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Feasibility of a cognitive behavioral online intervention for women with Sexual Interest/Arousal Disorder

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Abstract

Objectives: Difficulties with sexual desire and arousal are common in women, but most lack access to effective treatment such as cognitive-behavioral therapy (CBT). *eSense* is a recently created online CBT intervention for sexual difficulties with promising evidence of usability. The current study assessed the feasibility of women completing the full *eSense* CBT program without guidance.

Methods: Eleven women with Sexual Interest/Arousal Disorder completed *eSense* and provided feedback via semi-structured interviews.

Results: Participants reported high satisfaction with *eSense's* functionality, improved knowledge about sexuality, greater awareness of their thought patterns, and better perspective around their sexual difficulties. Despite some difficulty completing homework, participants exhibited statistically significant pre-post improvements in sexual desire ($d = 1.04$), sexual arousal ($d = 1.83$), sexual satisfaction ($d = 1.35$), and sexual distress ($d = 1.79$).

Conclusion: The findings add to the growing evidence that self-guided online interventions are feasible and potentially efficacious in treating female sexual dysfunction.

KEYWORDS

CBT, female sexual dysfunction, internet interventions, online therapy, Sexual Interest/Arousal Disorder, telehealth

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1 | INTRODUCTION

Impairments in female sexual function are very common, with one-year prevalence estimates ranging from 32% to 58% (Hayes et al., 2008). The most common impairments are those related to sexual desire and arousal (Mitchell et al., 2013). Significantly distressing problems in these areas are labeled as female Sexual Interest/Arousal Disorder (SIAD) in the DSM-5 (APA, 2013). Impaired sexual function is associated with a variety of negative outcomes (e.g., Kashdan et al., 2018; Stephenson & Meston, 2015), and diagnosed sexual dysfunction is by definition distressing to the individual. Given the prevalence and impact of female sexual difficulties, evidence-based, accessible treatment options are needed.

Cognitive behavioral therapy (CBT) is one of the most widely used, and well supported, methods of psychotherapy for a wide range of problems (Butler et al., 2006). CBT typically includes cognitive interventions such as identifying and challenging maladaptive and inaccurate interpretations of one's self, one's future, and the world (e.g., Beck, 1995), as well as behavioral interventions meant to challenge faulty or maladaptive beliefs (e.g., Foa et al., 2006), or to improve mood (e.g., Hopko et al., 2003). These methods have been applied to sexual dysfunction since at least the 1980s (e.g., Libman et al., 1985). In CBT for sexual problems, clients are typically encouraged to evaluate and challenge maladaptive sexual beliefs (e.g., "not reaching orgasm means there is something fundamentally wrong with me") and engage in new behaviors surrounding sex (e.g., scheduling times to engage in mutual touch with a partner without the goal of becoming sexually aroused; Stinson, 2009).

Although the overall number of studies is somewhat limited in comparison to areas like mood and anxiety disorders (Butler et al., 2006), CBT for female sexual dysfunction has been assessed in multiple clinical trials (e.g., Brotto, Zdaniuk, et al., 2020; McCabe, 2001) and generally been found to be efficacious (e.g., Frühauf et al., 2013). For example, CBT has been shown to be superior to a wait list (e.g., Hucker & McCabe, 2014) and equally as effective as mindfulness-based therapy for sexual problems (Brotto et al., 2012, Brotto, Bergeron, et al., 2020). Most studies in this area include women with a range of sexual problems including low desire, low arousal, and/or difficulty reaching orgasm (e.g., McCabe, 2001; van Lankveld et al., 2001), but a number also focus specifically on sexual pain disorders (e.g., Brotto et al., 2019; ter Kuile et al., 2013).

Unfortunately, CBT (and evidence-based treatment generally) is not accessible to most women with sexual problems. Studies suggest that somewhere between 19% and 32% of women with sexual concerns receive treatment (Maserejian et al., 2010; Moreira et al., 2005; Nicolosi et al., 2006), and those who do seek treatment take an average of five years or more to access it (Jones & McCabe, 2011). Likely barriers include embarrassment (on the part of both patients and providers), stigma, lack of evidence-based care options, geographical distance, and cost (e.g., Markit, 2018; Schaller et al., 2020). Many of these barriers can be at least partly addressed by translating CBT to online delivery (e.g., Hobbs et al., 2019).

Numerous online CBT interventions have been created, and have generally been found to be efficacious in treating anxiety, depression, and other problems (e.g., Gershkovich et al., 2017; Spek et al., 2007). There is also initial evidence that such interventions may help address many barriers to accessing psychotherapy (e.g., Bennett et al., 2020; Hadjistavropoulos et al., 2014, 2017). The degree of therapist involvement in these online interventions varies from (A) simply shifting traditional synchronous (i.e., "live") client-therapist interactions to email or chat, to (B) mixed treatments including static content delivered asynchronously online, augmented by live or asynchronous interaction with a therapist, to (C) entirely self-guided with no personalized support (Marks & Cavanagh, 2009). In general, guidance (vs. no guidance) may be associated with slightly better outcomes (Baumeister et al., 2014), but these findings are somewhat inconsistent across studies (e.g., Shim et al., 2017). Indeed, unguided interventions have demonstrated efficacy in many cases, and multiple studies have found equivalent outcomes between guided and unguided programs (e.g., Berger et al., 2011; Campos et al., 2019; Titov et al., 2015). There is a growing interest in testing the relative efficacy of treatments with different levels of support because interventions requiring little or no guidance would be significantly less expensive and easier to disseminate.

Online interventions for sexual dysfunction have similarly included traditional one-on-one interactions between therapist and client facilitated purely via email (e.g., Hall, 2004; van Diest et al., 2007), and programs

providing a mixture of self-guided reading and remote therapist contact (e.g., Hucker & McCabe, 2014). Evidence also suggests that traditional self-guided bibliotherapy for sexual dysfunction can be helpful (e.g., Mintz et al., 2012; van Lankveld et al., 2001), and self-guided online resources are beginning to be constructed (e.g., Gurney et al., 2020). However, to our knowledge, only online interventions that include individualized support from expert providers have been formally assessed (van Lankveld, 2016). Although such interventions address many barriers to accessing treatment (e.g., geographic distance from providers), licensed therapists trained in sex therapy continue to be relatively rare (Miller & Byers, 2012; Reissing & Giulio, 2010; Wiederman & Sansone, 1999) and costly, limiting the scalability of such methods. An intervention that minimizes direct contact with experts would significantly expand access to evidence-based treatment.

One newly created online intervention is *eSense*. This eight-module program was created by experts in sexual dysfunction as an engaging, interactive online treatment that includes (A) psychoeducation regarding the causes and maintaining factors of female sexual dysfunction, (B) detailed instructions and rationale for a variety of CBT interventions for sexual dysfunction, and (C) nuanced fictional case examples demonstrating how therapeutic activities are carried out, including common barriers. *eSense* was developed with a team of web designers and graphic artists to include text, images, audio, video, and downloadable worksheets to guide at-home practice.

In a recent initial usability assessment, participants worked through the first of eight *eSense* modules (psychoeducational information regarding sexual dysfunction) in person while “thinking aloud” regarding the functionality of the website (Zippan et al., 2020) before completing homework assignments on their own over the following week. Results suggested that participants generally found the first module of *eSense* easy to use and described the content as clear, relevant, and helpful. Furthermore, participants exhibited moderate-to-large improvements in multiple clinical outcomes including sexual arousal and satisfaction.

These findings suggest that participants were able to navigate the *eSense* platform, and that even complex educational information (e.g., theoretical models of sexual dysfunction) could be clearly communicated via text, images, and rich case examples. There was also promising preliminary evidence that one psychoeducational module of *eSense* alone might improve clinical symptoms in women with SIAD. We wished to build on these promising findings regarding module one alone by gathering feasibility data for use of the entire eight-module program, which included more complex at-home activities such as cognitive restructuring and sensate focus behavioral exercises, without personalized guidance. If a significant portion of women with sexual dysfunction can utilize *eSense* without guidance, and experience some degree of symptom improvement, it may be possible to (A) provide broad, low-cost access to treatment for sexual dysfunction, and (B) empirically test the degree to which individualized guidance confers additional benefit in terms of treatment engagement and/or improvement in outcomes (e.g., Berger et al., 2011; Gershkovich et al., 2017).

The current study aimed to test the degree to which women with SIAD could complete the eight-module *eSense* program without individualized guidance. Feasibility was assessed via participant retention and engagement with the program (completion of modules and homework assignments), and via reported satisfaction with the treatment. We also examined any improvements in clinical outcomes (sexual desire/arousal, sexual satisfaction, and sexual distress) associated with use of the program, and gathered feedback regarding potentially helpful changes to content or structure.

2 | MATERIALS AND METHODS

2.1 | Participants

Participants were recruited primarily from the senior author's research website (n = 17) and through a registry of women who had provided consent to be contacted after having participated in previous research (n = 9).

Eligible study participants had to be woman-identified (cis or trans), between the ages of 19 to 65, who appeared to meet the criteria for SIAD (three or more of the following symptoms with significant personal distress, for a period of six months or more: reduced or no interest in sexual activity, lack of sexual thoughts or fantasies, lack of initiation and receptivity to sexual activity, reduced or no sexual pleasure during sexual activity, inability for any sexual stimuli to trigger desire, and impaired or absent physiological arousal during sexual activity; APA, 2013). Per the DSM-5's exclusion factors, participants also had to self-report that their symptoms were not attributable to severe relationship conflict, significant stressors, a nonsexual mental disorder, the effects of a substance or medication, or to another medical condition (APA, 2013).

Potential participants with subclinical SIAD were questioned as to whether their lack of sexual interest, if lifelong, might be due to asexuality. Asexual participants were excluded given that asexuality is not a sexual dysfunction (APA, 2013). Women with significant sexual pain (e.g., a diagnosis of provoked vestibulodynia or vulvodynia) were also excluded, particularly if it largely accounted for their low desire.

Additionally, participants had to be fluent in English, be in a stable, committed romantic relationship, have consistent access to the internet, and be comfortable using online platforms (all self-assessed). They could not have any visual impairments or disability that would make it difficult for them to read and interact with online materials. Participants could not be receiving treatment for their sexual concerns elsewhere for the duration of the study.

Of 26 women who contacted the study coordinator, 18 were able to be scheduled for phone screening. Of these 18, 12 women met inclusion criteria (reasons for exclusion included sexual pain as a primary problem, active substance abuse issues, and posttraumatic symptoms that seemed to fully account for sexual problems). One participant withdrew before accessing *eSense*, resulting in a final sample size of 11. Our target sample was a minimum of 10, as this is generally sufficient to reach saturation of usability themes in feedback (Kushniruk, 2002; Zippan et al., 2020).

2.2 | Measures

2.2.1 | Quantitative measures

Quantitative measures included a pre-treatment (within a week before beginning *eSense*) and post-treatment assessment (within two weeks of completing the final module). The pre-treatment assessment included a demographics questionnaire that assessed various factors including age, gender identity, educational attainment, and history of unwanted sexual contact ("Have you ever experienced unwanted or nonconsensual sexual contact?"). Pre-treatment assessment also included the Female Sexual Distress Scale-Revised (FSDS-R; DeRogatis et al., 2008), and the desire, arousal, and satisfaction subscales of the Female Sexual Function Index (FSFI; Rosen et al., 2000). Posttreatment assessment included the FSDS-R, the FSFI subscales mentioned above, a selection of items from the Erectile Dysfunction Inventory of Treatment Satisfaction Scale (EDITS; Althof et al., 1999; adapted for use with a female sample), and a selection of items from the Homework Rating Scale focused on compliance with the prescribed homework exercises (Kazantzis et al., 2004). The EDITS addressed participants' satisfaction with the intervention, including ease-of-use, expectations, and likelihood of continuing to utilize therapy skills. We selected items from the Homework Rating Scale that were relevant to the content the women were exposed to, including those assessing completion, comprehension, difficulty, obstacles, efficacy, and enjoyment.

2.2.2 | Participant interviews

A trained research assistant (with no formal training in psychotherapy) conducted weekly phone interviews with the participants after they had completed each module online. The interviews included semi-structured questions

about the website as a whole, as well specific questions and Likert scale items about its content, relevancy, organization, esthetics and functionality (see Table 1 for questions used). Participants were also asked to rate the clarity and difficulty of the homework every week. This weekly interview also provided an opportunity for the women to note any difficulties they were having, and to ask questions about their sexual issues. The research assistant validated participant responses without providing any therapeutic feedback. After completing the final module, the women were interviewed one last time and asked additional reflection questions, such as what they had learned from *eSense*, and if they were doing anything differently as a result.

2.3 | eSense content

The content of *eSense* was adapted from well-established CBT-based skills such as providing psychoeducation regarding causal and maintaining factors of sexual problems, thought records/challenging, behavioral experiments, and sensate focus: a behavior-based sex therapy tool focused on non-pleasure oriented touching between partners (see Carey, 1998; Stinson, 2009). *eSense* has short sentences and paragraphs, with headings and subheadings to maximize readability, and uses plain language (high school reading level) to maximize effectiveness for diverse populations. In line with best practices for online therapies, text was interspersed with pictures, diagrams, videos, and audio clips to maximize engagement. Modules are meant to take between 60 and 120 min, supplemented by between-module practice throughout the week. See Table 2 for a summary of *eSense* content.

2.4 | Procedure

Potential participants were scheduled for a 20-min phone screen to determine their eligibility. Eligible participants were sent a link to complete the baseline measures online via Research Electronic Data Capture (REDCap), and once these measures were completed, they were provided with access to one module per week for eight weeks. Participants were instructed to work through each module at home on their own time, and to attempt all assigned home exercises. At the end of each module, the women took part in a 10- to 15-min phone interview with a research assistant about the module they had just completed, with a slightly longer interview after completing Module 8 (along with post-intervention quantitative measures).

Participants were compensated $25 for answering questionnaires at pre-treatment and post-treatment ($50 total). Upon completion, participants were also given free lifetime access to *eSense*. This study was approved by the Behavioural Research Ethics Board at the University of British Columbia as well as the Vancouver Coastal Health Research Institute Research Ethics Board.

3 | RESULTS

3.1 | Demographic information

The final sample included 11 participants with an age range of 21–35 ($M = 29.18$, $SD = 4.47$; see Table 3). The average length of the women's relationships was 55.5 months ($Mdn = 48$, $SD = 40.36$). The length of their sexual difficulties ranged from eight months to eight years, with an average of five years. None of the women had received previous treatment for their sexual issues. Five of the women reported a history of depression, and one reported a history of anxiety. Three of the women were on birth control, and five of the women were on antidepressants. Three-quarters of the sample (8 out of 11) reported having experienced unwanted sexual contact, two as children.

TABLE 1 Semistructured interview questions and likert items regarding usability of website

Factor	Interview questions
Weeks 2–7	
Overall impressions of treatment section	*What were your overall impressions of the content you just covered?*
	What content or activities did you find interesting?
	What content or activities did you find uninteresting or unhelpful?
Relevance and organization of content	*To what extent do you think the module addressed issues relevant to you and women with similar problems?*
	Did the order of topics make sense? Is there anything you would change?
	What areas do you think were covered particularly well?
	Did you think anything was not covered well or missing?
	How would you rate the overall organization of content?
	1 – extremely confusing; 10 – extremely clear and logical
Website functionality & esthetics	*Was it easy to navigate through the section? Did you experience any difficulties?*
	How would you rate the ease of navigation?
	1 – extremely difficult or impossible; 10 – extremely easy
	Was the imagery helpful or distracting?
	Did you like the look of this module? Did it feel appropriate to the subject matter?
Homework feedback	*To what extent did you think the homework was presented clearly in this module?*
	1 – extremely confusing; 10 – extremely clear
	Regarding the homework, how easy or difficult was it to do at home?
	1 – difficult; 10 – easy
	Would anything make it easier to accomplish or more helpful?
Week 8—Additional questions	
Personal changes	*Is there anything you learned from eSense that you didn't know before? If so, what did you learn?*
	Are you doing anything differently as a result of participating in this study?
Retrospective feedback and suggestions for changes	*What eSense content did you find most memorable?*
	Is there anything you would change about the look of the site overall?
	What is the most important thing you will take away from this study?
	Is there anything else you'd like to tell me about your experience with eSense?
Personal changes	*Is there anything you learned from eSense that you didn't know before? If so, what did you learn?*
	Are you doing anything differently as a result of participating in this study?
Retrospective feedback and suggestions for changes	*What eSense content did you find most memorable?*
	Is there anything you would change about the look of the site overall?
	What is the most important thing you will take away from this study?
	Is there anything else you'd like to tell me about your experience with eSense?

TABLE 2 Structure of eSense CBT arm

Module	Content
1: Definitions and causes of sexual dysfunction	Introduction to sexual function
	Causes of sexual dysfunction
	Theoretical models of sexual dysfunction
	Overview of CBT treatment for FSD
2: The cognitive model and thought record	Introduction to Beck's cognitive (A-B-C) model
	How the cognitive model relates to sexual difficulties
	Introduction to the thought record
3: Unhelpful thinking patterns	Unhelpful thinking patterns and their causes
	Introduction to core beliefs (and how to identify them using the downward arrow technique)
	Introduction to cognitive biases
4: Cognitive restructuring	Introduction to cognitive restructuring
	Identifying cognitive distortions, weighing the evidence, employing alternative, balanced thinking
	Introduction to behavioral experiments
	Challenging unhelpful thoughts (expanding the thought record)
5: Behavioral experiments	Moving from thoughts to behaviors
	Anxiety-related predictions and hopelessness-related thoughts
	Conducting behavioral experiments
6: Self-touch and sensate focus	Introduction to sensate focus
	Structure of sensate focus
	Self-observation and self-touch exercises
7: Sensate focus with your partner	Introduction to sensate focus with a partner
	Positive communication skills
	Structure of couple sensate focus
8: Maintaining (and extending) your gains	Summary of program components and rationale
	Focus on contextual maintaining factors and skills checklist
	Relapse prevention
	Additional treatment options

3.2 | Quantitative results

3.2.1 | Participant engagement and retention

Nine participants (82%) completed all weekly feedback interviews. The remaining two participants completed five and seven weekly interviews (of eight possible). One participant did not complete the quantitative post-test measures, resulting in a sample size of 10 at post-treatment and a retention rate of 91%.

TABLE 3 Participant demographic information

Characteristics	Time 1 (*N* = 11)
Age (*M*, *SD*)	29.18 (4.47)
Gender identity (*N*, %)	
Woman	11 (100%)
Sexual orientation (*N*, %)	
Heterosexual	8 (72.70%)
Bisexual	3 (27.30%)
Self-identified ethnicity (*N*, %)	
South Asian	1 (9.10%)
Caucasian	10 (90.9%)
Education (*N*, %)	
Attended some college	1 (9.10%)
Graduated 4-year college	5 (45.50%)
Postgraduate degree	5 (45.50%)
Occupational status (*N*, %)	
Employed full-time	9 (81.80%)
Employed part-time	1 (9.10%)
Unemployed	1 (9.10%)
Relationship status (*N*, %)	
In a relationship	6 (54.50%)
Married	2 (18.20%)
Common-law	3 (27.30%)

3.2.2 | Treatment satisfaction and experiences with homework

For ease of interpretation, we present the median score of each item of the EDITS and HRS utilized. Overall satisfaction with the program was rated as a 4/5 ("somewhat satisfied"), intervention meeting expectations was 4/5 ("considerably"), likelihood of continuing to use the intervention was 4/5 ("moderately likely"), and ease of using the intervention was 2.5/5 ("moderately difficult" to "neither easy nor difficult").

Participants reported attempting "a lot" of homework assignments (3/4), and rated the quality of their work on assignments as "moderately" good (2/4). Assignments were rated as "moderately difficult" (2/4), and obstacles were reported to have interfered "very" much with assignment completion (3/4), though participants "very" much understood the instructions (3/4). The rationale for the assignments was rated as "extremely" clear (4/4), guidelines for assignment completion were rated as "very" specific (3/4), and match with their goals for therapy was rated as "moderately" to "very" good (2.5/4). Participants "somewhat" to "moderately" enjoyed the assignments (1.5/4), and the assignments "somewhat" helped them gain a sense of control over their problems (2/4).

3.2.3 | Pre-post changes in sexual desire, arousal, distress, and satisfaction

Repeated measures ANOVAs were used to assess pre-post changes in outcomes. We also computed effect sizes using Cohen's *d*. Descriptive statistics of variables and model results can be found in Table 4. All outcomes exhibited statistically significant improvements from pretreatment to posttreatment. All effect sizes were large (d = 1.04–1.83).

3.3 | Interview feedback

eSense was generally described as being informative, thoughtful, useful, clear, accessible, and easy to digest ("complex models were easily conveyed"). Users said that the intervention helped them to become aware of, and reflect on, their patterns of behavior. Some said that it was valuable to gain insight on how biased their thoughts and perceptions could be, and that seeing this clearly reduced distress. Many users appreciated how information and skills were progressively built on from one module to the next. In terms of usefulness, one participant said:

> For the first time…I felt I had a tool that could actually change my patterns.

3.3.1 | Intervention content

A majority of users said that the content was highly relevant, and that the order and flow of information made sense (across weekly interviews, an average of 9 out of 11 users responded "yes" to this question). The average rating for organization of content was 8.95/10. Most users enjoyed evaluating and challenging their own thoughts. One participant had done the "digging down to core beliefs" exercise before and felt that *eSense* "explained it better than [it was] explained [to me] in person." Many participants appreciated the review/summary at the end of each module, and liked the practical nature of the home exercises; one said that "the small, feasible steps and concrete attainable goals made it easier to understand." Another user said that it was "nice to have some guidelines on effective communication; they were easy to understand and implement in a conversation." The Possible Challenges section of each module, which outlined potential barriers and how to overcome them, was also cited as helpful, along with content on relapse prevention.

Across weekly interviews, an average of 7 out of 11 users said that they felt "nothing" was uninteresting or lacking. Some of the home exercises were deemed difficult (e.g., thought records, downward arrow, behavioral

TABLE 4 Pre-intervention (pre) and post-intervention (post) measures of sexual desire, arousal, distress, and satisfaction

Variables	Pre		Post		F (df)	p	Cohen's d
	M	SD	M	SD			
Sexual desire (N = 10)	2.16	0.70	3.12	0.84	8.73 (1, 9)	.016	1.04
Sexual arousal (N = 8)	3.18	0.68	4.13	1.05	12.76 (1, 7)	.009	1.83
Sexual distress (N = 10)	34.40	7.50	26.50	6.92	34.06 (1, 9)	<.001	1.79
Sexual satisfaction (N = 8)	2.63	0.93	3.85	0.71	17.98 (1, 7)	.004	1.35

Note: Data presented are means and *SD*s. Possible ranges—sexual desire 1–6; sexual arousal 1–6; sexual distress 0–52; sexual satisfaction 1–6 (sexual satisfaction single item: 1–5). Cohen's *d* statistics computed utilizing Lenhard and Lenhard (2016).

experiments). Some (n = 4) participants didn't relate to the case studies and wanted to see more examples. Others (n = 3) said that *eSense* was a bit too information-dense or text-heavy in some places. A few (n = 3) said they would have liked to have been able to check in with a dedicated treatment "guide," both for accountability and to help explain homework exercises.

3.3.2 | Site functionality and design

The average rating for ease of website navigation was 9.28/10. The most common request was to add a progress bar. Most users found the imagery to be helpful. However, some of the users were impatient or confused with animations loading and looping. Users enjoyed that illustrations were diverse and inclusive (depicting women of different ethnicities and sexual orientations), though a couple of users found them to be too explicit. Participants also requested more audio and video content.

3.3.3 | Home activities

The average rating for clarity of the homework instructions was 8.58/10. The rating for ease of completion was 7.12/10. The main difficulty reported was not having enough time; attempting activities every day was unrealistic for most participants. One user felt that personalized guidance would have been helpful for the downward arrow exercise—she was not clear on how to do it in practice although she understood the concept. Another issue several women mentioned was the difficulty of completing sexual exercises when the frequency of sex in their relationships was low to none: "The biggest challenge I have faced each week has been that I haven't had enough sexual activity to write about."

There were a number of suggestions for improvement of homework. In terms of format, all participants preferred fillable PDFs, and a few asked for the intervention to be an app instead of a website (with built-in reminders). Participants asked for more time and flexibility in terms of how long to work on individual modules, a built-in journal for sexual activity, mid-week check-ins, and tips for how to incorporate partners. One said that it would be "great to chat with someone to come up with strategies for overcoming obstacles."

3.3.4 | Learning and changes

Participants said that they learned a great deal from the program, even those who were already familiar with CBT. Benefits ranged from normalization to reductions in anxiety to gaining self-compassion and agency. One user said she had learned to be more flexible: "Instead of thinking how my sex life *should* be, [I can] redefine what I want and work with my partner to create our ideal sexual life." Users also became more aware of their thoughts, emotions, behavior patterns, traumas, and unconstructive beliefs around sex, and were putting more effort into changing them:

> I learned so much about how mindset affects sexuality, and that it can be modified a lot easier that I initially thought. You don't always have to start an encounter at a 10 out of 10 excitement level for it to still end up being a good experience.

Other participants said they were able to communicate better with their partners, and engage in sexual activity "with a different, more open perspective."

Multiple participants said that they hoped *eSense* would one day be available to the general public. It was cited as a valuable resource that therapists should recommend routinely to their patients.

4 | DISCUSSION

The goal of the current study was to assess the feasibility of women with SIAD completing a new eight-module CBT-based online intervention without personalized guidance. In general, participants were able to effectively use the program and were highly satisfied with the platform's functionality. They also reported satisfaction with the clarity and relevance of content, as well as the specificity of instructions. Likely as a result of these positive experiences, attrition was very low—only one dropout—especially in comparison to typical rates for online interventions (Linardon & Fuller-Tyszkiewicz, 2020). However, participants did report significant difficulty in completing homework assignments, rating them moderately difficult on average and reporting obstacles (primarily lack of time) that interfered with completion. This difficulty completing homework assignments is noteworthy given the established positive relationship between homework compliance and outcomes in face-to-face CBT interventions (Kazantzis et al., 2010).

However, despite the challenges in completing assignments, participants reported pre-post improvements in all clinical outcomes. All effect sizes were large and statistically significant. These effects must be interpreted with caution due to the very small sample size of the study and lack of control condition, but it is noteworthy that improvements were of a similar magnitude to effects reported in previous studies of online CBT for female sexual dysfunction with therapist and peer support (e.g., Hucker & McCabe, 2015), and in line with those generally reported in treatment outcome studies of in-person CBT and mindfulness-based in-person therapies for sexual dysfunction (e.g., Frühauf et al., 2013; Stephenson & Kerth, 2017). Of course, replication of the current findings and direct within-study comparisons are needed before reaching any conclusions regarding relative efficacy, but equivalent outcomes across online and face-to-face interventions has been demonstrated in some cases (e.g., Carlbring et al., 2018).

Based on these findings, completing *eSense* without individualized guidance appears feasible, and potentially helpful, for women with SIAD. However, a number of methodological aspects of the study should temper these interpretations. Most importantly, the study utilized a small convenience sample and included no control condition. As such, we cannot confidently make conclusions about efficacy or attribute improvements over time to *eSense*. In particular, women completed brief phone interviews weekly with a non-expert, supportive research assistant. While no specific feedback or advice was provided, simple non-directive empathic listening can have therapeutic effects (Cuijpers et al., 2012) and it will be important for future studies to rule out contact with members of the research team as the cause of improvement.

Additionally, the sample was not representative of all women with SIAD, consisting primarily of younger, educated, Caucasian women. Populations who may have the most need for this type of program are likely more diverse in terms of age, education level, income, and ethnicity (e.g., Ojeda & McGuire, 2006; Walker et al., 2015). For example, less than half of those who expressed an interest in the study went on to participate, and it is unclear whether those unable to schedule an intake assessment were more likely to differ demographically from those who went on to participate. Future larger studies will ideally recruit samples that include populations with less access to traditional face-to-face sex therapy. Another limitation is that we were unable to directly assess participant engagement with *eSense* using analytics such as length of time spent on modules, which forms were downloaded, and so forth. Relatedly, we did not include formal, validated measures of treatment acceptance (e.g., the Treatment Evaluation Inventory; Kazdin et al., 1981), but did include widely utilized proxies for acceptance such as attrition rate and adherence to study procedures (e.g., Alsubaie et al., 2020; Short et al., 2017). Future studies that directly assess program usage and formally test treatment acceptability will be helpful in replicating and extending the current results.

Despite these limitations, the current findings have a number of implications for future research. First, interview responses from participants provide rare evidence regarding which components of CBT for sexual dysfunction may be most helpful. The fact that a wide range of activities were identified as "most helpful" by different participants (i.e., no single component was broadly acknowledged as essential across the sample) lends some support to the necessity for a full treatment package (vs. only psychoeducation, only cognitive interventions, or only sensate focus). It is, however, possible that larger samples would allow for identification of key "ingredients," and the modular nature of *eSense* would lend itself well to future dismantling studies that could identify necessary and sufficient components.

It is also noteworthy that multiple participants reported training in communication skills as very helpful. This content was adapted from widely used methods of couple therapy (e.g., Christensen et al., 2004; Gottman, 1999), rather than protocols for individual sex therapy. Indeed, although sexual dysfunction and relational dynamics are clearly interrelated in many cases (e.g., Metz & Epstein, 2002; Stephenson et al., 2013), there is often a surprising lack of attention to the broader relationship in sex therapy (e.g., Binik & Meana, 2009; McCarthy & Thestrup, 2008). When sex therapy interventions do focus on the broader relationship, they rarely draw from empirically supported methods of couples therapy, instead creating new couple-focused activities that have not been independently tested (e.g., Hucker & McCabe, 2015). Our findings highlight the benefits of integrating more content directly from existing empirically-supported relationally focused interventions (e.g., Doss et al., 2016).

In addition to altering or improving the content of *eSense*, future studies may also explore different modes of implementation. As mentioned previously, multiple studies have suggested that unguided online interventions can be efficacious for a range of mental health concerns (e.g., Berger et al., 2011). Similarly, unguided bibliotherapy has been shown to be helpful for sexual difficulties (e.g., Guitelman et al., 2019). However, emerging evidence suggests that augmenting online interventions with individualized support can significantly decrease attrition (e.g., Gershkovich et al., 2017) and increase levels of improvement (e.g., Baumeister et al., 2014; Ho et al., 2014). Establishing unguided use of *eSense* as efficacious would set the stage for similar studies assessing the additive effects of differing modes and levels of guidance for sexual dysfunction interventions, as have been conducted in related areas (e.g., Roddy et al., 2018). These findings would be of great interest in understanding the importance of the therapeutic relationship in sex therapy (e.g., Lafrenaye-Dugas et al., 2020), and in understanding the most cost-effective and accessible form of online treatment.

Finally, it is of interest to consider *eSense* and similar programs serving as useful bridges to more traditional forms of face-to-face therapy. Even individuals who have the willingness and ability to seek out individual therapy can experience barriers to receiving consistent care (Hoge et al., 2014; Mohr et al., 2006). The COVID-19 pandemic has likely exacerbated these barriers (Wind et al., 2020), while simultaneously worsening sexual problems (Li et al., 2020). Programs like *eSense* may be an ideal option to augment traditional therapy that has been disrupted or delayed (e.g., Villemaire-Krajden & Myhr, 2019), and could make individuals more likely to access traditional therapy by reducing stigma (e.g., Levin et al., 2018).

In sum, a small sample of women with SIAD were able to utilize a new online CBT-based program called *eSense*. The fact that participants demonstrated improvements in an asynchronous program without therapist guidance provides preliminary support for cost-effective and accessible online treatments for the many women who experience sexual dysfunction. These findings provide a foundation for future formal tests of efficacy, expanding of program content, and comparison between different modes of delivery. *eSense* and similar programs hold the promise of augmenting and expanding the reach of evidence-based practice for sexual dysfunction.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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