

The Impact of Body Awareness on Women's Sexual Health: A Comprehensive Review

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ABSTRACT

Introduction: Body awareness has been linked to female sexual response in laboratory manipulation studies and is used in clinical settings to ameliorate sexual difficulties.

Aim: To evaluate and review the literature on body awareness and female sexual function.

Methods: A literature review was conducted through PsycInfo, PsycARTICLES, and PubMed using terms such as *body awareness* and *sexual function*. A manual search also was conducted using reference lists.

Main Outcome Measures: Studies were included if manipulated body awareness was a main variable of interest and if outcome variables included female sexual functioning or sexual response.

Results: 29 studies were included in this review and grouped into 3 categories: sensate focus ($n = 7$), mindfulness ($n = 13$), and laboratory manipulations of body awareness ($n = 9$). Body awareness is identified as an area of importance for female sexuality. Explicit instructions aimed at increasing body awareness, including those used in the clinical techniques of sensate focus and mindfulness, appear to enhance sexual response for many women, including women with low sexual arousal, hypoactive desire, anorgasmia, and sexual pain and in non-clinical samples. Induction of implicit body awareness also resulted in increased arousal in 1 study.

Conclusion: Body awareness appears to enhance sexual well-being for some women. This is supported by laboratory manipulation studies conducted on women with and without sexual difficulties and by intervention studies using sensate focus and mindfulness for women with a range of sexual problems. The extent to which enhanced body awareness accounts for results in intervention studies is often unclear because of other features of the interventions and/or study design. This review provides the field with a summary of intervention and laboratory studies on body awareness, with results pointing toward body awareness as an integral component of treatment for sexual dysfunction. **Seal BN, Meston CM. The Impact of Body Awareness on Women's Sexual Health: A Comprehensive Review. Sex Med Rev 2018;X:XXX–XXX.**

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Key Words: Body Awareness; Sensate Focus; Mindfulness; Sexual Dysfunction; Sexual Response; Treatment

INTRODUCTION

Impairments in female sexual function are among the most commonly reported health problems in the United States, with estimated 1-year prevalence rates ranging from 32% to 85%.^{1–3} Estimates differ between studies depending on factors such as the date of the study, the country in which the statistics were collected, and whether the presence of distress was included in the diagnosis. Overall, however, the most common sexual impairments in women appear to be low sexual desire (64%),

followed by difficulties with orgasm (35%), arousal (31%), and sexual pain (26%).¹ To date, few empirically validated psychological treatments exist for treating these sexual dysfunctions in women.⁴ In their review of empirically validated treatments, Heiman and Meston⁴ noted that sensate focus, a treatment technique that incorporates body awareness, was efficacious in treating a number of sexual concerns in women. In the present review, we investigate the degree to which body awareness per se might be a beneficial treatment strategy for women's sexual dysfunction.

Body awareness is defined as “an attentional focus on and awareness of internal body sensations.”⁵ It is a construct that is related to, but distinct from, body image. Although body image involves an individual's perception of the esthetics of their body, body awareness does not necessarily involve an evaluative component. Much has been written on the impact of body image on sexual function in women (for review, see Woertman and van den Brink⁶), but, to our knowledge, there has been no review to

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date on the role that awareness of bodily sensations can play in women's sexual well-being. The aim of this review is 2-fold. (i) We provide a summary of recent studies that used sensate focus or mindfulness techniques for women's sexual dysfunction, because these treatments enhance bodily awareness. (ii) We provide a comprehensive review of the existing experimental literature on studies that manipulated body awareness and measured sexual outcomes in women. The overall aim of this review is to provide insight into the impact of body awareness on sexual well-being in women.

METHODS

We conducted a literature search through EBSCOHost's PsycInfo, PsycARTICLES, and PubMed databases using the search terms *body awareness*, *self awareness*, *self focus*, *interoceptive awareness*, *sensate focus*, and *mindfulness* crossed with *sexual function*, *sexual dysfunction*, *sexual difficulties*, and *sexual response*. We limited the studies on sensate focus to 1997 onward, because this topic has been previously reviewed.⁴ Results from the searches were compiled ($n = 255$) and duplicates were removed ($n = 62$), resulting in 193 articles. We also conducted a manual search based on reference lists and included 14 studies on this basis. Studies were eligible for inclusion if they were published in peer-reviewed journals, in English, included a female sample, presented original findings, had outcome variables focused on sexual response or sexual functioning, specifically mentioned manipulation of bodily or physical sensations or feelings (body awareness), and, in the case of sensate focus and mindfulness studies, used 1 of these techniques as a main active treatment component. We reviewed the titles and abstracts of the articles and removed articles that were not in English ($n = 3$), did not use female samples ($n = 16$) or did not separate women from men in analyses ($n = 1$), and did not have outcome variables focused on sexual functioning or sexual response ($n = 5$). We also excluded dissertation abstracts ($n = 12$), case studies ($n = 3$), book chapters, review articles, commentaries, opinion pieces, theoretical articles, and editorials ($n = 102$). The resulting articles ($n = 65$) were reviewed and evaluated by the 1st author based on research design and specific study methodology and were excluded if there was no explicit identification of manipulated body awareness, as previously defined ($n = 29$), and, in the case of studies on sensate focus and mindfulness specifically, if the study did not identify using at least 1 of these techniques as a main active treatment component ($n = 7$). In total, 29 studies remained and were included in this review (7 studies on sensate focus, 13 studies on mindfulness, and 9 laboratory manipulations of body awareness).

RESULTS

Sensate Focus

The notion that body awareness could affect women's sexual well-being was 1st introduced by Masters and Johnson⁷ in their book *Human Sexual Inadequacy* within the context of their then

newly prescribed treatment, sensate focus. Sensate focus is a behavioral technique in which couples learn to focus on the pleasurable sensations brought about by touching and to decrease attention to goal-directed sex (eg, orgasm). By focusing on the physical bodily sensations during sexual activity, instead of being preoccupied with sexual performance, couples can learn to be present and to better respond to their partner during the sexual situation. In the beginning stages of sensate focus, couples are encouraged to touch each other's bodies and assess for sexual sensations but refrain from touching breasts or genitals or engaging in intercourse. Over time, couples are encouraged to touch more and more increasingly erotic areas of the body to build organic desire in preparation for intercourse. When desire has been fully heightened, intercourse is reintroduced as part of the sexual repertoire.

Sensate focus is one of the most-studied forms of sex therapy and has been supported in a number of empirical studies. In early trials, success rates of 84% to 100% were reported,^{7,8} and a previous review described sensate focus as being well established for the treatment of primary anorgasmia, probably efficacious for the treatment of secondary anorgasmia, and effective for the treatment of vaginismus.⁴ Below, we review in more detail 7 studies that examined the impact of sensate focus on women's sexual function that have been published since the review by Heiman and Meston,⁴ including 3 trials in which participants were randomized to treatment or a waitlist control group^{9–11} and 4 effectiveness trials in which participants served as their own control^{12–15} (Table 1). These more recent studies showed success rates ranging from 34% to 74% in efficacy studies.^{9,11} Effectiveness trials of mixed sexual problems (eg, hypoactive desire, female sexual arousal disorder [FSAD], anorgasmia, painful intercourse, vaginismus) showed similar rates,^{12,13} and effectiveness studies on vaginismus showed success rates of up to 100% for treatment completers.^{14,15}

In 1 study, 74 women with hypoactive sexual desire and their partners were randomly assigned to a 12-session group treatment or a waitlist control.⁹ Treatment involved 9 therapeutic techniques, including sensate focus and related exercises (eg, intimacy exercises, communication skills training, emotional communication skills training, and mutual reinforcement training). Results showed that 74% of women at post-treatment and 64% at a 3-month and 1-year follow-up no longer met diagnostic criteria for hypoactive sexual desire. More recently, Jones and McCabe¹⁰ recruited women who experienced a mixture of sexual dysfunctions (hypoactive sexual desire disorder [HSDD], sexual arousal disorder, anorgasmia, or genital pain) to participate in an online treatment study. 39 women and their partners completed a study in which they were randomly assigned to a 10-week online treatment program ($n = 17$) or a waitlist control ($n = 22$). Women completed questionnaires at pretest, post-test, and 3-month follow-up. Treatment involved communication skills training, sensate focus exercises, and regular contact with a therapist. General body pleasuring and focusing on enjoyment of

Table 1. Summary of each sensate focus study

Study	Sample	N	Study design	Assessment	Main findings
Trudel et al, 2001 ⁹	HSDD	74	RCT, 12-session group tx vs w/l control	Semistructured interview, self-report questionnaires	Sig improvements in tx vs control; 74% of tx group after tx and 64% at 1-yr f-u no longer met HSDD criteria
Jones and McCabe, 2011 ¹⁰	HSDD, FSAD, anorgasmia, genital pain	39	RCT, 10-wk online tx vs w/l control	Self-report questionnaires	Sig improvements in FSFI desire, arousal, lubrication, orgasm, satisfaction, and pain score with tx vs control; tx group less likely to perceive sexual concerns to be a problem, greater improvement on several relationship factors
Zarski et al, 2017 ¹¹	Vaginismus	77	RCT, 10-session online tx vs delayed tx w/l control	Self-reported intercourse and non-intercourse penetration, self-report questionnaires	34% of tx group vs 21% of control group could achieve intercourse at post-tx or f-u; sig more improvements on non-intercourse penetration, fear of sexuality, and sexual satisfaction with tx vs control
Sarwer and Durlak, 1997 ¹²	HSDD, inhibited orgasm, vaginismus, dyspareunia	182	Within-subject (pre-post), 7-session tx program	Interviews	64% reported primary sexual problem abated after tx
McCabe, 2001 ¹³	Mixed sexual dysfunction (lack of desire, sexual arousal disorder, anorgasmia, painful intercourse, vaginismus)	54	Within-subject (pre-post), 10-session tx program	Self-report questionnaires	44.4% reported cessation of sexual problems, 14.7% reported problems <25% of the time after tx
Kabakçı and Batur, 2003 ¹⁴	Vaginismus	28	Within-subject (pre-post), average number of tx sessions = 11.5	Self-report questionnaires	tx completers reported satisfactory vaginal intercourse and sig increases on all sexual function measures, and fell into non-clinical range after tx
Jindal and Jindal, 2010 ¹⁵	Vaginismus and wanting to achieve pregnancy	63	Within-subject (pre-post), 6 weekly tx sessions	Resolution of vaginismus, allowing for genital examination, achievement of sexual intercourse with intravaginal deposition of semen, achieving pregnancy	tx completers experienced resolution of vaginismus, 33 women achieved pregnancy

FSAD = female sexual arousal disorder; FSFI = Female Sexual Function Index¹⁶; f-u = follow-up; HSDD = hypoactive sexual desire disorder; RCT = randomized controlled trial; sig = significant; tx = treatment; w/l = waitlist.

physical sensations were emphasized throughout treatment. Women assigned to the treatment vs control condition showed significant improvements in desire, arousal, lubrication, orgasm, satisfaction, and pain. Women in the treatment group also were less likely to perceive their sexual concerns to be problematic after treatment, and they reported greater improvement on several relationship factors.

In a more recent internet-based treatment study, Zarski et al¹¹ conducted a randomized control trial of 77 women with vaginismus who reported being unable to have intercourse. Participants were randomly assigned to a 10-session online treatment group or a delayed treatment waitlist control. Treatment lasted for 5 to 10 weeks total (1–2 sessions/week) and included 1 session of sensate focus training in addition to education, relaxation training, and gradual exposure. Assessments were conducted at baseline, post-treatment, and at 6-month follow-up. At post-treatment or follow-up, 34% of participants in the treatment group and 21% in the waitlist control group could achieve intercourse. Results also showed significant improvements for the treatment group compared with the control group for non-intercourse penetration ability (for self and partner insertion), fear of sexuality, and sexual satisfaction.

In addition to the randomized controlled trials, there are a number of effectiveness trials of sensate focus in the literature that are typically based on couples presenting at clinics for treatment of sexual problems. Sarwer and Durlak¹² investigated 365 married couples (N = 182 women) who presented to a sexual dysfunction clinic for help with a range of sexual difficulties, with *Diagnostic and Statistical Manual of Mental Disorders, 3rd Edition* diagnoses of hypoactive sexual desire (n = 124), inhibited orgasm (n = 34), or vaginismus or dyspareunia (n = 24). Treatment occurred over 7 weeks and included an average of 3 sensate focus exercises per week over a 5-week period (from week 3 onward), progressing from facial touching to intercourse. Across participants, there was a 64% treatment success rate conservatively defined as (i) primary sexual complaints had abated, (ii) no new problems had arisen, and (iii) the couple had engaged in intercourse in each of the last 3 weeks of treatment. The amount of sensate focus used was the strongest predictor of treatment success. McCabe¹³ used a 10-session cognitive-behavioral treatment program that included sensate focus for women who presented to a sexual behavior clinic for treatment of their sexual dysfunctions, including lack of sexual interest (n = 51), sexual arousal disorder (n = 21), anorgasmia (n = 42), painful intercourse (n = 18), and vaginismus (n = 3). Approximately 44% of women reported cessation of sexual problems after treatment and an additional 14.7% reported experiencing problems less than 25% of the time. Therapy was most likely to be effective for women with anorgasmia and sexual arousal disorder. Compared with pretreatment scores, participants also reported more positive attitudes toward sex, decreased feelings of being a sexual failure, perceiving sex as being more enjoyable, and experiencing less of an impact from sex on their relationship.

2 effectiveness studies focused exclusively on vaginismus. In the 1st study, couples were assessed at the initial intake, immediately after cognitive-behavioral treatment, and at a 4-week follow-up.¹⁴ The number of treatment sessions ranged from 7 to 23 (average = 11.5), and couples were treated until symptoms showed improvement. Treatment included cognitive restructuring, gradual desensitization, and sensate focus exercises to increase sensual awareness and partner communication. Of the 16 couples who completed treatment, all reported satisfactory vaginal intercourse at the end of treatment and improvements on all measures of sexual functioning, falling in the range of non-clinical levels. In the 2nd study, 60 women diagnosed with primary vaginismus completed treatment consisting of 6 weekly 15-minute sessions that addressed 4 components: (i) counseling and education about vaginismus; (ii) Kegel exercises, gradual desensitization, and pelvic muscle relaxation; (iii) counseling for the male partner about fears or performance anxiety or erectile dysfunction; and (iv) sensate focus exercises, introduced gradually and forming the basis for homework assignments.¹⁵ The investigators reported that sensate focus was highly effective for women, with all treatment completers experiencing resolution of vaginismus.

In reviewing studies on sensate focus, it is difficult to know the degree to which enhanced body awareness plays a role in facilitating sexual outcomes. Although focusing on bodily sensations is an integral component of sensate focus, other features of this treatment, such as decreasing anxiety and communication training, undoubtedly contribute to successful treatment outcomes. Moreover, as evidenced by the review, often treatments using sensate focus include additional elements such as education training, relaxation training, and communication skills training, which make it impossible to parse apart the effectiveness of body awareness alone. To our knowledge, there has been no dismantling study that have provided information on the individual active ingredients of sensate focus. In summary, however, recent studies reported that sensate focus appeared effective for treating women with different sexual concerns including problems with hypoactive sexual desire, impaired sexual arousal, vaginismus, dyspareunia, and anorgasmia. It is also noteworthy that additional gains in sexual satisfaction and different relationship factors were reported in most studies.

Mindfulness

Similar in many ways to sensate focus, mindfulness is a clinical technique that increases body awareness through the self-regulation of attention onto an immediate experience with “curiosity, openness, and acceptance” and away from goal-centered results.¹⁷ Participants are taught to experience potentially distracting thoughts (eg, a focus on performance or appearance) as “passing events of the mind”¹⁸ and to refrain from reacting to them. Within the context of sexuality, mindfulness involves the awareness and acceptance of sexual sensations and

feelings as they occur. Mindfulness has been linked to body awareness through neuroscientific data, survey data, and practitioner report.^{19–22}

Below we review the results from 13 studies (Table 2) using mindfulness to treat a range of female sexual difficulties, including sexual arousal and/or desire problems ($n = 7$),^{23–29} provoked vestibulodynia (PVD; $n = 1$),³⁰ and self-reported mixed sexual problems and/or sexual distress ($n = 5$).^{31–35} Of these studies, 5 used random assignment to condition^{24,28,32,34,35} and 1 used an active control group.³² The remaining studies used a within-subjects design, in which each participant served as her own control.^{23,25–27,29–31,33} All studies reviewed included a body awareness component (eg, tuning into bodily sensations with a body scan). Similar to results from recent trials of sensate focus, a range of success rates was reported across studies of mindfulness.

In 1 of the earlier studies of women with sexual arousal and/or desire problems, 26 women with sexual desire and/or arousal disorder took part in 3 90-minute group psychoeducation sessions and home practice.²³ According to the investigators, the psychoeducational sessions were originally created based on material adapted from different sources including (i) *Becoming Orgasmic* by Heiman and LoPiccolo,³⁹ an empirically supported behavioral treatment for women with lifelong anorgasmia, (ii) *The Seven Principles for Making Marriage Work* by Gottman and Silver,⁴⁰ (iii) *The Miracle of Mindfulness* by Hahn,⁴¹ and (iv) *Progressive Relaxation* by Jacobson.⁴² The sessions included educational information about sexual difficulties (eg, prevalence rates, etiologic factors), discussion of the role of thinking patterns (eg, biased thinking) and behaviors (eg, avoidance) in sexual difficulties, an introduction to mindfulness, and in-session skill practice (eg, examining the role of biased thinking in sexual difficulties, participating in a body scan). Participants were provided with handouts and homework assignments and were instructed to practice their skills between sessions. Results showed significantly increased sexual desire and interest and decreased sexual distress after treatment. There also were marginal increases in self-reported subjective sexual arousal and perceived physical sexual arousal in response to erotic films. Follow-up analyses showed that women with a history of childhood sexual abuse experienced the most improvement on several indices of arousal, overall sexual function, and sexual distress. In a similar study, Brotto and Basson²⁴ assigned 117 women with low sexual desire and/or arousal to treatment or a 3-month delayed waitlist control. The intervention consisted of 4 biweekly 90-minute mindfulness-based group psychoeducational sessions and home practice. Compared with waitlist, women in the intervention group experienced significant improvements in sexual desire, arousal, lubrication, satisfaction, and overall sexual functioning. Mental sexual arousal and feelings of genital tingling and pleasure also significantly increased compared with the waitlist control. Results were maintained at 6-month follow-up assessment. Sexual distress and orgasmic difficulties significantly decreased over time, regardless of condition. The

investigators attributed change in distress to careful assessment, validation of symptoms, and positive expectancies and improvements in orgasm to decreased distress and less distractibility from concerns about not receiving treatment. In a separate analysis of data from the same study, Brotto et al²⁵ found a significant increase in the physiologic (photoplethysmography) and subjective sexual arousal correlation from before to after intervention across all participants ($N = 79$). This finding suggests that after treatment women were attending more to their genital sensations during sexual arousal than they were before treatment. In a recent 8-session trial of mindfulness training, 26 women with *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition*⁴³ sexual interest/arousal disorder took part in weekly 2.25-hour group treatment sessions.²⁶ Treatment, which was adapted from mindfulness-based cognitive therapy for the treatment of sexual difficulties (eg, using a sex therapy technique of self-touch in a mindful way), included in-session and daily home mindfulness practice, each with standalone exercises (eg, focusing on breathing, using mindful self-touch, daily formal meditation) and mindfulness exercises integrated into typical activities (eg, focusing on body sensations while taking a shower). A substantial emphasis was placed on bodily sensations and exploration of the body and the genitals (eg, tuning into sexual sensations in the body while using a sexual aid to elicit arousal). Results showed a 60% increase in reported sexual desire, a 26% increase in overall sexual function, and a 20% decrease in sexual distress after treatment compared with baseline. However, most of these scores remained in the clinical range, with only 28% of participants in a non-clinical range for desire, 22% for overall sexual functioning, and 4% for sexual distress. The investigators noted that this treatment program could serve as a starting point for women with sexual dysfunction. Indeed, it has been previously stated that results from the practice of mindfulness are not necessarily immediate.¹⁸

We identified 3 studies of women with sexual arousal and/or desire problems related to medical illness. In the 1st study, 22 women with a history of gynecologic cancer and acquired FSAD after hysterectomy took part in 3 group sessions that included mindfulness training.²⁷ Results showed a significant decrease in sexual distress and significant increases in mental sexual excitement, genital throbbing and pulsing, and perceived genital arousal in response to erotica and in self-reported sexual desire, arousal, orgasm, and satisfaction. There also was a trend toward significance for increased self-reported pleasure from genital stimulation and marginal increases in physiologic sexual arousal (photoplethysmography), self-reported mental arousal, and perceived autonomic arousal in response to erotica. In the 2nd study, a controlled study by the same 1st author, 31 women who had been treated for gynecologic cancer and who reported sexual arousal and/or desire problems were randomly assigned to 3 90-minute sessions of mindfulness-based cognitive therapy or a 3-month delayed treatment waitlist.²⁸ Although the control group did not experience any change, the treatment group

Table 2. Summary of each mindfulness study

Study	N	Study design	Assessment	Main findings
Sexual arousal/desire difficulties				
Brotto et al, 2008 ²³	26	Within-subject (pre-post), 3 group sessions	SSA, PSA, self-report questionnaires	Sig increased FSFI and SIDI desire, DASA genital wetness, decreased FSDS distress after tx; marginally increased SSA (including perceptions of genital arousal) after tx
Brotto and Basson, 2014 ²⁴	117	RCT (randomization in ~50% of cases), between- (4 group sessions vs delayed tx control) and within-subject (pre-post)	Self-report questionnaires	Sig increased SIDI desire, FSFI arousal, lubrication, satisfaction, total, DASA mental excitement, genital tingling and pleasure for tx group vs control
Brotto et al, 2016 ²⁵	79	Within-subject (pre-post), 4 group sessions	SSA-PSA concordance	Sig increased SSA-PSA concordance after tx
Paterson et al, 2017 ²⁶	26	Within-subject (pre-post), 8 group sessions	Interview, self-report questionnaires	Sig increased SIDI desire, FSFI desire, satisfaction, arousal, lubrication, orgasm, total, decreased FSDS distress after tx
Brotto et al, 2008 ²⁷	22	Within-subject (pre-post), 3 group sessions	SSA, PSA, self-report questionnaires	Sig increased FSFI desire, arousal, orgasm, satisfaction, total, decreased FSDS distress, DASA mental excitement, genital tingling/throbbing after tx; trend toward sig increased PSA and SSA perceived genital arousal after tx
Brotto et al, 2012 ²⁸	31	RCT (partial random assignment), between- (3 group sessions vs delayed tx control) and within-subject (pre-post)	SSA, PSA, self-report questionnaires	No change for control group; sig increased FSFI desire, arousal, lubrication, orgasm, satisfaction, total, sig decreased FSDS distress for tx group; sig increased SSA perceived genital arousal
Hocaloski et al, 2016 ²⁹	7	Within-subject (pre-post), 5 sessions	Self-report questionnaires	Sig increased FSFI desire, arousal, total, DASA genital wetness; strong non-sig effects for decreased FSDS distress, increased FSFI orgasm, satisfaction, DASA genital tingling

(continued)

Table 2. Continued

Study	N	Study design	Assessment	Main findings
PVD				
Brotto et al, 2015 ³⁰	85	Within-subject (pre-post), includes immediate tx group (n = 62) and delayed tx w/l group (n = 23), no random assignment reported	Vulvovaginal physical examination, self-report questionnaires	sig improved pain on physical examination, pain self-efficacy, pain catastrophizing, pain hypervigilance after tx; sig decreased FSDS distress after tx; sig increased pain self-efficacy with w/l
Mixed sexual problems and/or sexual distress				
Bober et al, 2015 ³¹	37	Within-subject (pre-post) 1 group, 2 individual telephone counseling sessions	Self-report questionnaires	Sig increased FSFI desire, arousal, satisfaction, pain, total, improved sexual self-efficacy and sexual knowledge after tx
Brotto et al, 2012 ³²	20	RCT, between- (2 group session of mindfulness vs CBT) and within-subject (pre-post)	SSA, PSA, self-report questionnaires	Sig decreased FSDS distress for both groups; sig higher SSA in response to same level of PSA for mindfulness group only
Brotto et al, 2017 ³³	46	Within-subject (pre-post), 12-module online program	Self-report questionnaires	Sig increased FSFI desire, arousal, lubrication, orgasm, satisfaction, total, sig decreased FSDS distress after tx
Hucker and McCabe, 2015 ³⁵	57	RCT, between- (6 online tx modules vs w/l control) and within-subject (pre-post)	Self-report questionnaires	Sig increased FSFI desire, arousal, lubrication, orgasm, satisfaction, decreased FSDS-R distress, decreased reported frequency of sexual problems for tx vs control
Hucker and McCabe, 2014 ³⁴	57	RCT, between- (6 online tx modules vs w/l control) and within-subject (pre-post)	Self-report questionnaires	Sig improvements in sexual and emotional intimacy and communication for tx group vs control

CBT = cognitive-behavioral therapy; DASA = Detailed Assessment of Sexual Arousal (unpublished questionnaire); FSDS = Female Sexual Distress Scale³⁶; FSDS-R = Female Sexual Distress Scale-Revised³⁷; FSFI = Female Sexual Function Index¹⁶; PSA = physiologic sexual arousal; PVD = provoked vestibulodynia; RCT = randomized controlled trial; SIDI = Sexual Interest and Desire Inventory³⁸; sig = significant; SSA = subjective sexual arousal; tx = treatment; w/l = waitlist.

experienced increased self-reported sexual desire, arousal, lubrication, orgasm, satisfaction and overall sexual functioning. There also was a significant decrease in sexual distress with the intervention and increased perception of genital arousal in response to erotica. Most results were maintained at 6-month follow-up. In the 3rd study, a study on FSAD or hypoactive sexual desire in the context of multiple sclerosis or spinal cord injury, 7 women participated in 5 90-minute group sessions over 10 weeks.²⁹ The intervention was similar to previous studies in that it focused on education, cognitive-behavioral techniques, and mindfulness. Although the study used a small sample, effect sizes indicated substantial improvements in self-reported sexual arousal and desire, an increase in the Female Sexual Function Index (FSFI)¹⁶ overall sexual functioning score (with scores in the non-clinical range), and increased genital wetness. There also were strong, but non-significant, effects for sexual distress, self-reported orgasm, sexual satisfaction, and genital tingling.

In a study on PVD, 85 women took part in 4 sessions of group psychoeducation treatment ($n = 62$) or a waitlist control ($n = 23$).³⁰ Group sessions provided education about sexual health and PVD and taught participants cognitive-behavioral therapy and mindfulness skills. Assessments were conducted before and after intervention and at 6-month follow-up. After treatment, women reported decreased pain during a physician's examination, decreased sexual distress, and improvement on measures of pain catastrophizing and hypervigilance related to PVD. Self-efficacy also improved with treatment for women in the waitlist condition.

In addition to these studies that focused on specific sexual concerns (ie, sexual arousal and/or desire concerns, PVD), we found several studies that used mindfulness-based interventions for women with mixed sexual problems ($n = 5$). In 1 such study, 37 women who underwent risk-reducing salpingo-oophorectomy related to a high risk of ovarian cancer and who endorsed at least 1 distressing symptom of sexual dysfunction participated in a 3.5-hour seminar and 2 telephone counseling sessions.³¹ The seminar consisted of 3 modules, including 2 on body awareness and mindfulness. Take-home materials included a mindfulness-based body scan, with telephone counseling providing support. All women reported FSFI scores in the clinical range before intervention. Although scores remained in the clinical range after the intervention, there were significant improvements on FSFI scores of desire, arousal, satisfaction, pain, and overall sexual functioning and on scores of sexual self-efficacy and sexual knowledge.

Sexual distress associated with a history of childhood sexual abuse was the focus of a study by Brotto et al,³² in which 20 women were randomly assigned to 2 sessions (3 hours total) of cognitive-behavioral therapy or mindfulness (with a specific focus on body awareness). Pre- and postintervention assessments of sexual arousal in response to erotica were conducted. Although

women in the 2 groups had decreased scores on the Female Sexual Distress Scale (FSDS),³⁶ women in the mindfulness group experienced significantly higher subjective sexual arousal in response to the same level of genital arousal (photo-plethysmography) after treatment compared the cognitive-behavioral therapy group.

3 online studies looked at women with mixed sexual problems. Most recently, 46 survivors of colorectal or gynecologic cancer who experienced distressing sexual difficulties completed a 12-module psychoeducational program over an average of approximately 30 weeks.³³ Upon entering the study, participants reported distressing difficulties with sexual desire, arousal, lubrication, and satisfaction and total scores on the FSFI were within the clinical range. The 60-minute online modules encouraged mindfulness training throughout participation, with 1 focusing specifically on awareness of body sensations. Post-intervention data showed significant improvements on all subscales of the FSFI, significantly decreased sex-related distress, and significant improvements in mood. The 6-month follow-up data on sexual distress showed that improvement was maintained. In an online study of women with sexual difficulties and their partners, Hucker and McCabe³⁴ examined the efficacy of a 6-module online program ($n = 26$) compared with a waitlist control ($n = 31$). Specific pretreatment concerns were similar for the treatment and control groups and included low sexual desire (96% and 97%, respectively), failure to become aroused (81% and 58%), decreased sexual satisfaction (58% and 52%), painful intercourse (58% and 42%), inability to achieve orgasm (39% and 42%), and delayed orgasm (23% and 32%). Women in the 2 groups had pretreatment clinical levels of distress on the FSDS, and 78% of women in the treatment condition and 84% of women in the control condition had pretreatment scores on the FSFI below the clinical cutoff for sexual function. Treatment incorporated mindfulness with sensate focus and was based on an adaptation of the protocol used previously.²³ Results showed that, with the exception of sexual pain, women in the online treatment group experienced less distress and significant increases in all aspects of sexual functioning compared with the control group. At post-treatment and 3-month follow-up, respectively, 64% and 42% of women who received treatment no longer had scores below the clinical cutoff for sexual dysfunction on the FSFI. By contrast, at the end of treatment, only 18% of women in the control group no longer had scores below the clinical cutoff for sexual dysfunction on the FSFI. In a separate analysis of data based on the same online study, Hucker and McCabe³⁵ found improvements on measures of sexual and emotional intimacy and communication for the treatment group compared with the control groups. With the exception of sexual intimacy, improvements in relationship functioning were maintained at 3-month follow-up. As they noted, results from these online studies can have limited generalizability because participants with substantial mental health and/or relationship issues were

excluded from the study, and substantial dropout rates were noted. Online interventions such as these might be most appropriate for people who are geographically or financially unable to receive face-to-face treatment.

Findings from the studies reviewed showed benefits from mindfulness-based interventions for women with sexual desire and/or arousal problems,^{23–29} PVD,³⁰ mixed self-reported sexual problems and distress,^{31,33–35} sexual distress related to a history of childhood sexual abuse,³² distressing sexual difficulties after cancer treatment,^{28,33} and sexual difficulties linked to multiple sclerosis or spinal cord injury.²⁹ Mindfulness trials consisting of group therapy for women with sexual problems typically involved 3 to 4 sessions, although the number of sessions in the studies reviewed ranged from 2³² to 8.²⁶ Online trials were more flexible in their timing. As described with studies on sensate focus, it is difficult to know the extent to which the changes with mindfulness studies are due to a specific focus on body awareness. A recent review on the potential mechanisms of change with mindfulness listed several theoretical factors that could account for change, including shifting the locus and/or quality of attention, decreased negative schemas, altered negative expectancies or goals for sex, less avoidance, lessened engagement with negative cognitions, and improved relational context.⁴⁴ However, based on the studies included in the present review, 1 commonality is a consistent focus on body awareness. In 10 of the studies reviewed, body awareness was a major treatment component, including during the live intervention sessions and during home practice. For example, most studies included an in-session “mindful body scan” consisting of being in the moment focused specifically on bodily sensations. Of the remaining 3 studies, Bober et al³¹ described that 1 of 3 modules focused specifically on body awareness, and Hucker and McCabe^{34,35} adapted their mindfulness exercises from the previous research on the topic,²³ suggesting that the specific use of body awareness was a major treatment component. This, in addition to neuroscientific data, survey data, and practitioner report directly linking mindfulness to body awareness,^{19–22} supports body awareness as a potential major mechanism of change.

Laboratory Manipulations of Body Awareness

We found 9 studies examining the impact of laboratory manipulations of body awareness on female sexual response that met our search criteria, including 6 that used a no-body awareness control and 3 that incorporated varied instructions of body awareness (Table 3). Of these, 1 used implicit instructions in the manipulation, with body awareness being induced without specific instructions to focus on the body.⁴⁵ The other studies used explicit instructions of body awareness, with participants being specifically instructed to focus on their bodily or physical sensations.^{46–53} Below we provide details on these studies.

The implicit study examined the effect of body awareness on subjective and physiologic (photoplethysmography) sexual

arousal to erotic films in 21 women who met *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition* criteria for sexual dysfunction (FSAD, HSDD and/or female orgasmic disorder).⁴⁵ The study involved 2 counterbalanced sessions of body awareness and no body awareness. In the body awareness condition, a full-length mirror was placed in front of each participant, reflecting her face and body. As part of the instructional set intended to increase body awareness, participants were told that, in addition to measuring genital arousal using vaginal photoplethysmography, heart rate would be measured throughout the session. Participants were asked to use the mirror to place 10 electrodes in specific locations on their bodies in preparation for an electrocardiographic test that might be conducted at the end of the session and used as a validity check on their heart rate. In actuality, no electrocardiograms were recorded; this instruction was solely for the purpose of directing their attention to specific body regions. In the no-body awareness control condition, the mirror was turned around, facing backward, and there was no mention of heart rate monitoring. Results showed significant increases in subjective sexual arousal (ie, feeling “turned on”) to the erotic films and significant increases in self-reported perceptions of genital arousal to the erotic films in the body awareness condition compared with the no-body awareness control condition. There were no changes in vaginal photoplethysmographic measures of genital arousal. A manipulation check ensured that participants were, indeed, focused on their bodies in the body awareness condition, although this manipulation check did not inquire specifically about bodily sensations. A test of cognitive distraction showed no differences across the 2 conditions, suggesting that the body awareness manipulation was not experienced as a distraction.

Similar findings of increased subjective arousal (ie, feeling “turned on”) and perceived genital arousal were found in studies that incorporated explicit body awareness. One of the earliest of these studies investigated the impact of attending to physical and sexual feelings on subjective sexual arousal in 24 female undergraduate students.⁴⁶ Each participant completed 1 laboratory session during which they were exposed to an audiotaped erotic story twice. Before each telling of the story, they received different instructions, presented in counterbalanced order. In 1 condition, they were instructed to pay attention to the description of events and situations in the story (S); in the other condition, they were instructed to pay attention to their own physical and sexual feelings by identifying with the woman in the story (SR). After each story, participants were asked to rate on a Likert scale their experiences during the story of subjective sexual arousal, perceived genital sensations, and perceived non-genital physical sensations. Results showed that genital and non-genital physical sensations were significantly higher in the SR group compared with the S group, as were reports of strength and frequency of sexual arousal in response to the story. These findings support the notion that voluntary control of attention can facilitate sexual response.⁴⁶

Table 3. Summary of each laboratory manipulation study

Study	Sample	N	Study design	Assessment	Main findings
Seal and Meston, 2007 ⁴⁵	FSAD, HSDD, FOD	21	2 sessions, within-subject (implicit BA vs no BA control)	SSA and PSA	Sig increased SSA in BA condition vs control; no change in PSA
Dekker et al, 1985 ⁴⁶	Non-clinical, undergraduate students	24	1 session, within-subject (attention to physical and sexual feelings sensations vs attention to events and situations control)	SSA	Sig increased SSA, perception of genital sensations and non-genital physical sensations in BA condition vs control
Korff and Geer, 1983 ⁴⁷	Non-clinical, undergraduate students	36	1 session, between-subjects ([i] attend to genital body cues, [ii] non-genital body cues, or [iii] no instruction control)	SSA-PSA concordance	Sig increased SSA-PSA concordance for 2 body attention groups vs control
Stanton and Meston, 2016 ⁴⁸	Non-clinical, undergraduate students	33	1 session, within-subject controlled (no instruction control followed by autogenic training instruction)	SSA, PSA	sig increased SSA and PSA with autogenic training vs control
Stanton et al, 2018 ⁴⁹	Community with low or absent sexual arousal	25	1 session, within-subject controlled (no instruction control followed by autogenic training instruction)	SSA, PSA	Sig increased SSA and perceived genital arousal with autogenic training vs control; no change in PSA with autogenic training
Velten et al, 2017 ⁵⁰	Community with sexual distress (n = 18) and no sexual distress (n = 23)	41	2 sessions, within-subject controlled (BA vs visualization task control)	SSA, PSA, SSA-PSA concordance	Sig increased SSA and SSA-PSA concordance; lower PSA in BA condition vs control
Kuffel and Heiman, 2006 ⁵¹	Community, no sexual dysfunction	56	1 session, within-subject (positive vs negative body schema)	SSA, PSA	Sig higher SSA and PSA in positive vs negative body schema condition
Middleton et al, 2008 ⁵²	Community with FSAD (n = 17) and no sexual dysfunction (n = 17)	34	1 session, between- (FSAD vs control) and within-subjects (positive vs negative body schema)	SSA, PSA	FSAD = controls, both with higher SSA and PSA in positive vs negative body schema condition
Prause et al, 2013 ⁵³	Non-clinical community	32	1 session, within-subject ([i] rate overall sex arousal, [ii] rate physical sensations, [iii] rate genital sensations and blood flow)	SSA, PSA	Sig higher SSA in group 3 vs 1, sig higher PSA in group 3 vs 1 or 2

BA = body awareness; FOD = female orgasmic disorder; FSAD = female sexual arousal disorder; HSDD = hypoactive sexual desire disorder; PSA = physiologic sexual arousal; sig = significant; SSA = subjective sexual arousal.

In an earlier investigation of explicit body awareness, 36 undergraduate students were randomly assigned to 1 of 3 conditions in which they were instructed to (i) attend to genital bodily cues (eg, pelvic warmth, vaginal lubrication), (ii) attend to non-genital bodily cues (nipple erection, heart rate increase), or (iii) no attentional instruction control.⁴⁷ Physiologic (photoplethysmography) and subjective sexual arousal were measured in response to 10 erotic photographs. Women in the 2 body attention groups showed a closer relation between genital and subjective arousal compared with women in the no-instruction control.

3 recent studies examined the effects of audiotaped body awareness instructions on physiologic (photoplethysmography) and subjective sexual arousal to erotic films. Stanton and Meston⁴⁸ had sexually functional women (N = 33) listen to a 14-minute relaxation and autogenic training recording consisting of instructions to repeatedly focus on sensations of heaviness and heat in the arms and legs during the 2nd of 2 laboratory sessions. Physiologic and subjective sexual arousal levels were significantly increased after the autogenic training session compared with the no-training control. A follow-up study was conducted on 25 women with diminished or absent sexual arousal.⁴⁹ In this study, participants took part in 1 laboratory session during which their physiologic (photoplethysmography) and subjective sexual arousal were measured before and after they listened to a 22-minute autogenic training recording that was similar in content to that previously used.⁴⁸ Findings showed significant increases in subjective sexual arousal and perceptions of physical arousal (eg, warmth, fullness, and pressure) after autogenic training compared with the no-training control period. Physiologic arousal (photoplethysmography) was not significantly increased with autogenic training compared with the control. The investigators suggested that longer sessions or multiple sessions might be needed to alter the physiologic arousal of women with arousal difficulties.⁴⁹ Veltan et al⁵⁰ conducted a similar study in women with (n = 23) and without (n = 18) clinical levels of sexual distress. Before viewing the erotic films, women listened to a 6-minute audiotaped body scan that guided them to focus on their bodily sensations with particular attention to genital sensations or they listened to a control recording (visualizing themselves walking through a lush forest), in counterbalanced order. The body scan recording resulted in higher levels of subjective sexual arousal and higher subjective-physiologic concordance compared with the control. Unexpectedly, lower physiologic sexual arousal was found in the body scan condition compared with the control. Although not assessed, the investigators suggested that this finding might be due to increased genital response with the visualization task owing to increased relaxation, which has been previously found to increase genital response.⁴⁸

Kuffel and Heiman⁵¹ investigated 56 sexually functional women who experienced depressive or normal mood. Participants were given positive (eg, “You like how your body feels when you are aroused and you look forward to how your body will respond physically”) and negative (eg, “Your body takes a

long time [to become aroused], and you don’t like how it feels when you actually do get aroused”) body-focused schema scripts in counterbalanced order, with instructions to imagine that the script described them. After presentation of each script, participants viewed a 5-minute erotic video during which their physiologic (photoplethysmography) and self-reported subjective (ie, feelings of being “turned on”) sexual arousal were measured. Although not the main focus of the study, examination of the raw data provided in the article showed that the positive and negative schema scripts were followed by increased physiologic and subjective sexual arousal to the erotic films. Similar findings of increased subjective and genital arousal after positive and negative schema inductions were noted in a follow-up study of 17 women with FSAD and 17 sexually functional controls.⁵² Although the focus of these studies was not specifically on body awareness, the findings suggest that subjective and physiologic sexual arousal can be enhanced for women with and without sexual dysfunction when women are given a cognitive instruction set that includes a body focus.

1 study involved a single-session investigation of body focus instructions on physiologic (photoplethysmography) and subjective (measured continuously) sexual arousal to participant-induced fantasy.⁵³ 32 women engaged in 3 fantasies, each separated by neutral video clips. Before each fantasy, in counterbalanced order, they were given 1 of 3 instructional sets to focus on and rate during the fantasy: (i) their overall sexual arousal, (ii) their physical sensations, and (iii) their genital sensations and vaginal blood flow. Instruction to focus on and rate their genital sensations led to significantly higher physiologic sexual arousal compared with the other focus conditions and to significantly higher subjective sexual arousal compared with the overall sexual arousal focus condition.

In summary, based on our review of laboratory manipulations of body awareness, it appears that body awareness can directly influence sexual response to erotic films in a laboratory setting. Most studies reviewed used explicit instructions of body awareness, with women specifically told to attend to their bodily sensations.^{46–53} Results from all 9 studies reviewed showed increases in subjective sexual arousal (including self-reported feelings of being “turned on” and perceptions of genital arousal) with body awareness, including for women with FSAD,^{45,52} diminished or absent arousal,⁴⁹ HSDD,⁴⁵ female orgasmic disorder,⁴⁵ women reporting clinical levels of sexual distress,⁵⁰ and for non-clinical community^{50–53} and university undergraduate samples.^{46–48} Results for physiologic sexual arousal, measured by photoplethysmography, are less clear. Of the 7 studies reporting separate results for physiologic sexual arousal in response to body awareness manipulations, 4 found increases,^{48,51–53} 2 found no change,^{45,49} and 1 found lower arousal in the body awareness condition compared with no-body awareness control.⁵⁰ In this latter study, the investigators speculated that lower levels of arousal might have been found in the body awareness condition compared with the no-body awareness control because of an increase in physiologic

arousal in the control condition, which was believed to have induced relaxation. 2 studies reported significant increases in the subjective-physiologic arousal relation in the body awareness condition compared with a no-body awareness control.^{47,50}

CONCLUSION

This review aimed at summarizing and understanding the literature connecting body awareness and female sexual well-being. Although, in the case of intervention studies, particularly sensate focus studies, it was impossible to tease apart the contribution of treatment factors other than increased body awareness, in all studies reviewed there was a noted gain in at least some aspect of sexual well-being. Notably, no study reported decrements in sexual well-being after sensate focus or mindfulness training. These positive outcomes held true for studies conducted among women with different sexual concerns including low sexual desire and/or arousal, orgasm difficulties, sexual pain, low sexual satisfaction, and clinical levels of sexual distress. The effects of body awareness on sexual well-being are more clearly understood from laboratory manipulation studies that implicitly or explicitly induced body awareness by directing women to attend to bodily sensations. All the studies reviewed showed increased self-reported subjective sexual arousal and most studies showed increased physiologic sexual arousal to erotic films after the body awareness manipulation. The positive gains reported in laboratory studies of induced body awareness held true for sexually functional women and for women with sexual desire, arousal, or orgasm concerns. This suggests that, in addition to improved sexual function for women with sexual concerns, sexual enhancement can be possible for women with no sexual problems.

Although this review showed success rates of up to 100% for treatment completers undergoing an intervention that included a body awareness component, it should be noted that there was a portion of women for whom the techniques did not result in improvement in sexual functioning. It would be helpful to understand for whom and under what specific conditions increased body awareness enhances sexual well-being. Future research could include measurement of additional factors likely related to body awareness and sexual response, such as specific focus of attention (eg, on genital sensations vs non-genital bodily sensations), the woman's understanding of and ability and willingness to follow body awareness instructions, her level of comfort with increased body awareness, and her level of body esteem. Research also could be expanded to a greater variety of samples, including people who might be undergoing experiences that could affect their body awareness and sexual functioning (eg, eating disorders, pregnancy or postpartum periods, pain conditions, history of sexual abuse).

It has been previously noted that a common problem with treatment studies is difficulty separating the effects of various treatment components and knowing what, precisely, leads to improvement, and for whom. Having a better understanding of which components lead to change for which specific groups would help with the provision of efficient and effective clinical

services. This review highlights increased body awareness as a potentially important underlying factor in interventions for sexual problems. Future research should aim to investigate body awareness as a potential specific mechanism of change in these interventions. Dismantling studies specifically focused on the impact of body awareness for the treatment of sexual problems might be reasonable and also might lead to increased treatment efficiency. More randomized controlled trials also are needed. Although 1 intervention study used an active treatment control,³² most studies used waitlist controls (with and without complete random assignment) or no control group. Difficulties with random assignment for clinical samples must be considered, including requirements to provide treatment in a timely manner.²⁴ However, randomized controlled trials would provide the field with much-needed information about treatment efficacy and specificity.⁵⁴

LIMITATIONS

There are several limitations to this review that need to be considered. (i) Our inclusion criteria limited results to research on manipulated body awareness, and other types of research (eg, case studies, surveys, review articles) were excluded. (ii) We limited our definition of body awareness to a focus on bodily sensations, although, as Mehling et al⁵ pointed out, body awareness is a complex construct and could involve additional components. (iii) Although we made an effort to ensure that awareness of bodily sensations was a focus in each study that we reviewed, the degree to which study participants were truly focused on bodily sensations was not always obvious. It would be helpful if future investigations included assessment of where one's thoughts are focused during sexual activity or during laboratory manipulations. (iv) Common to treatment studies, the sensate focus and mindfulness studies used different therapeutic techniques in their methods, making it difficult to know the extent to which change resulted specifically from body awareness. Despite these limitations, it appears that providing women with instructions to focus on their bodily sensations could be beneficial for their sexual health.

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