



History of Sexual Assault as a Predictor of Response to a Self-Guided Online Program for Sexual Desire and Arousal Difficulties in Women

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Abstract

Sexual Interest/Arousal Disorder (distressing, long-lasting impairments in sexual desire and/or arousal) is common in women, but few have access to efficacious psychotherapies, including cognitive-behavioral therapy (CBT) and mindfulness-based therapy (MBT). eSense, an online program meant to maximize treatment access, has been shown to be a feasible, satisfactory, and potentially efficacious intervention. However, subpopulations such as sexual assault survivors may find the program less usable or efficacious. The current study compared women with and without a history of sexual assault (SA) regarding their ability to use and benefit from eSense. Forty-four women (22 with a history of SA; M age = 34.20 years) used eSense (CBT or MBT) and completed validated self-report scales of sexual function, sexual distress, treatment satisfaction, and homework compliance. A history of SA did not predict differences in attrition or changes in clinical outcomes. Exploratory analyses suggested that women with a history of SA reported slightly higher difficulty completing homework assignments, but also slightly higher treatment satisfaction. These preliminary results suggest that eSense may be usable and helpful for women with a history of SA. We discuss ways to maximize the acceptability and efficacy of online programs for women with a history of SA.

Keywords Sexual assault · Cognitive-behavioral therapy · Mindfulness · Sexual desire · Sexual Interest/Arousal Disorder · DSM-5

Introduction

Impaired female sexual desire and arousal are very common, with prevalence estimates ranging from approximately 21–67% (Hayes et al., 2006; Mitchell et al., 2013). When impairment is long-lasting, significantly personally distressing, and not fully explained by causes such as physical illness or relational conflict, these difficulties can constitute a diagnosable sexual dysfunction such as Sexual Interest/Arousal Disorder (SIAD; APA, 2013). In addition to subjective distress, women with sexual dysfunction also report higher rates of a broad range of negative conditions, including depression,

anxiety, and low satisfaction with life (e.g., Dursun et al., 2020; Stephenson & Meston, 2015a).

Multiple psychosocial treatments have been developed to treat sexual dysfunction, including cognitive-behavioral (McCabe, 2001) and mindfulness-based (Brotto et al., 2016; Stephenson & Kerth, 2017) therapies. Cognitive behavioral therapy (CBT) for sexual dysfunction typically includes psychoeducation, cognitive restructuring of unhelpful and/or inaccurate beliefs about sex, and behavioral modification such as directed masturbation exercises and sensate focus (ter Kuile et al., 2010). CBT has been shown to increase sexual function, as well as positive attitudes toward sexual experiences and relationships in multiple studies (e.g., Günzler & Berner, 2012; McCabe, 2001). Mindfulness-based therapy (MBT) for sexual dysfunction typically includes regular daily practice of mindfulness exercises that encompass non-judgmental observation of bodily sensations, mindfulness practice focused on sexual and non-sexual activities, as well as psychoeducation (Brotto et al., 2016; Stephenson, 2017). MBT has been found to improve sexual desire, arousal, and distress in multiple studies (Brotto & Basson, 2014; Brotto et al., 2021).

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Although CBT and MBT differ from one another in multiple ways (e.g., CBT interventions challenge maladaptive thoughts whereas mindfulness-based interventions focus on nonjudgmental acceptance of thoughts; Brotto et al., 2012, 2016), the interventions also share some similarities, including the use of non-goal-oriented focus on physical sensations during sex and encouragement of self-compassion (Brotto et al., 2016; Hucker & McCabe, 2015). In the broader psychological literature, results have suggested similar outcomes and mechanisms of action (e.g., Arch & Craske, 2008; Arch et al., 2013) and in a small number of direct comparisons when treating sexual dysfunction, both have been found to be similarly effective at reducing symptoms (Brotto et al., 2012, 2019, 2020). In sum, while sexual dysfunction is common and distressing, multiple efficacious treatment options are available and these treatments are likely more similar than different.

Despite the existence of these effective treatments, a majority of women with sexual concerns do not receive help (Maserejian et al., 2010; Moreira et al., 2005). Many barriers can prevent access to treatment, including stigma, misinformation (or lack of information) about sexual dysfunction, shame, and geographical distance from providers (Anto-Ocrah et al., 2020; Schaller et al., 2020). To address these issues, there have been multiple attempts to translate interventions to an online format including online CBT (Jones & McCabe, 2011; Stephenson et al., 2021), online MBT (Brotto et al., 2022), and hybrid treatments with both CBT and MBT components (Hucker & McCabe, 2014, 2015). Initial evidence suggests that programs like these may be efficacious in improving sexual function (Jones & McCabe, 2011), and relationships (Hucker & McCabe, 2014). Although available studies tend to be limited by methodological issues such as small sample sizes, lack of control groups, etc., effect sizes for the pre/post-treatment changes associated with use of online programs are generally in the moderate-to-large range, with gains typically maintained at follow-ups (Mahar et al., 2022).

One of the most recently developed of these online programs is called eSense. eSense was developed by psychotherapy experts and patients, in conjunction with professional graphic designers and web developers to treat distressing difficulties in sexual desire and arousal. The program has two distinct arms, one CBT and one MBT, each including eight modules. Both arms consist of images, audio, video, and text. Both also include educational content related to sexual difficulties, detailed instructions for therapeutic activities (including fictional case examples), and suggested between-module homework exercises. Initial usability testing for the eSense platform provided promising results (Zippan et al., 2020) and two small feasibility trials of self-guided versions of the program (Brotto et al., 2022; Stephenson et al., 2021) have suggested that both arms are usable, satisfying to

participants, and associated with significant improvements in sexual function and sexual distress. However, while interventions like eSense have many upsides in terms of cost and scalability (e.g., Batterham et al., 2022; Dear et al., 2020), it is important to identify populations for which such an approach may be less effective, or even contraindicated (e.g., Marks & Cavanagh, 2009; Rozental et al., 2015, 2017). One important factor that could reduce the usability or effectiveness of eSense is a history of sexual assault (unwanted or non-consensual sexual contact).

A large portion of women with sexual dysfunction report a history of sexual assault (Berthelot et al., 2014; Sarwer & Durlak, 1996) and there are multiple reasons why these women may benefit less (or could even experience an exacerbation in symptoms) while using a self-guided intervention for sexual dysfunction. First, a significant percentage of women with a history of sexual assault also experience symptoms of Posttraumatic Stress Disorder (PTSD; APA, 2013). Indeed, sexual assault may be the type of trauma associated with the most severe PTSD symptoms (e.g., Guina et al., 2018). PTSD is associated with physiological reactivity to reminders of the trauma and related avoidance of such triggers (APA, 2013; Ehlers & Clark, 2000). It is thus unsurprising that women with a history of sexual assault can often struggle with avoidance of sexual activities (Bird et al., 2021; Rosenthal et al., 2005) and intrusive sexual thoughts/memories (Ching et al., 2020; Kelley et al., 2019). Many of the therapeutic activities included in eSense (e.g., challenging anxiety-producing sexual thoughts, bringing mindful awareness to sensations of sexual arousal, etc.) may serve as reminders of sexual trauma and trigger an aversive sympathetic nervous system response. It would thus be understandable for these women to avoid such activities, especially in the absence of an established therapeutic relationship.

Indeed, gold-standard treatment methods for survivors of sexual assault such as Cognitive Processing Therapy (CPT; Resick et al., 2017) and Prolonged Exposure (PE; Foa et al., 2007), tend to be delivered within the context of an ongoing therapeutic relationship and the relationship is typically seen as important in ensuring the efficacy of the therapy (McLaughlin et al., 2014; Sijercic et al., 2021). However, multiple studies have found that self-guided interventions for PTSD (which include no relationship with a provider) can be efficacious (Olthuis et al., 2016), and that the presence or absence of individualized guidance may not impact degree of symptom improvement (Stefanopoulou et al., 2020). Some researchers have argued that online interventions may even be preferable for survivors of trauma in that they may help reduce barriers that can prevent engagement with face-to-face care (Azarang et al., 2019).

It is, unfortunately, difficult to determine whether such findings are applicable to the treatment of sexual difficulties in particular because so few studies on trauma-related

treatments explicitly focus on sexual experiences. However, the limited research specifically focused on sex therapy similarly suggests that formation of a close therapeutic alliance may be of particular importance when treating individuals with sexual dysfunction and a history of interpersonal trauma (Lafrenaye-Dugas et al., 2018, 2023). A small number of studies have also suggested that factors related to SA (e.g., childhood maltreatment) may predict reduced improvement in response to psychotherapeutic treatments for sexual difficulties (e.g., Charbonneau-Lefebvre et al., 2022). However, there is also evidence that women with a history of sexual assault may respond well to in-person group interventions (Brotto & Basson, 2014) and unguided writing interventions (e.g., Meston et al., 2013) which include little-to-no therapeutic alliance.

More generally, it is unclear whether a history of trauma reduces response to treatment of comorbid conditions. In some cases, researchers have found that a history of trauma may predict poorer response to treatment for disorders such as nicotine abuse or depression (Lewis et al., 2010; Sbrilli et al., 2020; Zvolensky et al., 2008). However, other studies have found no difference in response between participants with or without trauma histories when treating comorbid anxiety disorders or depression (Bomyea et al., 2013; Trautmann et al., 2019; Waldron et al., 2019).

Similarly, while multiple researchers and clinicians suggest that unique approaches to therapy may be necessary to effectively treat survivors of sexual assault (e.g., MacIntosh, 2019) and there are indications that interventions created specifically for this population can be efficacious (e.g., Herbert & Bergeron, 2007), there is little empirical evidence as to whether women with a history of sexual assault benefit less from gold-standard sex therapies. Indeed, there is some evidence that women with a history of childhood sexual abuse might benefit *more* from some treatments (Brotto et al., 2008). In sum, there is circumstantial evidence suggesting that self-guided interventions like eSense (that do not include a therapeutic alliance) may be significantly less usable or beneficial for women with a history of sexual assault, however, other evidence suggesting these women may experience equivalent (or even greater) improvement.

There are multiple specific outcomes that could differ for women with and without a history of sexual assault. First, given higher rates of avoidance of sexual stimuli (e.g., Rosenthal et al., 2005), treatment engagement among survivors could be reduced, as indicated by higher attrition and/or fewer attempts to engage in recommended treatment activities. Second, given the likely higher rates of negative emotions and lower rates of positive emotions surrounding sex (e.g., Meston et al., 2006), survivors could have a less positive experience engaging with the intervention, resulting in lower treatment satisfaction. Third, given possible decreased engagement and/or higher rates of dissociation during

therapeutic sexual activities (e.g., Hansen et al., 2012), the degree of improvement in clinical outcomes of interest (e.g., sexual desire, sexual satisfaction) could be reduced.

Finally, the association between changes in different clinical outcomes could differ. Previous research has suggested that women with a history of sexual assault may exhibit a weaker association between sexual function (e.g., levels of physiological or subjective sexual arousal) and sexual distress (e.g., feelings of frustration, sadness, or shame surrounding sex; Stephenson et al., 2014), with high levels of distress more likely even in cases of “high” levels of function. This pattern may be related to the negative sexual schemas of many sexual assault survivors that give rise to feelings of shame, disgust, or guilt regarding their own sexual response (e.g., Kilimnik et al., 2018; Schloretd & Heiman, 2003). In other words, sexual assault survivors might experience a “double bind” wherein they experience distress in cases of “impaired” sexual function (due to decreased physical pleasure, negative partner responses, etc.; Stephenson & Meston, 2015b) and in cases of “non-impaired” function (due to feelings of guilt and shame regarding their sexual response; Beitchman et al., 1992; Stephenson & Meston, 2012). Given these effects, it is possible that women with a history of sexual assault may experience similar increases in sexual function in response to sex therapy, but that these functional increases would be less likely to translate into improvements in measures of sexual distress.

Any of the above findings would provide important information regarding the usefulness of interventions like eSense for sexual assault survivors. For example, interventions may need to include more specific information regarding sexual assault and potential trauma responses and/or be paired with individualized support to be acceptable and efficacious for these women. Alternatively, if sexual assault survivors experience significant benefit using unguided programs like eSense, it would be much easier to increase access to helpful treatments for this population.

To begin addressing these questions, the current analyses used data from the two recent feasibility trials of eSense (Brotto et al., 2022; Stephenson et al., 2021). Both trials included validated self-report measures of treatment satisfaction, homework engagement, as well as changes in sexual function and distress. Our goal was to compare women with and without a history of unwanted or non-consensual sexual contact in terms of retention, treatment satisfaction, engagement with homework, changes in sexual function and distress, as well as the association between changes in sexual function and distress.

To reach this goal, we engaged in secondary data analysis of a combined dataset from the two published studies (Brotto et al., 2022; Stephenson et al., 2021). As mentioned above, although there are potentially important differences between CBT and MBT interventions, these differences tend

to be subtle, with evidence of similar outcomes and shared mechanisms being the norm (e.g., Goldin et al., 2016). Given this similarity and the small number of participants available, collapsing across samples was necessary and justifiable. Similarly, while there are likely important differences between different types of sexual assault experiences (e.g., childhood sexual abuse vs. adult sexual assault), these differences tend to be complex and difficult to study given high levels of revictimization (e.g., Briere et al., 2020; Littleton et al., 2014). This complexity, along with the small sample size available, made it impossible to meaningfully compare women who experienced sexual assault at different ages.

Due to these unavoidable limitations, our hypotheses were tentative and the analyses were generally considered exploratory. However, given the limited research and theory in this area, we believe presentation of hypothesis-generating results is a necessary first step toward firm and actionable conclusions. We tentatively predicted that, when attempting to complete eSense, women with a history of sexual assault may: Exhibit higher rates of attrition, report lower satisfaction with the intervention, report less engagement with homework assignments, experience less improvement in sexual function and distress, and exhibit a weaker association between increases in sexual function and improvements in sexual distress.

Method

Participants

Across both (non-concurrent) studies, participants were recruited in one of three ways: (1) by consenting to be contacted for future studies, after having participated in previous research conducted by the last authors; (2) via a list of recruiting studies on the same author's lab website (www.brottolab.com); and (3) through social media advertisements on the same lab's social media account (@UBCshr) (see Stephenson et al., 2021; Zippan et al., 2020). Potential participants had to email a study coordinator to express interest in either study. Inclusion criteria for both studies were: being a cis or trans woman between the ages of 19–65, having low or absent sexual desire with distress, being fluent in English, and having reliable access to the internet. Participants also had to be in a stable, committed romantic relationship of at least six months. Exclusion criteria were that sexual difficulties could not be exclusively attributable to another mental disorder or general medical condition (self-determined), the use of prescription medication or recreational substances, or significant relationship conflict. Potential participants whose low sexual desire/interest could be mainly accounted for by genital pain (e.g., having a history of provoked vestibulodynia or vulvodynia)

were also not eligible. Additionally, the women could not be undergoing professional treatment for their sexual concerns while participating in the study. Finally, participants could not have any visual impairments that would make it difficult to use the website.

Difficulties with sexual arousal and desire were informally assessed for SIAD symptoms using DSM-5 criteria (APA, 2013) via a phone screen. Women who had lifelong impairments in sexual desire were questioned with regard to asexuality, and excluded if this was deemed to be a significant factor in their lack of sexual interest.

Measures

Both studies included the same validated quantitative measures, administered via pre- and post-treatment online questionnaires. Pre-treatment surveys included an initial questionnaire assessing standard demographics, as well as specific sex-related questions such as age of first intercourse and history of unwanted or non-consensual sexual contact (“Have you ever experienced unwanted or non-consensual sexual contact?”), with follow-up questions asking whether this was experienced as a child, adult, or both. Given that assessment of sexual assault was not the primary goal of the original studies, we did not include more comprehensive measurement of these experiences.

Baseline assessment also included the Female Sexual Function Index (FSFI; Rosen et al., 2000) and the Female Sexual Distress Scale-Revised (FSDS-R; Derogatis et al., 2008). Both scales are considered gold-standard self-report measures of sexual function and distress (Rosen et al., 2014) and served as the primary measures of clinical outcomes. The FSFI includes separate subscales for sexual desire, sexual arousal, lubrication, orgasm, and sexual satisfaction, with scores obtained by summing items and multiplying by a weighting factor (see Rosen et al., 2000 for additional detail). While only the full scale FSFI and the desire subscale (Gerstenberger et al., 2010) have been formally tested in validation studies, use of the individual subscales is common (Neijenhuijs et al., 2019).

Post-treatment assessment included the FSDS-R, the FSFI, the Erectile Dysfunction Inventory of Treatment Satisfaction Scale (EDITS; Althof et al., 1999), adapted for use with a female sample, and selected items from the Homework Rating Scale (HRS; Kazantzis et al., 2004). The EDITS addressed participants' satisfaction with the intervention, while relevant HRS items included those assessing completion, comprehension, difficulty, obstacles, efficacy, and enjoyment of the assigned home activities. Please see the original study publications for additional information and descriptive statistics from the various scales (Brotto et al., 2022; Stephenson et al., 2021).

Procedure

In both studies, potential participants were screened via a standardized phone interview that determined their eligibility. Those who provided informed consent were sent a link to online measures on either Research Electronic Data Capture (REDCap) or Qualtrics. Once these questionnaires were completed, participants were given access to the first module of eSense. Users were instructed to work through each module weekly, including all between-module activities. Studies differed slightly in terms of gathering additional feedback during eSense use. In the first study (Stephenson et al., 2021), participants completed a standardized, weekly 20 min phone interview with the study coordinator after completing each module. After module 8, participants took part in a slightly longer interview. In the second study (Brotto et al., 2022), participants completed post-module surveys exclusively online. Participants in both studies were given a minimum of 8 weeks and a maximum of 12 weeks to complete eSense.

In each study, participants were compensated \$25 for answering questionnaires at both pre- and post-treatment (\$50 total). After completing the studies, participants were also given free lifetime access to their respective arms (CBT or MBT) of eSense.

Data Analysis

Women with and without a history of SA were compared in a number of ways. First, chi-square was used to assess whether women with vs. without a history of SA differed in terms of rates of retention, operationalized as the proportion of participants who completed post-treatment measures.¹ Second, differences between groups in terms of treatment satisfaction and experiences with homework were assessed via one-way ANOVA with history of SA as the predictor and the EDITS and HRS as outcomes. Subsequent to these analyses using full-scale scores, exploratory analyses were performed using individual items of the EDITS and HRS as outcomes. Third, the degree to which history of SA predicted pre-post changes in clinical outcomes was assessed using repeated measures ANOVA with clinical outcomes of interest at pre and post-treatment as a within-subjects factor and history of SA (yes vs. no) as a between-subjects factor. The parameter of interest was the interaction between time and SA history. Initial analyses used the total scores of the FSFI and FSDS-R as outcomes. Subsequently, exploratory analyses using relevant individual subscales of the FSFI (i.e., sexual desire, sexual

arousal, lubrication, orgasm, and sexual satisfaction) were performed.

Fourth, the degree to which history of SA moderated the association between changes in sexual function (i.e., sexual desire, sexual arousal, lubrication, and orgasm) and sexual distress was assessed using multiple linear regression. In these models, the sexual distress at post-treatment was regressed on sexual distress at pre-treatment, history of SA (yes vs. no), change in sexual function (e.g., post-treatment sexual desire–pre-treatment sexual desire), and the interaction between history of SA and change in sexual function. Separate models were run for each aspect of sexual function. The parameter of interest was the interaction between change in sexual function and SA history. In cases of non-significant interactions (which were expected given the small sample size available), we planned to examine correlation coefficients between change scores in sexual function (e.g., post-treatment sexual desire – pre-treatment sexual desire) and change scores in sexual distress (i.e., post-treatment sexual distress – pre-treatment sexual distress) to explore whether the association between changes in sexual function and distress differed based on SA history.

All of the above analyses were run twice, once with the comparison group being survivors of SA at any age (child or adult) vs. women without any history of SA and once with the comparison group being survivors of adult SA only (with or without CSA) vs. women without a history of adult SA (with or without CSA). All analyses were conducted using IBM SPSS Statistics, version 26.²

Results

Demographic Information

The initial sample included 44 participants (11 of whom used eSense-CBT and 33 of whom used eSense-MBT) with a mean age of 34.20 years ($SD = 9.14$; range = 20–64). Average relationship length was 7.89 years ($SD = 7.84$; range = 7 months–31 years). Twenty-two participants (50%) reported any history of unwanted sexual contact—4 (9.1%) as children and 19 (43.2%) as adults (2 reported both childhood and adult sexual assault). One participant declined to answer this question, leaving 21 (47.7%) without any history of unwanted sexual contact. There were no significant demographic

¹ One participant completed the eight modules of eSense, but did not complete post-treatment measures. Inclusion or exclusion of this participant did not meaningfully change the pattern of results.

² We chose to include these analyses focusing on women with a history of adult SA in particular because including women who experienced childhood sexual abuse as well adds additional error variance to analyses (given the likely important differences in experiences from women with unwanted sexual contact as an adult). As such, examining women with only adult SA may provide a more statistically powerful method of testing effects of interest.

Table 1 Participant demographic information

Characteristics	Study 1 (N=11)	Study 2 (N=33)	Total
Age (M, SD)	29.18 (4.47)	35.88 (9.57)	34.20 (9.14)
<i>Gender identity (N, %)</i>			
Woman	11 (100%)	32 (97.0%)	43 (97.7%)
Non-binary	0	1 (3.0%)	1 (2.3%)
<i>Sexual orientation (N, %)</i>			
Heterosexual	8 (72.7%)	25 (75.8%)	33 (75.0%)
Bisexual	3 (27.3%)	5 (15.2%)	8 (18.2%)
Demisexual	0	1 (3.0%)	1 (2.3%)
Pansexual	0	2 (6.1%)	2 (4.55%)
<i>Self-identified ethnicity (N, %)</i>			
Arab	0	2 (6.1%)	2 (4.55%)
South Asian	1 (9.1%)	0	1 (2.3%)
White	10 (90.9%)	29 (87.9%)	39 (88.6%)
Mixed	0	2 (6.1%)	2 (4.55%)
<i>Education (N, %)</i>			
High school	0	1 (3.0%)	1 (2.3%)
Attended some college	1 (9.1%)	2 (6.06%)	3 (6.82%)
Graduated 2-year college	0	3 (9.1%)	3 (6.82%)
Graduated 4-year college	5 (45.5%)	8 (24.2%)	13 (29.5%)
Post-graduate degree	5 (45.5%)	18 (54.5%)	23 (52.3%)
<i>Occupational status (N, %)</i>			
Employed	10 (90.1%)	21 (63.6%)	31 (70.5%)
Unemployed	1 (9.1%)	3 (9.1%)	4 (9.1%)
Student	2 (18.2%)	7 (21.2%)	9 (20.5%)
Retired	0	1 (3.03%)	1 (2.3%)
Other	2 (18.2%)	3 (9.1%)	5 (11.4%)
<i>Relationship status (N, %)</i>			
In a relationship	6 (54.5%)	10 (30.3%)	16 (36.4%)
Married	2 (18.2%)	20 (60.6%)	22 (50%)
Common-law	3 (27.3%)	5 (15.2%)	8 (18.2%)

differences between participants with or without a history of SA. See Table 1 for additional information regarding sample demographics.

Participant Engagement and Retention

Of 44 participants, 10 (22.7%) did not complete post-treatment measures. Out of 21 women without a history of SA, 4 (1.87%) did not complete post-treatment measures. Out of 22 women with a history of SA, 6 (27.2%) did not complete post-treatment measures. This difference in attrition was not statistically significant ($\chi^2(2)=0.52, p=0.469$; Fisher's $Z_r=0.112$). This pattern of results did not differ when only women with a history of adult SA were considered.

Treatment Satisfaction and Experiences with Homework

The total score of the EDITS did not differ significantly between women with and without a history of SA ($F(1, 29)=1.87, p=0.181$), regardless of whether all SA or only adult SA was considered. In exploratory analyses, of the eight

items of the EDITS, three items exhibited significant differences between women with and without a history of SA. Women with a history of any SA reported higher overall satisfaction with treatment than women without a history of SA ($F(1, 31)=4.81, p=0.036$). This effect was slightly weaker when women with a history of only adult SA were compared to women without a history ($F(1, 31)=2.67, p=0.084$). Women with a history of SA also reported they were more likely to continue using eSense content after their participation ended than those without ($F(1, 31)=6.85, p=0.014$). Again, this effect was slightly weaker when women with a history of only adult SA were compared to women without a history ($F(1, 31)=3.29, p=0.051$). Women with a history of any SA also reported that their partners were more satisfied with the effects of the treatment than those without ($F(1, 20)=6.47, p=0.019$). This effect was slightly stronger when women with a history of only adult SA were compared to women without a history ($F(1, 20)=7.52, p=0.004$). No other items on the EDITS exhibited notable differences between groups.

The total score of the Homework Rating Scale did not differ significantly between women with and without a

Table 2 Group comparisons on measures of treatment satisfaction and homework completion

Scale Item	Mean (SD) adult SA only (N = 13)	Mean (SD) any SA (N = 16)	Mean (SD) no SA (N = 17)	Effect sizes (Cohen's <i>d</i>)
<i>Treatment satisfaction</i>				
Overall satisfaction with treatment	4.61 (.50) ⁺	4.64 (.49)*	4.05 (.82)	.81 / .84
Treatment met expectations	4.00 (.40)	4.00 (.39)	3.64 (.78)	.55 / .56
Likelihood of continued use	4.76 (.43) ⁺	4.71 (.46)*	4.05 (.89)	1.00 / .90
Ease of using treatment	2.92 (1.03)	3.00 (1.03)	2.88 (1.05)	.03 / .11
Confidence about sexual activity	4.00 (.40)	4.07 (.47)	4.05 (.42)	– .14 / .21
Partner satisfaction with treatment	4.71 (.48)*	4.62 (.51)*	3.61 (.76)	1.68 / 1.53
Partner feelings regarding continued use	4.42 (.78)	4.50 (.75)	4.00 (.70)	.57 / .68
Sexual response felt natural	3.83 (.93)	3.76 (.92)	3.82 (.88)	.01 / – .05
<i>Homework</i>				
Quantity of assignments completed	2.38 (.50)	2.42 (.51)	2.64 (.78)	– .39 / – .33
Quality of homework attempts	2.15 (.55)	2.14 (.53)	2.23 (.83)	– .12 / – .14
Difficulty of homework	1.76 (.92)	1.78 (.89)	1.58 (.93)	– .21 / – .21
Obstacles interfered with homework	2.84 (.98)*	2.85 (.94)*	1.88 (.99)	– .98 / – 1.01
Understood rationale for homework	3.53 (.51)	3.57 (.51)	3.58 (.61)	– .08 / – .03
Guidelines for homework were specific	2.92 (.76)	3.00 (.78)	3.00 (.70)	– .10 / 0
Assignments matched therapy goals	2.38 (.96)	2.42 (.93)	2.41 (.87)	– .03 / .02
Assignments were enjoyable	2.16 (.57)	2.23 (.59)	1.94 (.82)	.32 / .40
Assignments helped you gain a sense of control	2.14 (.69)	2.25 (.70)	1.92 (.61)	.32 / .48
Assignments helped progress	2.57 (.53)	2.62 (.51) ⁺	2.14 (.66)	.71 / .82

Items in treatment satisfaction scale ranged from 1 to 5. Items in homework scale ranged from 0 to 4. * $p < .05$; ⁺ $p < .10$. For Cohen's *d*, positive values indicate better outcomes for women with a history of SA and negative values indicate better outcomes for women without a history of SA

history of SA ($F(1, 29) = 1.34, p = 0.257$), regardless of whether all SA or only adult SA was considered. In exploratory analyses, of the 12 items of the Homework Rating Scale, one item exhibited significant differences between women with and without a history of any SA—women with this history reported that obstacles (e.g., lack of time) interfered with completing homework assignments more than those without this history ($F(1, 31) = 7.14, p = 0.012$). This effect was weaker when women with a history of only adult SA were compared to women without a history ($F(1, 31) = 3.50, p = 0.043$). See Table 2 for additional information regarding treatment satisfaction and homework completion.

Pre-post Changes in Sexual Function and Distress

Women with vs. without a history of SA did not differ significantly in terms of changes in sexual function or sexual distress over time. This pattern held regardless of how SA was operationalized (adult vs. any age) and in exploratory analyses using relevant subscales of the FSFI: No interactions between time and SA status were significant ($p = 0.704$ for total FSFI, 0.30 for FSFI-R, 0.660 for sexual desire, 0.570 for sexual arousal, 0.73 for lubrication, 0.07 for orgasm,

0.54 for sexual satisfaction).³ In the case that was closest to statistical significance (orgasm), women with a history of SA trended toward experiencing larger improvements while using eSense. Means for clinical outcome measures by group can be found in Table 3.

Association Between Changes in Sexual Function and Sexual Distress

A model including changes in sexual function, SA status, and their interaction as a predictor of changes in sexual distress, along with exploratory tests focusing on each subscale of sexual function separately produced no significant interaction terms. The interaction term closest to statistical significance came from the model comparing changes in lubrication predicting changes in distress for women with a history of SA to those without ($F(4, 18) = 4.61, p = 0.010$, Beta for interaction term = 0.381, $p = 0.208$).

Although no interaction terms were significant, a non-significant pattern in line with hypotheses was found across

³ We also re-ran this set of analyses carrying forward pre-treatment values for participants who had not provided post-treatment values (i.e., intent-to-treat analyses). We found the same pattern of results using this method.

Table 3 Pre and post-treatment clinical outcomes for completers

Outcome	Mean (SD) pre-treat any SA	Mean (SD) post-treat any SA	Mean (SD) pre-treat no SA	Mean (SD) post-treat no SA
Sexual Desire	2.12 (.55)	3.36 (.87)	2.08 (.73)	3.17 (.66)
Sexual Arousal	3.05 (1.20)	4.30 (1.13)	2.60 (.87)	4.42 (.84)
Lubrication	4.05 (1.59)	4.75 (1.56)	3.79 (1.45)	4.82 (1.49)
Orgasm	3.46 (1.48)	4.82 (1.31)	3.37 (1.55)	4.00 (1.64)
Sexual Satisfaction	2.98 (1.05)	4.40 (1.06)	3.17 (1.12)	4.50 (1.00)
FSFI Total	20.60 (4.97)	27.35 (4.48)	19.31 (3.11)	25.92 (4.14)
FSDS	34.66 (8.91)	22.86 (9.08)	28.82 (6.84)	19.52 (6.76)

FSFI Female Sexual Function Index, FSDS-R Female Sexual Distress Scale-Revised; SA sexual assault

all aspects of sexual function. For example, although no correlations were statistically significant (likely due to small sample size), increases in sexual desire were associated with larger decreases in distress for women without a history of SA ($r = -0.19$), but not for women with SA ($r = 0.01$). Increases in subjective arousal were associated with larger decreases in distress for women without a history of SA ($r = -0.18$), but slight increases in distress for women with SA ($r = 0.09$). Increases in lubrication were associated with larger decreases in distress for women without a history of SA ($r = -0.27$), but larger increases in distress for women with SA ($r = 0.31$). Increases in orgasmic function were associated with slightly larger decreases in distress for women without a history of SA ($r = -0.13$), but increases in distress for women with SA ($r = 0.31$). These non-significant trends were in similar directions when considering a history of only adult SA.

Discussion

The goal of the current analyses was to compare the experiences of women with and without a history of sexual assault while using eSense—a self-guided online intervention for distressing low desire and arousal in women. While analyses were generally exploratory and likely underpowered, the results suggest minimal differences between groups. Women with a history of sexual assault were generally able to complete eSense, engage in homework assignments, and experience improvements in sexual function and distress to a similar degree as women without a history of sexual assault. Indeed, the primary difference between the groups at post-treatment (found only in exploratory analyses) was that women with a history of sexual assault trended toward being *more* satisfied with the experience than women without this history. This finding is in line with past research suggesting that even self-guided online interventions may be acceptable and helpful for individuals with trauma histories (e.g., Possemato et al., 2016; van der Meer et al., 2020).

However, a number of results from exploratory analyses may suggest unique challenges for women with an assault history while using eSense. In particular, women with an assault history dropped out of the study at slightly higher rates (although this difference was not statistically significant) and reported that obstacles were more likely to interfere with completing homework assignments. While these results must be replicated with a larger sample, they are in line with other recent research suggesting that adverse childhood experiences can disrupt treatment of sexual difficulties (Charbonneau-Lefebvre et al., 2022). The results also speak to the possibility that women with a history of sexual assault may benefit from having individualized support from a provider or non-expert “coach” who can normalize their struggles, communicate empathic understanding, and provide encouragement to persevere through challenging activities (e.g., Leung et al., 2022). It is also possible that some of the content in eSense should be modified to ensure a trauma-informed approach is undertaken, and that explicit information on how to manage trauma related symptoms that impact the sexual difficulties should be included.

A final result of interest was the (non-significant) trend for women with a history of sexual assault to exhibit weaker associations between increases in sexual function and improvements in sexual distress over the course of the intervention. While these trends would need to be replicated in a study that is sufficiently powered to detect them, they raise important questions regarding the experiences of women with a history of sexual assault receiving sex therapy (self-guided or otherwise). For example, it is possible that “successful” treatment for these women is less dependent on increases in sexual desire or arousal and more focused on other factors such as improved sexual communication with partners or improvements in broader aspects of mental health (e.g., mood and anxiety). Indeed, recent research suggests that women with a history of SA (and significant dissociation during sex) may be more motivated to engage in sex to increase relational intimacy or gain partner approval (vs. motives like physical pleasure; Gerwitz-Meydan & Lahav, 2021). As such,

perceiving their sexual partners to be satisfied with sexual activity may sometimes be of more importance to women with a history of SA than are improvements in their own sexual function. Future research that includes larger samples and more in-depth assessment of treatment experiences will be helpful in exploring these possibilities.

Any conclusions drawn from these results should be tempered by multiple limitations of the current analyses. First and foremost, due to limited previous research in this area, all hypotheses were tentative and a majority of the analyses were considered exploratory. While the resulting findings are useful to inform future hypotheses, the analyses were very likely underpowered. As such, replication using larger sample sizes, as well as randomization to treatment type and inclusion of control conditions, will be necessary to draw firmer conclusions and explore related questions. For example, does the effect of SA on treatment outcomes differ between CBT and MBT given that they involve different responses to maladaptive processes such as rumination (thought challenging/restructuring vs. mindful acceptance respectively), which exhibits important links to sexual assault (e.g., Barnhofer et al., 2006)? Second, only a small sample that was relatively homogeneous in terms of ethnicity, education, and other demographic factors was available. As such, it is unknown how these results may apply to, for example, women of color, or those who identify as sexual or gender minorities.

Another important aspect of the sample was that women were required to be in stable relationships, which may have resulted in the exclusion of women with a history of SA that negatively impacts relational functioning/stability. These effects tend to be particularly notable in cases of childhood sexual abuse (e.g., Godbout et al., 2009), and there is some evidence of important differences in outcomes depending on multiple aspects of the assault such as age and relationship to perpetrator (e.g., Stephenson & Meston, 2012; Ullman et al., 2006). The fact that the strength of effects in the current study differed somewhat depending on whether survivors of childhood sexual abuse in particular were included highlights the importance of future studies engaging in targeted recruitment of women with childhood abuse and/or relational distress to determine whether the current results apply to these populations.

A final important limitation of our study stems from our assessment of “sexual assault.” Specifically, a single “double-barreled” item was used that asks simultaneously about unwanted and non-consensual sexual contact. However, not all unwanted sex is non-consensual and whether all non-consensual sexual contact constitutes sexual assault continues to be debated (e.g., Kern & Peterson, 2020). For example, women may agree to consensual but unwanted sex due to implicit pressure from a partner, or as part of a mutually agreed upon norm within the relationship (e.g., if one partner experiences less sexual desire, they may nonetheless decide to engage in sex; O’Sullivan & Allgeier, 1998). More broadly, different methods

of defining and assessing “sexual assault” (e.g., including or not including specific behavioral requirements such as threat or use of physical force, physical contact/penetration, etc.) can result in widely varying prevalence estimates (e.g., Fisher et al., 2000) and correlates (e.g., Broach & Petretic, 2006; Testa & Derman, 1999), suggesting that many individuals conceptualize non-consensual sexual experiences and sexual assault as distinct phenomena. In other words, the assessment of “sexual assault” in the current study is limited in that it may be combining multiple distinct types of unwanted sexual experiences. Different methods of assessing SA may have resulted in a different pattern of results (e.g., if only experiences considered “traumatic” by the individual were assessed, there may be larger effects on satisfaction, engagement, and/or clinical outcomes). Future studies would ideally use a more comprehensive and/or multiple assessments of unwanted/coercive sexual experiences to determine whether our results generalize between these different experiences.

Despite these limitations, the current study provides the first evidence of which we are aware that a self-guided online intervention for distressing problems with desire and arousal may be acceptable and helpful for women with a history of sexual trauma. If replicated, these results suggest it may be possible to significantly increase the accessibility and real-world impact of evidence-based interventions for this large population. It is also possible that augmenting online interventions with some amount of personalized support may help address some of the unique barriers that could prevent women with a history of sexual trauma from engaging with, and maximally benefiting from, this form of intervention.

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Data availability Data available upon reasonable request.

Code availability Not applicable.

Declarations

Conflict of interest The authors have not disclosed any conflict of interest.

Ethical Approval Both studies were approved by the Behavioural Research Ethics Board at The University of British Columbia and the Vancouver Coastal Health Research Ethics Board.

Informed Consent All participants in both studies provided informed consent.

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