functions within specific neural networks [45,46]. In the case of MBCT-S, mindfulness training may assist women in being more aware of physical changes during anticipation of and engagement in sexual activity through enhancement of interoceptive awareness [47]. Also, given that non-judgmental awareness and acceptance is a main element of mindfulness, it may mitigate negative judgments and help WWE avoid worrying about their epileptic symptoms during sexual activity [10]. Through such processes, WWE may become more present, focused and aware during sexual activity. Through such processes, WWE may derive greater sexual arousal, desire and satisfaction. However, as the current study did not assess for many potential active ingredients (e.g., changes in interoceptive awareness, non-judgmental tendencies relating to acceptance of epileptic illness), the underlying mechanisms of MBCT-S remain speculative and warrant further direct examination in future studies.

Given that healthcare providers of WWE may encounter difficulties in addressing sexual-related problems, we modified the MBCT-S by involving healthcare providers and examined whether the modified MBCT-S may have better effects than the original MBCT-S. As hypothesized, MBCT-S with healthcare provider involvement was

associated with greater improvements in sexual functioning than was MBCT-S without healthcare provider involvement at the six-month follow-up. However, MBCT-S with healthcare provider involvement did not perform better than the MBCT-S without healthcare providers with respect to WWE's sexual distress, QoL, and psychological distress. Therefore, involving healthcare providers in the MBCT-S may have additional benefits for WWE, but not in all domains and perhaps more so over time. Our results further indicate that involving healthcare providers in the MBCT-S may have benefits for WWE's partners (i.e., improvements in erectile functioning) and healthcare providers (i.e., reduced perceived barriers in discussing sexual problems with WWE). Also, relationships between healthcare providers and WWE were improved if healthcare providers were involved in the MBCT-S.

4.1. Strengths and limitations

The strengths of the present study include the followings. First, the sample size (a total of 660 WWE) was large and fulfilled our sample size calculation; therefore, our results are unlikely to be biased by extreme sexuality performance from participants (i.e., outliers). Second, the study employed rigorous methodology including a randomized controlled design and advanced statistical methods. Specifically, the randomized controlled trial can help eliminate biases (e.g., history effects and maturation effects) that may contribute to false positive results. The advanced statistics addressed cluster effects and investigated mediation effects of intimacy and mindfulness. Third, effects of MBCT-S were investigated using validated instruments that assessed multiple, although not all, domains. Therefore, healthcare providers may understand some domains that may be impacted by MBCT-S and alternate approaches may be considered in those not effectively targeted by the intervention, and these should be studied further in future investigations. Finally, MBCT-S effects were evaluated over a relatively long period of time (at six-month follow-up).

There are some limitations. First, the studied population in the present study was Iranian. Therefore, the findings may not generalize to other populations given potential cultural differences. Second, because we only recruited older adult WWE, our findings may not be able to generalize to younger WWE. While we hypothesize that younger WWE may also benefit from MBCT-S (and perhaps more so), this group warrants direct examination. Third, because the primary outcomes are subjective (i.e., self-reported) and the participants receiving MBCT-S could not be blinded, we cannot exclude the possibility of placebo effects. However, as effects were large and the subjective measures are psychometrically sound, we believe that the results are considerable. Lastly and importantly, the use of TAU may be considered a methodological limitation because TAU as a control, while controlling for some interventional considerations (e.g., meeting with care providers), may not control for all potential confounds. Specifically, a recent systematic review and meta-analysis suggests that the efficacies of mindfulness-based interventions may diminish when compared to specific active control conditions, such as therapeutic education [48], as compared to the a non-specific TAU control condition is employed. In other words, we cannot ensure whether MBCT-S outperforms other types of sexual function treatments for WWE. Future studies are needed to examine how MBCT-S may operate in comparison to other targeted interventions.

4.2. Clinical implications

The MBCT-S interventions involving or not involving healthcare providers were feasible and well accepted by participants, including WWE and their partners. Thus, the program, including the one with the involvement of healthcare providers, could be adopted in clinical settings and help improve sexual-related outcomes for WWE. Additionally, our results demonstrated that specific characteristics of WWE (e.g., the use of AEDs and epilepsy symptoms) did not reduce MBCT-S effects.

Table 2
Means and standard deviations (SDs) of all outcome measures in control and intervention groups at baseline and follow-ups.

	Group	Baseline	Month 1	Month 6
Female Sexual Function Index total score	TAU	17.72 (10.83)	16.79 (11.08)	16.76 (10.72)
	PP	18.07 (9.67)	20.94 (8.99)	20.92 (9.58)
	PPHP	16.96 (10.57)	21.72 (8.07)	21.97 (10.54)
Desire domain score	TAU	3.45 (1.49)	3.31 (1.77)	3.21 (1.68)
	PP	3.40 (1.62)	3.67 (1.59)	3.66 (1.57)
	PPHP	3.31 (1.69)	4.13 (1.54)	4.15 (1.33)
Arousal domain score	TAU	2.86 (1.93)	2.71 (1.93)	2.70 (1.66)
	PP	2.83 (2.03)	3.57 (1.99)	3.60 (2.01)
	PPHP	2.72 (2.11)	3.45 (2.05)	3.54 (2.09)
Lubrication domain score	TAU	2.80 (2.28)	2.64 (1.48)	2.55 (1.42)
	PP	2.73 (2.22)	3.14 (1.33)	3.17 (1.43)
	PPHP	2.55 (2.14)	3.22 (1.27)	3.21 (1.81)
Orgasm domain score	TAU	2.55 (2.14)	2.33 (2.08)	2.48 (2.06)
	PP	2.93 (2.27)	3.37 (2.11)	3.31 (2.15)
	PPHP	2.54 (2.31)	3.30 (1.23)	3.34 (2.33)
Satisfaction domain score	TAU	3.23 (2.11)	2.89 (2.19)	2.91 (2.13)
	PP	3.37 (1.96)	3.81 (1.88)	3.84 (1.93)
	PPHP	3.10 (1.99)	3.89 (1.77)	3.93 (.199)
Pain domain score	TAU	3.07 (2.01)	2.91 (2.17)	2.90 (2.29)
	PP	2.75 (2.45)	3.38 (2.21)	3.33 (2.45)
	PPHP	2.75 (2.42)	3.78 (2.28)	3.80 (2.40)
Female Sexual Distress Scale total score	TAU	11.86 (7.33)	12.39 (7.42)	12.28 (7.43)
	PP	11.85 (6.85)	9.25 (7.69)	9.21 (7.70)
	PPHP	11.13 (7.53)	9.06 (7.89)	9.01 (7.78)
Mindfulness for sexual functioning (FFMQ-S total score)	TAU	56.15 (11.66)	52.57 (13.79)	51.01(11.29)
	PP	56.79 (10.73)	65.51 (12.22)	65.70 (10.93)
	PPHP	55.76 (10.47)	68.48 (14.17)	69.11 (11.57)
Observing domain score	TAU	12.45 (2.01)	11.24 (4.24)	11.04 (3.05)
	PP	12.57 (1.96)	14.43 (3.63)	14.50 (3.17)
	PPHP	12.54 (1.91)	14.94 (3.77)	14.95 (3.49)
Describing domain score	TAU	13.70 (2.62)	12.96 (4.01)	12.32 (3.40)
	PP	13.83 (2.62)	15.53 (3.66)	15.43 (3.15)
	PPHP	13.44 (2.33)	15.73 (3.86)	15.88 (3.47)
Acting with awareness domain score	TAU	10.35 (2.65)	9.88 (3.26)	9.76 (2.99)
	PP	10.52 (2.16)	12.52 (4.55)	12.55 (4.05)
	PPHP	10.28 (2.01)	13.54 (4.96)	13.59 (4.63)
Nonjudging of inner experience domain score	TAU	9.22 (3.08)	8.73 (3.68)	8.75 (3.32)
	PP	9.53 (2.99)	11.46 (4.78)	11.52 (4.25)
	PPHP	9.04 (3.01)	12.31 (5.48)	12.59 (4.27)
Nonreactivity to inner experience domain score	TAU	10.41 (2.44)	9.74 (3.51)	9.20 (3.08)
	PP	10.33 (2.39)	11.56 (2.80)	11.66 (2.65)
	PPHP	10.46 (2.48)	11.95 (2.92)	12.04 (2.80)
Emotional intimacy domain score from PAIR (patients)	TAU	21.03 (5.73)	19.38 (10.64)	19.25 (10.30)
	PP	23.54 (4.65)	24.53 (7.99)	24.58 (8.05)
	PPHP	22.28 (5.01)	23.89 (8.47)	23.96 (8.60)
Sexual intimacy domain score from PAIR (patients)	TAU	20.58 (5.02)	19.16 (9.94)	19.06 (9.71)
	PP	20.89 (4.92)	22.37 (8.94)	22.41 (8.95)
	PPHP	20.83 (5.69)	24.08 (8.16)	24.13 (8.24)
Emotional intimacy domain score from PAIR (partner)	TAU	20.53 (5.61)	19.50 (10.22)	19.36 (9.94)
	PP	21.50 (6.02)	22.76 (8.84)	22.79 (8.86)
	PPHP	21.57 (5.85)	23.54 (8.40)	23.60 (8.41)
Sexual intimacy domain score from PAIR (partner)	TAU	21.52 (7.10)	20.82 (11.02)	20.49 (10.66)
	PP	22.36 (6.52)	23.92 (8.24)	23.99 (8.23)
	PPHP	22.33 (6.27)	25.43 (8.14)	25.55 (8.35)
Erectile Function (IIEF score)	TAU	14.17 (8.84)	13.58 (9.35)	13.54 (9.18)
	PP	13.24 (9.23)	15.03 (9.76)	15.11 (9.80)
	PPHP	13.88 (8.56)	17.51 (8.73)	17.54 (8.96)
Anxiety from HADS	TAU	8.11 (5.24)	8.16 (5.01)	8.17 (5.22)
	PP	8.72 (4.58)	8.11 (4.79)	8.05 (4.79)
	PPHP	8.48 (5.21)	7.83 (5.45)	7.75 (5.01)
Depression from HADS	TAU	6.42 (4.65)	6.54 (4.71)	6.57 (4.66)
	PP	6.69 (4.81)	5.59 (3.98)	5.53 (5.00)
	PPHP	6.60 (4.63)	5.62 (4.83)	5.52 (4.83)
QOLIE-31 total score	TAU	65.72 (21.08)	61.11 (19.76)	61.34 (20.18)
	PP	67.13 (20.77)	72.22 (21.36)	76.94 (24.01)
	PPHP	66.15 (19.86)	74.33 (20.45)	79.47 (25.21)
SABS total score	TAU	48.36 (12.08)	52.66 (14.19)	53.11 (13.66)
	PP	44.82 (14.62)	48.30 (10.58)	47.69 (11.28)
	PPHP	46.93 (15.12)	31.27 (9.64)	30.18 (9.41)

Table 2 (*continued*)

	Group	Baseline	Month 1	Month 6
PDRQ-9 total score	TAU	18.34 (7.56)	16.03 (10.41)	15.67 (8.25)
	PP	19.68 (9.68)	19.04 (10.70)	19.01 (10.94)
	PPHP	18.01 (10.14)	27.64 (11.73)	28.11 (11.48)

Note. PAIR = Personal Assessment of Intimacy in Relationships Scale; IIEF = International index of erectile function; HADS = Hospital Anxiety and Depression Scale; QOLIE-31 = Quality of Life in Epilepsy Inventory; SABS = Sexual Attitudes and Beliefs Survey; PDRQ-9 = Patient-Doctor Relationship Questionnaire; TAU = treatment as usual; PP = patient and partner; PPHP = patient, partner, and healthcare provider; FFMQ-S = Sexual Five-Facet Mindfulness Questionnaire.

Instead, MBCT-S effects were strong and could last long (up to six months). Although the MBCT-S in the present study was conducted in a group setting, which may provide the opportunity for WWE to learn from peer experiences using the meditations and sexuality exercises, we agree with Paterson et al. [10] that this program may be utilized in individual contexts. However, further research is warranted to examine the effects of individual MBCT-S in WWE.

4.3. Conclusions

In conclusion, our results demonstrate that an eight-session of MBCT-S is efficacious in enhancing sexual function and reducing sex-related distress for Iranian older adult WWE. The underlying mechanism appears related to changes in mindfulness and improved intimacy, both emotional and sexual. With a large sample size (660 in total) using a multicenter, cluster, prospective, randomized, controlled trial design, our results indicate MBCT-S effects may last through six months. Additionally, involving healthcare providers in MBCT-S may strengthen MBCT-S effects on longer-term sexual functioning.

Disclosure

None of the authors have any conflict of interest to disclose. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

Ethical publication statement

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Declaration of competing interest

Dr. Potenza discloses the following relationships: Dr. Potenza has received financial support or compensation for the following: Dr. Potenza has consulted for and advised RiverMend Health, Lightlake Therapeutics/Opiant, the Addiction Policy Forum and Jazz Pharmaceuticals; has received research support from the Mohegan Sun Casino and the National Center for Responsible Gaming; has

Table 3
Mixed linear regression models in predicting FSFI, PAIRS, and FSDS.

	Sexual intimacy (patient)[a]			Emotional intimacy (patient)[a]			Sexual intimacy (partner)[a]			Emotional intimacy (partner)[a]			FSFI			FSDS		
	B	SE	p	B	SE	p	B	SE	p	B	SE	p	B	SE	p	B	SE	p
PP (Ref: TAU)	0.08	0.11	0.467	2.79	0.98	0.005	0.67	0.91	0.462	1.48	0.88	0.093	0.16	1.05	0.879	−0.50	0.76	0.511
PPHP (Ref: TAU)	0.01	0.16	0.950	1.23	0.98	0.210	0.68	0.89	0.445	0.89	0.90	0.323	0.63	1.05	0.549	−0.62	0.79	0.433
Month 1 (Ref: baseline)	1.18	0.33	< 0.001	1.24	0.31	< 0.001	1.03	0.34	0.003	0.67	0.28	0.017	0.09	0.26	0.729	0.33	0.27	0.222
Month 6 (Ref: baseline)	1.46	0.33	< 0.001	1.65	0.38	< 0.001	1.70	0.39	< 0.001	1.04	0.28	< 0.001	1.00	0.26	< 0.001	−0.49	0.28	0.081
Month 1 comparisons																		
PPHP vs TAU	3.88	0.47	< 0.001	2.45	0.43	< 0.001	3.75	0.49	< 0.001	2.61	0.41	< 0.001	1.03	0.37	0.006	−2.09	0.39	< 0.001
PP vs TAU	2.40	0.46	< 0.001	2.12	0.41	< 0.001	2.46	0.49	< 0.001	1.76	0.40	< 0.001	0.71	0.36	0.049	−2.60	0.39	< 0.001
PPHP vs PP	1.48	0.47	0.002	0.34	0.44	0.440	1.29	0.48	0.007	0.86	0.40	0.032	0.33	0.37	0.373	0.50	0.35	0.154
Month 6 comparisons																		
PPHP vs TAU	4.71	0.44	< 0.001	3.27	0.51	< 0.001	4.80	0.46	< 0.001	3.01	0.40	< 0.001	5.75	0.37	< 0.001	−2.56	0.40	< 0.001
PP vs TAU	2.94	0.47	< 0.001	2.64	0.41	< 0.001	3.26	0.44	< 0.001	2.29	0.37	< 0.001	3.86	0.37	< 0.001	−3.09	0.37	< 0.001
PPHP vs PP	1.78	0.41	< 0.001	0.63	0.37	0.089	1.54	0.49	0.002	0.72	0.39	0.065	2.89	0.36	< 0.001	−0.53	0.38	0.164
Age	−0.01	0.03	0.739	−0.01	0.02	0.617	−0.04	0.07	0.568	−0.01	0.01	0.318	−0.01	0.02	0.617	0.02	0.02	0.318
Duration of illness	0.01	0.04	0.803	0.01	0.07	0.886	−0.08	0.07	0.254	−0.04	0.08	0.617	−0.01	0.08	0.901	0.04	0.05	0.424
Partner's age	−0.02	0.02	0.318	−0.02	0.01	0.046	−0.02	0.01	0.046	−0.03	0.01	0.003	0.05	0.04	0.212	0.03	0.07	0.668
Intercept	22.73	1.69	< 0.001	21.45	1.77	< 0.001	23.63	1.77	< 0.001	23.60	1.93	< 0.001	15.02	1.97	< 0.001	11.25	1.44	< 0.001
$\hat{\sigma}^2_{st}$ (patient)	42.54	3.64	< 0.001	53.51	4.32	< 0.001	52.29	4.27	< 0.001	53.33	4.29	< 0.001	7.62	0.29	< 0.001	36.31	2.93	< 0.001
$\hat{\sigma}^2_{sc}$ (clinic)	12.26	0.47	< 0.001	10.78	0.41	< 0.001	18.23	4.40	< 0.001	9.08	0.35	< 0.001	17.59	5.18	0.001	8.41	0.32	< 0.001

Note. B = coefficient; SE = standard error; TAU = treatment as usual; PP = patient and partner; PPHP = patient, partner, and healthcare provider; FSFI = Female Sexual Function Index; PAIRS = Personal Assessment of Intimacy in Relationships Scale; FSDS = Female Sexual Distress Scale.

[a] Sexual intimacy and emotional intimacy were measured using Personal Assessment of Intimacy in Relationships Scale.

Table 4
Mixed linear regression models in predicting other secondary outcomes.

	IIEF			Anxiety[a]			Depression[a]			QOLIE-31			SABS			PDRQ-9			FFMQ-S		
	B	SE	p	B	SE	p	B	SE	p	B	SE	p	B	SE	p	B	SE	p	B	SE	p
PP (Ref: TAU)	0.85	0.93	0.361	−0.73	0.51	0.153	−0.36	0.50	0.472	5.46	4.12	0.186	0.11	0.18	0.541	0.03	0.05	0.549	0.70	1.19	0.557
PPHP (Ref: TAU)	0.42	0.94	0.655	−0.40	0.51	0.433	−0.17	0.49	0.729	6.28	3.89	0.107	−1.12	0.37	0.003	0.10	0.07	0.154	0.17	1.02	0.868
Month 1 (Ref: baseline)	0.43	0.32	0.179	−0.52	0.12	< 0.001	−0.08	0.13	0.539	6.33	3.88	0.103	−0.63	0.51	0.217	0.12	0.14	0.392	1.72	0.67	0.010
Month 6 (Ref: baseline)	0.59	0.32	0.066	−0.45	0.31	0.147	−0.11	0.13	0.398	4.87	1.50	0.001	−0.51	0.49	0.298	0.09	0.08	0.261	3.57	0.62	< 0.001
Month 1 comparisons																					
PPHP vs TAU	2.99	0.45	< 0.001	−0.69	0.17	< 0.001	−0.70	0.18	< 0.001	3.84	2.28	0.093	−3.08	0.31	< 0.001	0.83	0.13	< 0.001	8.91	0.96	< 0.001
PP vs TAU	1.80	0.45	< 0.001	−0.56	0.16	< 0.001	−0.61	0.17	< 0.001	2.93	1.36	0.032	0.14	0.22	0.525	0.02	0.06	0.739	6.09	0.95	< 0.001
PPHP vs PP	1.19	0.45	0.008	−0.33	0.17	0.053	−0.09	0.14	0.521	0.67	0.54	0.215	−2.88	0.38	< 0.001	0.80	0.11	< 0.001	2.81	0.94	0.003
Month 6 comparisons																					
PPHP vs TAU	4.22	0.45	< 0.001	−0.78	0.13	< 0.001	−1.10	0.19	< 0.001	7.12	1.89	< 0.001	−2.16	0.27	< 0.001	1.16	0.22	< 0.001	16.29	0.88	< 0.001
PP vs TAU	2.38	0.43	< 0.001	−0.48	0.16	0.003	−0.92	0.20	< 0.001	5.01	1.64	0.002	0.62	0.56	0.269	0.07	0.06	0.244	12.29	0.91	< 0.001
PPHP vs PP	1.84	0.42	< 0.001	−0.28	0.13	0.032	−0.18	0.12	0.134	2.36	1.22	0.053	−2.73	0.39	< 0.001	1.01	0.19	< 0.001	4.01	0.88	< 0.001
Age	−0.05	0.04	0.212	0.03	0.04	0.454	0.01	0.02	0.617	−0.07	0.06	0.244	0.01	0.03	0.739	−0.07	0.02	< 0.001	0.02	0.02	0.318
Duration of illness	−0.06	0.07	0.392	0.06	0.04	0.134	0.04	0.04	0.318	−0.68	0.46	0.140	0.02	0.02	0.318	0.06	0.03	0.046	0.06	0.09	0.505
Partner's age	−0.09	0.14	0.521	0.02	0.02	0.318	0.01	0.05	0.842	−0.04	0.05	0.424	0.09	0.07	0.199	0.01	0.03	0.739	−0.01	0.06	0.868
Intercept	17.22	1.80	< 0.001	9.56	1.03	< 0.001	7.61	0.96	< 0.001	38.94	3.12	< 0.001	35.41	0.11	< 0.001	29.14	2.10	< 0.001	56.82	1.51	< 0.001
$\hat{\sigma}^2_{st}$ (patient)	62.82	4.84	< 0.001	22.96	1.65	< 0.001	18.10	1.38	< 0.001	62.51	4.37	< 0.001	27.67	0.34	< 0.001	33.62	3.07	< 0.001	51.07	5.37	< 0.001
$\hat{\sigma}^2_{sc}$ (clinic)	11.50	0.44	< 0.001	1.49	0.07	< 0.001	1.84	0.08	< 0.001	15.78	0.16	< 0.001	20.17	0.19	< 0.001	16.08	0.93	< 0.001	10.42	2.32	< 0.001

Note. B = coefficient; SE = standard error; TAU = treatment as usual; PP = patient; PPHP = patient and partner; PPHP = patient, partner, and healthcare provider; IIEF = International index of erectile function; QOLIE-31 = Quality of Life in Epilepsy Inventory; SABS = Sexual Attitudes and Beliefs Survey; PDRQ-9 = Patient-Doctor Relationship Questionnaire; FFMQ-S = Sexual Five-Facet Mindfulness Questionnaire.
[a] Anxiety and depression were measured using Hospital Anxiety and Depression Scale.

Table 5
Mediated effects on Female Sexual Function Index (FSFI) and Female Sexual Distress Scale (FSDS).

Outcome	Mediator	B (SE)/ p							
		Intervention effect on outcome: C		Intervention effect on mediator: A		Mediator effect on outcome: B		Mediated effect: A*B	
PP vs. TAU									
FSFI	Mindfulness for sexual functioning[a]	3.86 (0.37)	/ < 0.001	6.09 (0.95)	/ < 0.001	0.29 (0.04)	/ < 0.001	1.77 (0.37)	/ < 0.001
	Sexual intimacy[b]			2.40 (0.46)	/ < 0.001	0.32 (0.05)	/ < 0.001	0.77 (0.19)	/ < 0.001
	Emotional intimacy[b]			2.12 (0.41)	/ < 0.001	0.15 (0.05)	/0.003	0.32 (0.12)	/0.008
FSDS	Mindfulness for sexual functioning[a]	− 3.09 (0.37)	/ < 0.001	6.09 (0.95)	/ < 0.001	− 0.30 (0.04)	/ < 0.001	− 1.83 (0.37)	/ < 0.001
	Sexual intimacy[b]			2.40 (0.46)	/ < 0.001	− 0.07 (0.04)	/0.081	− 0.17 (0.10)	/0.090
	Emotional intimacy[b]			2.12 (0.41)	/ < 0.001	− 0.04 (0.03)	/0.183	− 0.08 (0.07)	/0.254
PPHP vs. TAU									
FSFI	Mindfulness for sexual functioning[a]	5.75 (0.37)	/ < 0.001	8.91 (0.96)	/ < 0.001	0.19 (0.04)	/ < 0.001	1.69 (0.40)	/ < 0.001
	Sexual intimacy[b]			3.88 (0.47)	/ < 0.001	0.28 (0.05)	/ < 0.001	1.09 (0.23)	/ < 0.001
	Emotional intimacy[b]			2.45 (0.43)	/ < 0.001	0.22 (0.05)	/ < 0.001	0.54 (0.15)	/ < 0.001
FSDS	Mindfulness for sexual functioning[a]	− 2.56 (0.40)	/ < 0.001	8.91 (0.96)	/ < 0.001	− 0.29 (0.04)	/ < 0.001	2.58 (0.45)	/ < 0.001
	Sexual intimacy[b]			3.88 (0.47)	/ < 0.001	− 0.11 (0.04)	/0.006	0.43 (0.16)	/0.007
	Emotional intimacy[b]			2.45 (0.43)	/ < 0.001	− 0.03 (0.02)	/0.134	0.07 (0.05)	/0.162
PPHP vs. PP									
FSFI	Mindfulness for sexual functioning[a]	1.89 (0.36)	/ < 0.001	2.81 (0.94)	/0.003	0.12 (0.04)	/0.003	0.34 (0.16)	/0.034
	Sexual intimacy[b]			1.48 (0.47)	/0.002	0.31 (0.05)	/ < 0.001	0.46 (0.16)	/0.004
	Emotional intimacy[b]			0.34 (0.44)	/0.440	0.07 (0.05)	/0.162	0.02 (0.03)	/0.505
FSDS	Mindfulness for sexual functioning[a]	− 0.53 (0.38)	/0.164	2.81 (0.94)	/0.003	− 0.35 (0.05)	/ < 0.001	0.98 (0.36)	/0.007
	Sexual intimacy[b]			1.48 (0.47)	/0.002	− 0.07 (0.02)	/ < 0.001	0.10 (0.04)	/0.013
	Emotional intimacy[b]			0.34 (0.44)	/0.440	0.02 (0.03)	/0.505	0.01 (0.01)	/0.318

Note. B = coefficient; SE = standard error; TAU = treatment as usual; PP = patient, partner; PPHP = patient and partner; PPHP = patient, partner, and healthcare provider; SABS = Sexual Attitudes and Beliefs Survey; PDRQ-9= Patient-Doctor Relationship Questionnaire.

[a] Mindfulness for sexual functioning was measured using Sexual Five-Facet Mindfulness Questionnaire.

[b] Sexual intimacy and emotional intimacy were measured using Personal Assessment of Intimacy in Relationships Scale on patients.

participated in surveys, mailings or telephone consultations related to addictive disorders or other health topics; has consulted for or advised law offices and gambling entities on issues related to addictive disorders and behaviors; has provided clinical care in the Connecticut Department of Mental Health and Addiction Services Problem Gambling Services Program; has performed grant reviews for the NIH and other agencies; has edited journals and journal sections; has given academic lectures in grand rounds, CME events and other clinical or scientific venues; and has generated books or book chapters for publishers of mental health texts. The authors alone are responsible for the content and writing of the paper. The authors declare that they have no competing interests.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.seizure.2019.10.010.

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