

A Mindfulness-Based Group Psychoeducational Intervention Targeting Sexual Arousal Disorder in Women

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ABSTRACT

Introduction. Despite their widespread prevalence, there are no existing evidence-based psychological treatments for women with sexual desire and arousal disorder. Mindfulness, the practice of relaxed wakefulness, is an ancient eastern practice with roots in Buddhist meditation which has been found to be an effective component of psychological treatments for numerous psychiatric and medical illnesses. In recent years, mindfulness has been incorporated into sex therapy and has been found effective for genital arousal disorder among women with acquired sexual complaints secondary to gynecologic cancer.

Aim. The aim of this study was to adapt an existing mindfulness-based psychoeducation (PED) to a group format for women with sexual desire/interest disorder and/or sexual arousal disorders unrelated to cancer.

Methods. Twenty-six women participated in three 90-minute sessions, spaced 2 weeks apart, with four to six other women. Group PED was administered by one mental health trained provider and one gynecologist with post graduate training and experience in sexual medicine.

Main Outcome Measures. Prior to and following the group, women viewed audiovisual erotic stimuli and had both physiological (vaginal pulse amplitude) and subjective sexual arousal assessed. Additionally, they completed self-report questionnaires of sexual response, sexual distress, mood, and relationship satisfaction.

Results. There was a significant beneficial effect of the group PED on sexual desire and sexual distress. Also, we found a positive effect on self-assessed genital wetness despite little or no change in actual physiological arousal, and a marginally significant improvement in subjective and self-reported physical arousal during an erotic stimulus. A follow-up comparison of women with and without a sexual abuse history revealed that women with a sexual abuse history improved significantly more than those without such history on mental sexual excitement, genital tingling/throbbing, arousal, overall sexual function, sexual distress, and on negative affect while viewing the erotic film. Moreover, there was a trend for greater improvement on depression scores among those with a sexual abuse history.

Conclusions. These data provide preliminary support for a brief, three-session group psychoeducational intervention for women with sexual desire and arousal complaints. Specifically, women with a history of sexual abuse improved more than women without such a history. Participant feedback indicated that mindfulness was the most effective component of the treatment, in line with prior findings. However, future compartmentalization trials are necessary in order to conclude this more definitively. **Brotto LA, Basson R, and Luria M. A mindfulness-based group psychoeducational intervention targeting sexual arousal disorder in women. J Sex Med 2008;5:1646–1659.**

Key Words. Mindfulness; Sex Therapy; Female Sexual Dysfunction; Arousal Disorder; Desire/Interest Disorder; Treatment; Sexual Abuse

Introduction

Women's sexual health has been a growing area of research and clinical focus over the past decade, falling on the heels of successful oral treatments for men with erectile difficulties. A literature review of recent studies on sexual dysfunctions has found that the majority investigate erectile dysfunction, though for persons less than 60 years old, prevalence rates for women's orgasm difficulties or pain during sex are at least twice as high [1,2], and the overall prevalence of sexual concerns in women has been estimated to be as high as 43% [3]. Lack of interest, lubrication difficulties, and inability to reach orgasm are the most prevalent sexual concerns of women, affecting 10–51% of women (depending on the country in which data are collected); however, the lack of pleasure from sex and pain during intercourse are also very common (22% and 14%) [1,2,4]. Absent or impaired genital arousal response affects from 11% to 19% of women younger than 30, up to 24–27% of women older than 50 [1,3], and may be as high as 75% for those women seeking routine gynecological care [5]. Lack of subjective sexual arousal, or “subjective sexual arousal disorder” [6], is a more common complaint than problems focused on insufficient lubrication among premenopausal women presenting clinically. Unfortunately, most epidemiological studies have focused on disordered genital lubrication and swelling, and not on subjective arousal disorders. The defining characteristics of the latter are relatively recent; therefore, their precise prevalence is unknown, but one British study showed a figure of 15% [7].

The complaint of low sexual desire is the most frequent sexual complaint among postmenopausal women in the clinical setting. In non-European Western countries, there is a 32.9% prevalence rate of lack of sexual interest among older women [2]. The diagnosis, “sexual desire/interest disorder,” is described as a lack of interest in sexual activity and a lack of responsive sexual desire [6]. Notably, the lack of spontaneous sexual desire before a sexual encounter has begun is not considered, by itself, to be a sexual dysfunction.

Among some of the pharmacological agents currently under study for loss of desire and arousal, few have shown modest benefit above placebo (e.g., bupropion, apomorphine, phentolamine mesylate), whereas for others (e.g., alprostadil, sildenafil citrate), results have been more disappointing [8–13]. Among the studies that have

shown some benefit, effects were mostly limited to improving genital arousal, with little or no effect on desire or subjective arousal. One promising agent touted to target subjective measures is the centrally acting melanocortin agonist, bremelanotide, which has been shown in one small study to significantly increase subjective sexual arousal among premenopausal women with sexual arousal disorder [14]. Replication of these trials and the demonstration that effects are clinically meaningful are necessary before considering these agents in the treatment of women's sexual desire and arousal complaints. In the meantime, women with distressing sexual arousal and desire concerns continue to scour the Internet for agents offering the promise of “renewed sexual vigor” with limited or no empirical support.

Although one pharmaceutical company has sponsored a number of randomized trials showing that a testosterone patch supplying 300-mcg testosterone daily significantly improved sexual desire in postmenopausal estrogenized women reporting distressingly reduced desire since menopause [15–18], at present, there are no hormonal products approved by the Food and Drug Administration or Health Canada for the treatment of low sexual desire. Lack of long-term safety data including potential promotion of cardiovascular disease, metabolic syndrome, and breast cancer [19,20] by testosterone and ongoing uncertainty about long-term estrogen therapy remain major issues. However, many women are being prescribed off-label testosterone, adapting formulations developed for men. Thus, although testosterone may prove in the long term to be helpful and safe for women with loss of responsive desire, there remains an urgent need to validate nonpharmacological treatments.

Heiman [21] summarized the research in 2002 with regard to the status of psychological approaches for sexual concerns and she noted a disappointing paucity of high-quality controlled trials. There are excellent data supporting the use of cognitive-behavioral treatments (CBT) for women's orgasmic disorder [22,23], and modest support for their efficacy with vaginismus [24,25] and some types of dyspareunia [26,27]. In these studies, the psychological treatments were well tolerated with respectable long-term efficacy following the end of treatment. Although the use of CBT and other psychological interventions for women's loss of sexual desire are common in clinical practice, we could locate only one published outcome study using a randomized con-

trolled design of CBT (administered in group format) for hypoactive sexual desire disorder (HSDD) [28] and none for sexual arousal disorders. In Trudel's study, 74% of women no longer met diagnostic criteria for HSDD after 12 weeks of treatment, and effects were largely maintained at a 1-year follow-up assessment. Unfortunately, the impact of this relative paucity of any evidence-based treatments for sexual desire or arousal complaints is that it may leave women with chronic difficulties that have lasting effects on quality of life, and it may limit women to experimenting with pharmacological agents with unknown safety and efficacy.

In response to this urgent need for validated psychological interventions for women's sexual desire and arousal disorders, our group recently developed a psychoeducational intervention (psychoeducation [PED]) targeted to women with such complaints secondary to gynecologic cancer [29]. The PED was based on a variety of empirically supported techniques in other areas of female sexual dysfunction, and integrated elements of education, cognitive and behavioral therapy, and mindfulness [Brotto & Heiman, unpublished]. The ingredients in the PED were adapted from a variety of sources including (1) *Becoming Orgasmic* by Heiman and LoPiccolo [15], which is an empirically supported behavioral treatment for women with lifelong anorgasmia; (2) *The Seven Principles for Making Marriage Work* by Gottman and Silver [30]; (3) *The Miracle of Mindfulness* by Hanh [31]; and (4) *Progressive Relaxation* by Jacobson [32]. The PED was developed to target sexual arousal and desire complaints and, secondarily, to target relationship dissatisfaction, body image distortion, depression, and maladaptive beliefs about sexuality. Several of the exercises were based on principles of "mindfulness," which is a practice originating in Buddhist meditation and which is defined as "relaxed wakefulness" [33] or "nonjudgmental, present-moment awareness." Mindfulness has been increasingly incorporated into Western medical and mental health and has been found to significantly improve symptoms of chronic pain [34], borderline personality disorder [35], depression [36], substance abuse [37], eating disorders [38], anxiety disorders [39], psychosis [40], child behavior problems [41], side effects of cancer treatment [42], and in enhancing emotional intimacy in nondistressed couples [43]. Homework involved a combination of reading, self-observation exercises, cognitive challenging exercises, couple communication and behavioral exercises, and mindfulness exercises, directed both

at the individual in her everyday life, and during specific body awareness exercises. The three-session PED was administered individually, and a variety of psychological and physiological end points were measured before and after the PED, as well as an in-depth interview following the treatment to solicit feedback about how to improve the PED.

Among the aforementioned sample of female gynecologic cancer survivors with genital arousal disorder (and comorbid sexual desire complaints), the PED significantly enhanced measures of desire, arousal, distress, depression, and overall quality of life [29]. It also resulted in a marginally significant improvement in physiological sexual arousal (vaginal pulse amplitude [VPA]) and a marginal improvement in relationship satisfaction. Qualitative feedbacks from women were analyzed using content analyses, and identified the mindfulness practice as the most likely influential aspect of the PED in terms of improving women's sexual satisfaction, mood, and quality of life [44].

Taken together, the positive outcome data on CBT for orgasm and pain disorders in women, the lack of outcome data on psychological treatments for desire and arousal disorders, the negative data on sexual pharmaceuticals in women, and a caution against overmedicalization [45] highlight the need for establishing and testing psychological treatments for women with sexual desire and arousal complaints. The aim of the current study was to modify our individual PED, tailoring it to women with sexual arousal and desire complaints unrelated to cancer, and to administer it in a group format. The purpose of using a group, rather than an individual format, was to increase the feasibility of the intervention, to target larger numbers of women, and to capitalize on the therapeutic effect of group support and sharing. Based on prior findings [29], we hypothesized that the group PED would significantly enhance self-report, but not necessarily physiological, sexual arousal, and would improve other measures of sexual response, mood, and relationship satisfaction.

Method

Participants

Women who were seeking treatment for acquired sexual desire and/or arousal concerns were eligible to participate. As this was a pilot project aimed at modifying an existing intervention for women with a cancer history and aimed at establishing effect sizes, our inclusion criteria were broad.

Women may have been hetero-, homo-, or bisexual in orientation, and we accepted women in or out of a relationship. We excluded any woman who had a history of dyspareunia that was unresponsive to treatment.

Out of approximately 35 women who were informed of the study, 26 agreed to participate and underwent a baseline (pregroup PED) assessment. The average age of the 26 women was 37 years (range 24–55), and all women had some level of postsecondary education. All but one woman was heterosexual, and 77% were currently involved in a relationship that was, on average, 7.46 years (range 1–27 years). Fifty-eight percent were Euro-Canadian; 23% were East Asian, and the remaining were either Hispanic or African Canadian. Fifty-four percent of the women indicated not being satisfied with the level of closeness in their relationship, and a different 54% reported having sought sex therapy in the past. Thirty-one percent reported a history of unwanted sexual activity.

Procedure

Women were recruited from clinicians providing care at the BC Centre for Sexual Medicine, a tertiary care facility offering assessment and therapy for sexual dysfunctions from across the entire province of British Columbia, Canada. All women underwent a full assessment, usually of both partners together and individually, during which the sexual difficulty and its etiology were discussed in detail. Also, during the interview, the couple's relationship history, her psychosexual and developmental history, her medical status, and her psychiatric status, including an assessment of sexual abuse, were undertaken. Any woman who met the criteria for sexual desire/interest disorder, combined, genital or subjective sexual arousal disorder, according to the recommended revised definitions [6], was informed about the group. If a woman expressed interest in participating, her name and contact information were forwarded to the study coordinator who later performed a telephone screen to determine eligibility for the group and who explained the procedures in more detail. Entrance criteria involved having one of the sexual desire or arousal disorders, fluency in English, and a willingness to participate in a group. Prospective participants then were scheduled for a baseline sexual arousal assessment taking place in the sexual psychophysiology laboratory of the lead author. The women were then mailed a package of questionnaires and were asked to return them completed prior to their sexual arousal assessment.

These same questionnaires were administered again following session 3 of the group PED and included the following:

The Female Sexual Function Index [46] (FSFI), a validated measure of sexual response, and the Female Sexual Distress Scale [47] (FSDS), a measure of sexually related distress, were major end points in this study. As a more specific measure of sexual desire, we administered the Sexual Interest and Desire Inventory [48] (SIDI), which has previously been validated in women with HSDD. As a more specific measure of sexual arousal, we administered the Detailed Assessment of Sexual Arousal (DASA), an unpublished questionnaire that has been found to significantly differentiate aspects of sexual arousal in women [49]. Subscales included "mental excitement," "genital tingling/throbbing," "genital wetness," and "pleasant genital sensations in response to direct stimulation."

The Dyadic Adjustment Scale [50] (DAS), considered the gold standard in measuring relationship adjustment, was administered given that in the prior study in women with sexual dysfunction and history of gynecologic cancer, there was a marginal improvement in relationship satisfaction. Although partners were not included in the psychoeducational intervention, some exercises directly involved the partner (e.g., in communication exercises). The Beck Depression Inventory [51] (BDI), a validated measure of depression, was administered to track improvements in mood.

The Film Scale [52] is a self-report questionnaire that assessed perception of genital sexual arousal, subjective sexual arousal, autonomic arousal, anxiety, positive affect, and negative affect in response to viewing audiovisual stimuli. Items were rated on a 7-point Likert scale from (1) not at all to (7) intensely. The Film Scale was administered prior to the neutral and following the erotic film at each of the sexual arousal assessments (pre- and post-group PED).

The pregroup PED session entailed an assessment of subjective and physiological sexual arousal in response to audiovisual neutral (3 minute) and erotic (7.5 minute) films. Physiological sexual arousal was measured with a vaginal photoplethysmograph [53] consisting of an acrylic vaginal probe, which is tampon-shaped and inserted vaginally in a private, locked room. Participants received detailed instructions from the investigator before leaving the testing room on how to insert the probe. Once inserted, they were encouraged to relax on a reclining chair for 10 minutes before watching the video segments. Subjective

sexual arousal was assessed before the neutral and after the erotic films using the Film Scale.

VPA was monitored throughout the exposure to each film segment and was recorded on a personal computer (HP Pentium M laptop [HP, Mississauga, ON, Canada]) to collect, convert (from analog to digital), and transform data. The software program AcqKnowledge III, version 3.8.1 (BIOPAC Systems, Inc., Santa Barbara, CA, USA), and a model MP150WSW data acquisition unit (BIOPAC Systems, Inc.) were used for analog/digital conversion. A sampling rate of 200 samples/second was used for VPA throughout the neutral and erotic film exposure. The signal was band-pass filtered (0.5–30 Hz). One of two vaginal probes (Behavioral Technology, Inc., Salt Lake City, UT, USA) was used. Data were analyzed in 30-second segments, then averaged over the neutral and erotic segments separately, resulting in two data points per subject per session. Artifact smoothing took place following visual inspection of the data. The vaginal probe was sterilized in a solution of Cidex ortho-phthalaldehyde (Johnson & Johnson, Toronto, ON, Canada) (0.55%), a high-level disinfectant, immediately following each session.

After the erotic film, the women were instructed to remove the probe and to meet with the study coordinator for debriefing. At that point, they were reminded about the scheduled dates of the group PED.

Group Psychoeducational Intervention (PED)

The lead author was responsible for editing the original PED, and used feedback from women in the prior study [29] to adapt it for the current study. The resulting group PED treatment included a therapist manual plus participant handouts [Brotto, unpublished]. The therapist manual contained detailed information on the material to be covered, the sequence of topics, and tips on troubleshooting difficult topics. At each session, the participants were given the handouts that corresponded to that session, were asked to keep these and to note their homework progress on the handouts, and to return them to the next session for discussion and reflection. The psychoeducational treatment manual is available upon request.

Analyses

The effectiveness of the erotic stimuli at eliciting genital (VPA) and subjective measures of arousal at pregroup PED was assessed with a dependent sample *t*-test (neutral and erotic conditions). The efficacy of the group PED on VPA and self-report

measures (FSFI, FSDS, SIDI, DASA, BDI, DAS) was assessed using a dependent sample *t*-test. In addition, we repeated the analyses accounting for whether or not a woman experienced a past history of sexual abuse using a between-within repeated measures analysis of variance (ANOVA). In cases of a significant interaction, simple effects analyses [54] using a corrected error term were utilized to determine which factors or testing intervals significantly differed.

Results

Sexual Response, Distress, Relationship Satisfaction, and Depression at Pregroup PED

The mean FSFI subscale scores at pregroup PED appear in the left column of Table 1. The overall FSFI total score was in the range previously found for women with sexual dysfunction [55]. The FSFI desire, arousal, and satisfaction scores were in the range of women previously diagnosed with arousal and desire disorders, whereas the FSFI lubrication score in the current sample was not in the clinical range. FSFI orgasm scores were in the range of women previously diagnosed with orgasmic disorder, but pain scores were not in the range found among women with dyspareunia. Scores on the SIDI were significantly lower than sexually healthy women, and were comparable to women with orgasmic disorder [48]. Our DASA revealed arousal scores on each domain to be in the intermediate range between “no arousal” and “intense arousal.” The mean FSDS score was in the range of women with significant sexually related personal distress [47]. Relationship function, as indicated by scores on the DAS subscales, are presented in Table 1. The scores were in the mid range on each of the DAS subscales with scores on the affectional expression subscale being in the lower range. The mean BDI score (10.3) indicated that women fell in the mild level of depressive symptoms.

Effects of Erotic Stimuli on Physiological and Subjective Sexual Arousal at Pregroup PED

The erotic film was effective at significantly increasing VPA at pregroup PED, $t(25) = -3.197$, $P = 0.004$. We employed a Bonferroni correction factor to Film Scale self-report measures given that these subscales are correlated. Thus, a P value of 0.008 (0.05/6) was necessary in order to determine significance. The erotic film significantly increased perception of genital arousal ($t[25] = -6.367$, $P < 0.001$) and subjective sexual

Table 1 Effects of psychoeducation (PED) on measures of sexual response (FSFI, DASA, and SIDI), sexual distress (FSDS), relationship adjustment (DAS), and depression (BDI)

Measure	Pre-PED		Post-PED		Scale range
	Mean	SD	Mean	SD	
FSFI desire**	2.20	0.94	2.88	0.88	1.2–6.0
FSFI arousal	2.66	1.60	3.10	1.56	0–6.0
FSFI lubrication	3.35	1.70	3.76	2.07	0–6.0
FSFI orgasm	2.63	1.68	2.59	1.64	0–6.0
FSFI satisfaction	2.77	1.44	3.14	1.35	0.8–6.0
FSFI pain	3.62	2.46	3.73	2.35	0–6.0
FSFI total score	17.2	7.61	19.2	7.94	2.0–36.0
SIDI***	31.7	8.17	37.4	7.76	0–51
FSDS**	32.9	10.7	25.8	13.6	0–48
DASA 1—mental excitement	3.64	1.15	3.97	0.84	0–7.0
DASA 2—genital tingling/throbbing	3.51	1.22	3.82	1.25	0–7.0
DASA 3—genital wetness*	3.35	0.24	3.83	1.27	0–7.0
DASA 4—experience of pleasant genital sensations	3.60	1.08	4.06	1.36	0–7.0
DAS consensus	3.65	0.63	3.66	0.86	0–5
DAS satisfaction	3.58	0.85	3.59	0.84	0–5
DAS cohesion	3.05	0.74	3.15	0.85	0–4.8
DAS affectional expression	1.88	0.52	1.78	0.71	0–3
BDI	10.6	8.05	8.14	10.0	0–63

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$ significant differences from pre- to post-PED.

Data represent means \pm SDs.

Note: Higher FSFI subscale and SIDI scores denote better sexual functioning. Higher FSDS scores indicate more sexually related distress. Higher DAS scores indicate better relationship adjustment.

FSFI = Female Sexual Function Index; FSDS = Female Sexual Distress Scale; SIDI = Sexual Interest and Desire Inventory; DASA = Detailed Assessment of Sexual Arousal; DAS = Dyadic Adjustment Scale; BDI = Beck Depression Inventory; SD = standard deviation.

arousal ($t[25] = -3.178$, $P = 0.004$). Perceived autonomic arousal ($t[25] = -4.854$, $P < 0.001$) and positive affect ($t[25] = -5.490$, $P < 0.001$) significantly increased, and anxiety marginally decreased ($t[24] = 2.683$, $P = 0.013$) during the erotic film, whereas negative affect was unchanged following the audiovisual stimulus at pregroup PED.

Effects of Group PED on Physiological and Subjective Sexual Arousal During an Erotic Stimulus

Complete post-group PED data on physiological and subjective arousal measures collected while viewing an erotic stimulus were available for 24 participants. Percent increase in VPA increased from pre- to post-group PED (82% to 126%), but this increase was not statistically significant ($t[23] = -1.716$, $P = 0.10$).

Each of the Film Scale subscales was calculated as difference scores from neutral to erotic stimulus conditions, and then compared from pre- to post-PED. Moreover, a Bonferroni correction of $P = 0.008$ was applied to these measures. As shown in Figure 1, perceived physical sexual arousal ($t[23] = -3.748$, $P = 0.05$) and self-reported subjective arousal ($t[23] = -5.106$, $P < 0.05$) were increased after the group PED, but did not reach a level of statistical significance given the Bonferroni correction factor.

Perceived autonomic arousal ($t[23] = -2.817$, $P = 0.010$), positive affect ($t[23] = -4.361$, $P <$

0.001), and anxiety during the erotic film ($t[23] = -2.817$, $P = 0.010$) increased, though nonsignificantly, after the group PED, whereas negative affect was not significantly affected ($t[23] = 0.957$, $P > 0.05$).

Effects of Group PED on Self-Report Questionnaire Items of Sexual Response

Complete post-group PED data on self-report measures of sexual response and mood were available for 19–21 participants. There was a significant increase in the desire subscale of the FSFI ($t[20] = -3.432$, $P = 0.003$) after the PED. Neither the arousal ($t[20] = -1.467$), lubrication ($t[20] = -1.22$), orgasm ($t[20] = 0.109$), satisfaction ($t[20] = -1.195$), nor pain ($t[20] = -0.283$) subscales of the FSFI significantly changed after the group PED. Sexual distress, as measured by the FSDS, significantly decreased following the group PED ($t[20] = 3.223$, $P = 0.004$), and sexual desire and interest, as measured by the SIDI, significantly increased ($t[20] = -3.759$, $P < 0.001$) (see Table 1).

Effects of Group PED on Self-Reported Sexual Arousal

Because we were interested in effects on sexual arousal as a major end point, we explored responses on the DASA. There was a significant increase in DASA question 3 (genital wetness)

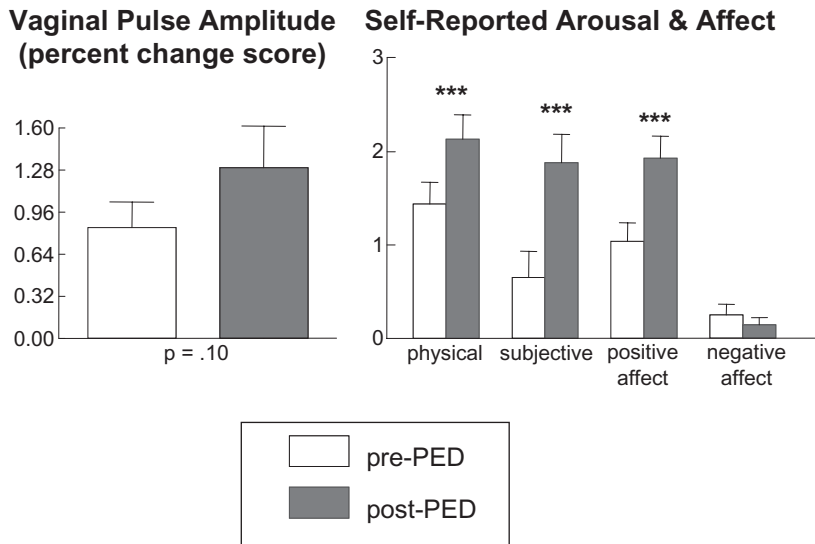


Figure 1 Effects of the group psychoeducational intervention (psychoeducation [PED]) on physiological sexual arousal (vaginal pulse amplitude percent change score) and self-report measures (perceived physical arousal, subjective sexual arousal, positive affect, and negative affect) during exposure to an erotic stimulus ($N = 24$). *** $P < 0.001$.

($t[19] = -2.128$, $P = 0.047$) and a marginal improvement in DASA question 4 (pleasant sexual genital sensations) ($t[20] = -1.833$, $P = 0.08$). Neither DASA question 1 (mental sexual excitement) scores ($t[20] = -1.375$) nor DASA question 2 (genital tingling/throbbing) scores ($t[20] = -1.537$) were significantly affected by the group PED (See Table 1).

Effects of Group PED on Relationship Function and Mood

Subscales on the DAS were not significantly improved after the group PED: DAS consensus, $t(18) = -0.028$; DAS satisfaction, $t(18) = -0.103$; DAS cohesion, $t(18) = -0.989$; and DAS affectional expression, $t(18) = 0.867$, all $P > 0.05$. The BDI scores were similarly not significantly affected by the group PED ($t[20] = 1.389$, $P > 0.05$) (see Table 1).

Effects of Group PED Based on Sexual Abuse History

We made an informal observation while conducting the group PED sessions that some of the women with a past experience of sexual abuse reported more difficulties attending to sexual stimuli with their partners, and being consequently more distracted when attempting to be sexual. Because of the targets of mindfulness which may guide women to stay in the present, we made a post hoc decision to compare women with and without a history of sexual abuse on their responses to the group PED. There were eight women who experienced a history of sexual abuse and 17 women who did not (one woman did not

indicate either way on her questionnaire). At pre-group PED, these two groups did not differ on the BDI, DAS, DASA, SIDI, nor on any measure of the FSFI except arousal. Women with a history of sexual abuse had significantly lower FSFI arousal scores ($t[23] = 2.193$, $P = 0.039$).

We conducted a between-within repeated measures ANOVA with time (pre- and post-group PED) as the within-subjects factor and sexual abuse history (present versus absent) as the between-subjects factor. These factors significantly interacted on the DASA question 1 (mental sexual excitement) ($F[1,18] = 5.355$, $P = 0.033$) and DASA question 2 (genital tingling/throbbing) ($F[1,18] = 9.454$, $P = 0.007$), such that women with a sexual abuse history significantly improved more on both measures than those women without a sexual abuse history.

As shown in Figure 2, sexual abuse status and group PED also significantly interacted on the FSFI arousal subscale ($F[1,18] = 10.428$, $P = 0.005$) and the FSFI total score ($F[1,18] = 5.403$, $P = 0.032$), whereas the interaction on the FSFI pain subscale was only marginally significant ($F[1,18] = 3.154$, $P = 0.09$). For each of these FSFI domains, women with a sexual abuse history improved more than women without such a history. There were no other significant interactions between the group PED and sexual abuse history on the other subscales of the FSFI.

A similar result was found with the FSIDS ($F[1,18] = 14.879$, $P = 0.00$) such that women with a sexual abuse history had a more marked improvement in sexual distress following the group PED, as shown in Figure 3.

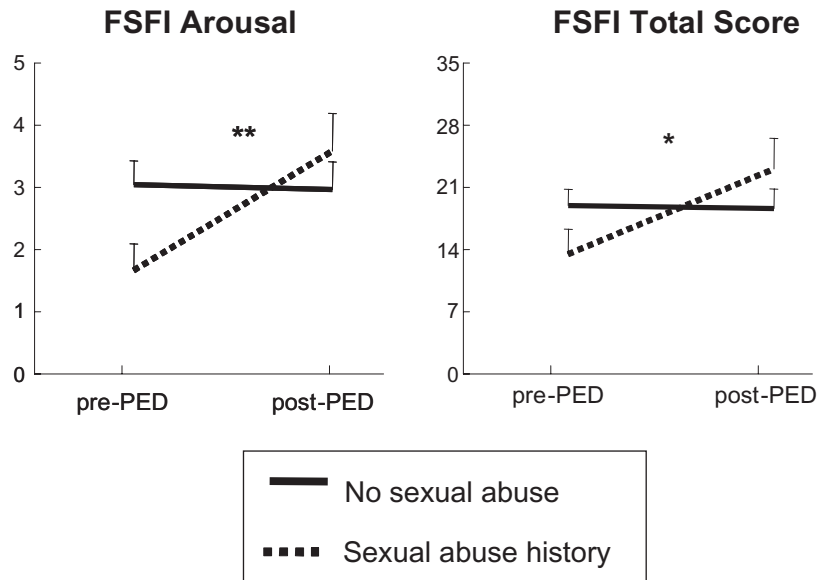


Figure 2 Effects of the group psychoeducational intervention (psychoeducation [PED]) on Female Sexual Function Index (FSFI) arousal and FSFI total scores for women with and without a history of sexual abuse (N = 21). * $P < 0.05$, ** $P < 0.01$.

During exposure to the erotic film, there was an interaction of sexual abuse history and negative affect ($F[1,21] = 5.561, P = 0.028$) such that the reduction in negative affect while watching the film from pre- to post-PED was much more marked among the women with a sexual abuse history as compared with the women without a

sexual abuse history. There were no significant interactions of sexual abuse and group PED on VPA or any other subjective measure during exposure to the erotic film.

Sexual abuse status and group PED had a near significant interaction effect on BDI scores ($F[1,18] = 3.884, P = 0.06$), such that women with a sexual abuse history had a greater improvement in depressive symptoms than women without a sexual abuse history. There was no significant interaction of group PED and sexual abuse status on the SIDI or on any subscale of the DAS.

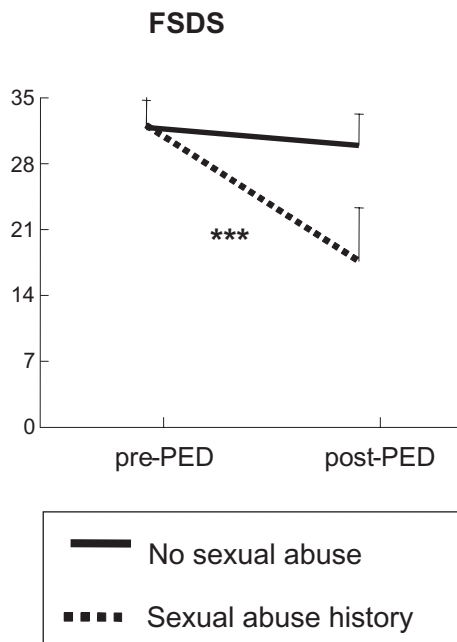


Figure 3 Effects of the group psychoeducational intervention (psychoeducation [PED]) on Female Sexual Distress Scale (FSDS) scores for women with and without a history of sexual abuse (N = 21). *** $P < 0.001$.

Discussion

This study utilized a manualized therapy which included elements of education, CBT, sexual therapy, relationship therapy, and mindfulness in a group setting, with homework exercises between sessions, and which led to significant increases in questionnaire measures of sexual desire and sexual distress. Reports of genital wetness also significantly improved following the group PED. In response to erotic stimulation, psychophysiological arousal measured in the laboratory did not significantly change after the group PED. However, it is worth noting that the perception of that response and the mental subjective excitement during the erotic stimulus significantly increased, despite little or no change in actual physiological arousal. Women also reported higher levels of positive affect to these arousing stimuli after the group PED. Reflective of the highly variable

correlation between physiological measures of increases in genital congestion and their perception [56], these results emphasized the importance of the cognitive appraisal of genital congestion, rather than the physical extent of vasodilatation. The improvements in subjective arousal from the erotic stimuli are in keeping with the known highly variable correlation between subjective arousal and measured increases in genital congestion.

Also notable in the current study was that women with a past history of sexual abuse improved more than women without such a history on measures of laboratory-based and at-home sexual arousal, overall sexual function, and sexual distress. A common disclosure by women with past abuse is that they learned to disconnect from their sexual feelings and sensations when they were in the abusive situation. Women with a history of sexual abuse also link negative affect to sexual stimuli [57], and are more likely to use negative emotion words when writing about sexual topics [58]. This was supported by our findings in that there was a more marked decrease in negative affect while watching the erotic stimuli following the group PED by women in the sexual abuse group. Past research has also shown that women with a history of sexual abuse have sexual self-schema that are significantly less romantic/passionate, and this explained the more negative sexual affect compared to women without an abuse history [59]. It is possible that our intervention may have targeted these specific sexual schema among women with a sexual abuse history, allowing them to express greater levels of sexual desire and less sexual distress. Prior research has shown significant differences in cortisol levels between women with and without a history of sexual abuse [60], and mindfulness-based therapies are well known to benefit conditions thought to be strongly modulated by chronic stress [61]. Because individuals with a history of sexual abuse have been shown on neuropsychological measures to have reduced attention [62], it is likely that improvements in sexual function related to mindfulness may have specifically been due to increased attention (to one's increasing arousal) while being sexual. Women with a sexual abuse history also had greater improvements in mood than women without an abuse history. Moreover, mindfulness cultivates an ability to observe and not react to or follow negative thoughts or feelings. These data suggest that for women with sexual complaints and a history of sexual abuse, mindfulness techniques

may be an especially important and useful component of their overall treatment.

What are the mechanisms by which mindfulness might have been effective in the current study? Meditative states and longer-term changes, known as traits, are being investigated using electroencephalography (EEG) and brain imaging techniques, including positron emission tomography (PET) and functional magnetic resonance imaging (fMRI). Central nervous system function is clearly affected (for review, see Cahn and Polich [63]). Structural (as opposed to functional) scans show enlargement of prefrontal areas and the right insula in mindfulness meditators [64]. Briefly, research suggests that the orbitofrontal cortex, medial and ventral regions of the prefrontal cortex, and the anterior cingulate cortex (all making up the "middle prefrontal cortex") are involved in integrating many functions that seem to be illustrated by mindful awareness. These range from bodily regulation [65], emotional balance [66], self-knowing awareness [67], attuned communication [68], empathy [69], fear modulation [70], and morality [71]. These areas are activated when a reflective state, disengaged from prior expectations, automatic thinking, and emotional reactions, is achieved [72]. Mindfulness practice may provide the necessary stimulation to allow the brain's neuroplasticity to result in actual growth of these integrative nerve fibers [73]. Moreover, mindfulness has been suggested to reorganize frontal hemisphere activity such as to reduce emotional reactivity.

Replicating the findings of Brotto et al. [29], data from the present study suggest that a three-session psychoeducational intervention is feasible and somewhat effective for women with sexual desire and arousal disorders. Women provided written feedback after their participation in the group suggesting that it was specifically the mindfulness exercises and discussions that they found most helpful. This is reminiscent of prior findings; however, only by testing each of the different therapeutic components separately could any firm conclusion be made.

Mindfulness has been described and integrated into other medical and psychological disorders, but has been incorporated only recently into sex therapy. Interestingly, it bears some resemblance to Masters and Johnson's [74] sensate focus, with its emphasis on remaining in the present. Mindfulness also has some similarities with hypnosis in that regard, which has recently been found to be effective for women with vestibulodynia [75]. In

his description of tantric practice and incorporating it into sex therapy, Voigt [76] discussed synchronized breathing and bringing the attention to this, and sustained eye contact between partners during intercourse. He also described intercourse and sexual exchange without orgasm as a means to intensify the sexual-spiritual energy. Another interpretation of each of these practices is that they allow the individual/couple to remain in the present, experiencing arousal and noticing it come and go—exercises reminiscent of mindfulness. The sustained eye contact and focus on synchronized breathing might also have this effect. Collectively, other forms of treatment for sexual complaints which have been found effective have elements similar to mindfulness; thus, it is not surprising that this technique was beneficial in the current sample.

A limitation in this research is that only women seeking help for a sexual concern were recruited for participation. Thus, we considered how representative this cohort of women was compared to women typically encountered in clinical settings, as well as women who participated in previous research. The current sample reported significant sexually related distress at baseline, and as a group showed depressive symptoms that fell in the mild range. Referring physicians screen for and treat clinical depression before referral to the clinic where recruitment occurred, but ongoing depressive symptoms are in keeping with our own experience and that of others assessing women with desire complaints [77]. Our subject's desire but not arousal scores were categorized as within the dysfunctional range on the FSFI. However, this is not surprising given that this instrument focuses more on genital events than on subjective arousal. One caveat is that the recruiting clinicians may not have recruited women whose personalities may have limited their improvement in a group treatment setting, thus producing a biased sample. However, overall, we believe that our sample is likely quite representative of women seeking treatment for sexual complaints in general.

It is worth noting that scores on the DAS, a measure of relationship satisfaction, did not significantly improve with the group PED. This is not surprising given that partners were not directly involved in the group, and relationship length and quality varied among the participants. A future revision of our group PED might incorporate more actively the partner in the homework exercises. For example, it might be helpful to prepare educational handouts for partners of

participants as a means of engaging them in the process.

One limitation of the study is the absence of a control group. Given that the aim of this study was to assess the feasibility of the group PED and to obtain preliminary effect sizes, we did not include a control group. Thus, any improvements may have been due to nonspecific therapeutic factors and not specifically to the components of treatment. A randomized, controlled trial of the group PED is currently underway. Another limitation is that the women were not separated according to the type of sexual abuse history they experienced. Thus, the women who were abused as a child or as an adult were grouped into the sexually abused category. It is possible that there may be different patterns of adult sexual function depending on when the sexual abuse took place. It is worth noting that at baseline, women with a history of sexual abuse also had lower FSFI arousal scores than women without an abuse history. It is possible, therefore, that the improvements seen in the women with an abuse history are due to the fact that they had significantly lower levels of sexual arousal and that the group PED may be targeting that symptom. However, given that the women without an abuse history also had FSFI arousal scores that fell within the clinical range, this speculation is unlikely.

Despite these limitations, we believe the findings have important implications. The study suggests that future research might specifically target women with sexual concerns who also have a history of sexual abuse. A recent conceptual article formulated a model by which sexual abuse is related to disruptions in adult female sexual function [78]. This group PED might be expanded in the future and tailored specifically to address sexual dysfunction in this group of women and particularly the putative link between a history of abuse and their sexual complaints. That the group administration of PED was feasible and well accepted by the participants may have larger economic value. Because we are targeting at least four to six women per group, this could result in a dramatic reduction of existing waiting lists among patients seeking individual care in a center for sexual medicine. Because chronic sexual difficulties may carry with them additional emotional (and perhaps physical) burdens, the group setting may be an effective way of reducing long-term suffering among women with sexual complaints. Moreover, given that the treatment and accompanying participant

handouts have been compiled into a user-friendly manual, our long-term goal is to increase its dissemination by training paraprofessionals in administering the group PED.

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