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Results of a Randomized Waitlist-Controlled Trial of Online Cognitive Behavioral Sex Therapy and Online Mindfulness-Based Sex Therapy for Hypoactive Sexual Desire Dysfunction in Women

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Objective: This study aimed to investigate the efficacy of two internet-delivered psychological treatments for hypoactive sexual desire dysfunction (HSDD) in women: internet-based cognitive behavioral sex therapy (iCBST) and internet-based mindfulness-based sex therapy (iMBST). ***Method:*** Women with HSDD were randomly assigned to one of three groups: iCBST, iMBST, or a waitlist control group. The interventions consisted of eight modules delivered via an e-health platform with e-coach support to enhance adherence. Sexual desire and sexual distress were assessed at baseline and at 3-, 6-, and 12-month follow-ups (active conditions only). Per protocol, of the 266 consenting women, 106 were randomized to iCBST (M_{age} = 36.1, SD = 10.3), 106 to iMBST (M_{age} = 36.4, SD = 0.2), and 54 to the control condition (M_{age} = 36.7, SD = 11.0). Primary analyses utilized an intention-to-treat approach with linear mixed models. Clinical significance, assessed with clinical cutoffs and the reliable change index, was examined for active conditions. ***Results:*** Compared to the control condition, both iCBST and iMBST demonstrated significant improvements in sexual desire and sexual distress at 3-month (d = 0.89–1.14) and 6-month follow-up (d = 0.74–1.18). Results were sustained at 12-month follow-up, with 35 and 41% demonstrating reliable improvements and additional 20 and 24% achieving clinically significant improvements in sexual desire after iCBST and iMBST. Regarding sexual distress, 49 and 42% exhibited reliable change, with an additional 37%–42% achieving clinically significant improvements. ***Conclusions:*** Results provide support for the overall long-term efficacy of psychological therapies in treating HSDD in women. However, fewer than one in four women showed improvements in sexual desire that met the threshold for clinically significant change.

What is the public health significance of this article?
This research highlights the potential of internet-delivered cognitive behavioral sex therapy and mindfulness-based sex therapy as valuable and accessible treatments for women experiencing distressing low sexual desire. With their sustained efficacy observed over a 12-month period, these treatments provide effective options for women seeking support for low sexual desire.

Keywords: cognitive behavioral therapy, mindfulness-based therapy, hypoactive sexual desire dysfunction, randomized-controlled trial, psychological online interventions

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The absence or marked reduction in the desire or motivation to engage in sexual activity is one of the most common sexual problems among women (Briken et al., 2020; Mitchell et al., 2013). Low sexual desire can manifest as reduced or absent spontaneous desire (i.e., a lack of sexual thoughts or fantasies), reduced or absent responsive desire to erotic cues and stimulation, or an inability to sustain desire or interest in sexual activity once initiated. If one or more of these symptoms are present for several months or longer and are associated with clinically relevant sexuality-related personal distress, they can be diagnosed as hypoactive sexual desire dysfunction (HSDD) based on the criteria of the eleventh version of the *International Classification of Diseases* (*ICD*-11; World Health Organization, 2018). Alternatively, using the latest version of the *Diagnostic and Statistical Manual of Mental Disorders, fifth edition* (American Psychiatric Association, 2013), clinically reduced levels of sexual desire can be diagnosed as female sexual interest/arousal disorder (SIAD). As a SIAD diagnosis warrants endorsement of at least three out of six criteria relating to symptoms of low sexual desire (e.g., lack of interest in sexual activity) or low sexual arousal (e.g., a lack of genial arousal during sexual activity), women with SIAD can show a variety of symptom patterns (Brotto et al., 2015). Low sexual desire is very common, with a population-based U.K. study showing that 34.2% of sexually active women experienced low desire over the past year (Mitchell et al., 2013). A first representative survey using the *ICD*-11 criteria yielded annual prevalence rates of 6.9% for HSDD among sexually active women (Briken et al., 2020). As low sexual desire is closely related to mental health problems such as depression and anxiety (Atlantis & Sullivan, 2012; Laurent & Simons, 2009) and can lead to impairments in women's health-related quality of life comparable to those of other chronic conditions such as diabetes or back pain (Biddle et al., 2009), treating HSDD can be understood as an integral part of women's overall health care.

Psychological Treatments of HSDD

Building on the premise of the incentive-motivation model that the experience of desire may follow rather than precede sexual excitement or arousal (Laan & Both, 2008), Basson (2001a, 2001b) developed a circular model of sexual response that has gained widespread clinical and research interest and that provides a rationale for psychological treatments for HSDD. The circular model posits that women begin sexual encounters for a variety of reasons, some of which are interpersonal rather than sexual in nature (e.g., to avoid conflict, to please a partner). Their willingness to become receptive to sexual stimulation once they enter a sexual situation depends on these reasons as well as contextual factors (e.g., timing, setting) and sexual behaviors (e.g., sensual touching, kissing, clitoral stimulation). Women then need to be able to pay attention to these sensations and interpret them as sexually pleasing. Only then, they may experience sexual arousal as well as a responsive form of sexual desire that comes into play when a woman feels sexually excited. Lastly, a sexual situation can result in both sexual (e.g., orgasm) and nonsexual (e.g., increased intimacy) outcomes. These outcomes may be positive or negative in valence depending on how the sexual situation unfolds and can provide reinforcement for future sexual behaviors. A majority of women experiencing difficulties with sexual functioning, including HSDD, endorse this model as an adequate description of their sexual experiences (Ferenidou et al., 2016; Sand & Fisher, 2007) and many psychological treatments include interventions that address different aspects of this cycle either implicitly or explicitly.

One of the most commonly used psychological treatments for HSDD is cognitive behavioral sex therapy (CBST; Frühauf et al., 2013), a change-oriented approach that includes cognitive and behavioral techniques which are used comparably for other mental disorders such as depression (e.g., keeping a thought diary and challenging maladaptive thinking patterns), as well as interventions targeting low sexual desire more specifically (e.g., debunking sexual myths; Brotto & Velten, 2020). In line with the circular model, the arsenal of methods used in CBST serves, for example, to improve the processing of stimuli during sex by encouraging women to replace negative interpretations (Velten et al., 2019; Zahler et al., 2021) with helpful thoughts or to develop sexual approach goals (e.g., having sex for pleasure; Mark & Lasslo, 2018).

Another psychological treatment that is increasingly used in women with HSDD is mindfulness-based sex therapy (MBST; Stephenson & Kerth, 2017), an acceptance-oriented approach that aims to foster a present-focused, nonjudgmental attention to sexual sensations and thoughts (Brotto, 2018). MBST for HSDD is also targeting key elements of the sexual response cycle, albeit in a different way than CBST, as the goal of MBST is to improve the effective possessing of sexual stimuli by teaching women to tune into their bodily sensations in the here and now (Velten et al., 2020) and to refrain from engaging with distracting thoughts during sex. Improvements in interoceptive awareness, self-compassion, and mindfulness-mediated improvements in low desire symptoms in a sample of women with SIAD who participated in a group-based MBST program (Brotto et al., 2021).

Both CBST and MBST for HSDD incorporate elements of sex therapy, which include educational information on, for example, low desire symptoms, the biopsychosocial model (Brotto et al., 2016), and commonly also information on the circular response model (Basson, 2001a). This information is then used to encourage women to identify problematic aspects of their current (i.e., dysfunctional) cycle and to work toward modifying sexual behaviors (e.g., setting the mood, using sexual aids) to improve their sexual experiences. Sex therapy also includes at-home exercises such as self-exploration with a handheld mirror, sensual self-touch, and partnered sensate focus exercises that aim to improve women's knowledge around sexuality, strengthen their ability to advocate for their own needs, and express their sexual desires in the context of sexual relationships (Brotto & Velten, 2020).

Efficacy of Psychological Treatments

A meta-analysis showed CBST for sexual dysfunctions to be consistently effective compared to waitlist control groups, with the largest effects shown for women with low desire ($d = 0.91$; Frühauf et al., 2013). Similarly, a meta-analysis of 11 MBST studies on sexual dysfunctions reported medium wait list-controlled or pre- to posteffect sizes for sexual desire ($g = 0.52$–0.62) and medium-to-large effects for sexual satisfaction ($g = 0.57$–0.91; Stephenson & Kerth, 2017). While head-to-head comparisons between CBST and MBST for HSDD are still lacking, studies for other mental disorders sometimes show comparable efficacy of cognitive behavioral therapy (CBT) and mindfulness-based therapy (MBT; Cherkin et al., 2016; Kocovski et al., 2013) but also superiority of CBT (Piet et al., 2010) or of MBT (Ruiz, 2012). The latest International

Consultation on Sexual Medicine recommended both CBST and MBST for the treatment of HSDD (Kingsberg et al., 2017), despite there still being a scarcity of methodologically sound, sufficiently powered, randomized-controlled studies (Pyke & Clayton, 2015). A first study comparing eight sessions of group-based MBST with a supportive sex education and therapy group including CBT elements in at least two of the sessions (i.e., understanding the relationship between thoughts, emotions, and behavior, challenging thought biases) showed large pre- to postimprovements ($d = 1.29$–1.60) in the primary outcomes of sexual desire and arousal in women with SIAD that could be sustained at a 12-month follow-up (Brotto et al., 2021). While no differential group effects were found for the primary outcomes, reductions in sexual distress over the study period were significantly larger in the MBST group.

While there is increasing evidence for psychological treatments being effective in treating HSDD, only a minority of women with HSDD receive professional help (Maserejian et al., 2010; Velten & Margraf, 2023) and access to treatment is limited by many factors, including structural (e.g., costs, lack of available experts) and attitudinal barriers (e.g., preference for self-help; Velten & Margraf, 2023). In response to these barriers, psychological online interventions have been developed that are available at low cost, are accessible to women regardless of their location, and can be created and updated by experts based on the best available evidence (Andersson & Cuijpers, 2008; Baker et al., 2010). For other mental health problems, such as depression or anxiety, online interventions based on MBT yielded small-to-moderate improvements in mental health outcomes (Spijkerman et al., 2016). In addition, CBT-based online interventions have shown moderate effects, for example, on depressive and anxiety symptoms in adolescents (Ebert et al., 2015).

A study using qualitative interview data from a subset of 51 participants of the present study showed that internet-delivered versions of CBST and MBST (i.e., internet-based cognitive behavioral sex therapy [iCBST] and internet-based mindfulness-based sex therapy [iMBST]) were perceived as helpful and likely to be effective in women with HSDD (Meyers et al., 2022). Further, in a 2022 meta-analysis, internet and mobile interventions were significantly more effective than waitlist control conditions at posttreatment, with medium effects for women's sexual functioning and large effects for sexual satisfaction (Zarski et al., 2022). While uncontrolled or pilot studies have suggested high acceptance and helpfulness of of iCBST or iMBST (Stephenson et al., 2021; Zippan et al., 2020), randomized-controlled data using a sufficiently large sample of women diagnosed with HSDD are still lacking.

Thus, the objective of this study was to evaluate the efficacy of iCBST and iMBST for improving the primary outcome of sexual desire and the secondary outcome of sexual distress in women with HSDD. Toward this goal, a three-arm randomized waitlist-controlled trial was conducted with data assessments at baseline, 3 and 6 months after enrollment. To investigate the longer term stability of symptom improvements and to assess the clinical significance of change, women in active conditions participated in an additional data assessment at 12 months after enrollment. Based on the best available evidence, we expected women in iCBST and iMBST to show significantly higher sexual desire and lower sexual distress compared to the control condition at 3- and 6-month follow-up. To explore potential differences in efficacy between active treatments, primary and secondary outcomes of iCBST and iMBST participants were compared at all assessment points.

Method

Design

This study is a randomized-controlled trial including a waitlist control group and two active conditions that adhere to Consolidated Standards of Reporting Trials statement guidelines along with its adaptation for internet interventions (Eysenbach et al., 2011). A detailed description of the study can be found in the published trial protocol (Meyers et al., 2020). The interventions were provided on a secure web-based e-health platform. The trial was conducted in compliance with the Declaration of Helsinki and has been approved by the ethics committee and the data protection officer of the faculty of Psychology of the Ruhr University Bochum. The trial was registered at https://Clinicaltrials.gov with the number NCT03780751.

Participants

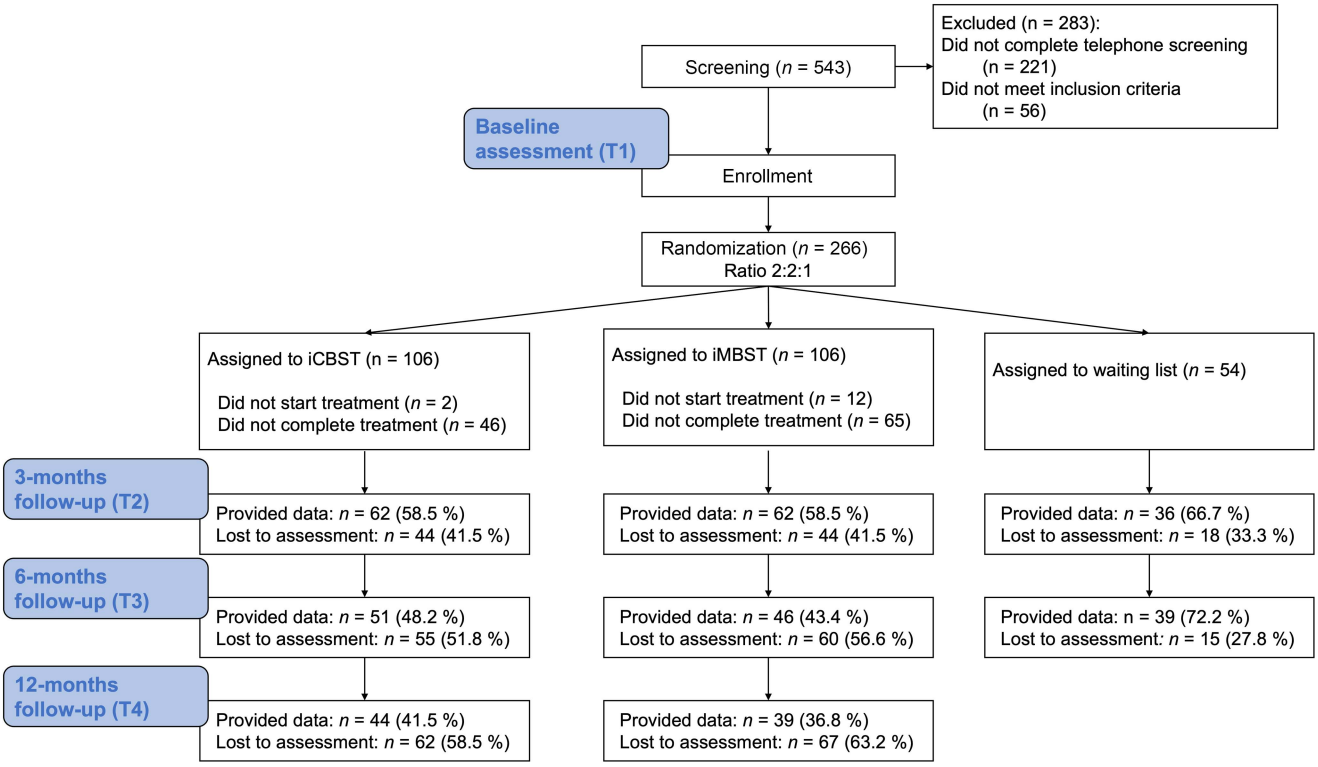
To be included, participants were required to be 18 years of age or older; to identify as cis- or trans-women; to be able to read, write, and speak German; and to meet *ICD*-11 criteria for HSDD. Exclusion criteria were being pregnant, ongoing treatment for any sexual dysfunction or plans to enter such treatment, acute suicidal ideation, significant symptoms of a mental disorder (e.g., eating disorders, posttraumatic stress disorder), or physical condition (e.g., ongoing cancer treatment) that might make participation in iCBST or iMBST or the required data assessments too challenging. Further, current substance use disorder, current or lifetime psychotic disorders, and significant relationship discord or violence were contraindications for study inclusion. Women whose low desire was fully attributable to pain during sexual intercourse were also not included, as conditions associated with painful sex should be treated before improvements in sexual desire can be expected.

As shown in the participant flow diagram (Figure 1), of the 543 women who showed an interest in the study by completing a short online screening questionnaire, 221 did not proceed to complete the required telephone screening, and 56 women did not meet inclusion criteria.

A total of 266 women provided informed consent and were included in the study. Women were on average 36.4 ($SD = 10.4$) years old, the majority ($n = 227$, 85.3%) was in a committed, monogamous relationship, and nearly half of the participants ($n = 116$, 43.6%) were married. See Table 1 for further information on sociodemographic variables.

Concerning their socioeconomic situation, 35.5% ($n = 94$) of women indicated a graduate degree, 30.1% ($n = 80$) vocational training, and 21.8% ($n = 58$) an undergraduate degree as their highest level of education. Half of the participants (50.0%, $n = 133$) were working full time, 25.9% ($n = 69$) part time, and 16.9% ($n = 45$) were college or university students. A minority of participants ($n = 35$, 13.2%) indicated that they themselves, their parents or grandparents, were not born in Germany but migrated there from, for example, Poland ($n = 6$; 2.3%), Italy ($n = 4$; 1.5%), Russia ($n = 4$; 1.5%), France ($n = 3$; 1.1%), or other countries ($n < 3$). There were no significant group differences on any of the descriptive variables (all $p > .246$). When asked about which intervention they would like to

Figure 1
Study Flow



Note. T = time; iCBST = internet-based cognitive behavioral sex therapy; iMBST = internet-based mindfulness-based sex therapy. See the online article for the color version of this figure.

receive, 41.4% of participants ($n = 110$) indicated a preference for iCBST, 23.3% ($n = 62$) indicated a preference for iMBST, and an additional 35.5% ($n = 94$) had no treatment preference. Regarding treatment credibility, participants were asked, on a scale from 1 (*completely useless*) to 5 (*very useful*), whether they expected iCBST, iMBST, or sex therapy to be suitable for treating their low desire concerns. On average, iMBST was expected to be useful, $M = 3.94$, $SD = 0.92$, and both iCBST, $M = 4.35$, $SD = 0.72$, and sex therapy, $M = 4.37$, $SD = 0.76$, were expected to be useful to very useful.

Procedure

Recruitment began in December 2018 and ended in April 2022. To invite a diverse sample of women, a variety of recruitment strategies were employed. Women learned about the study by visiting a designated study website and associated pages on social media, articles in local and nationwide media publications (e.g., magazines, newspapers), online discussion boards, and flyers at specialized counseling agencies/sites, general practitioners, and gynecologists. As part of a two-step screening process, inclusion and exclusion criteria were assessed in an online screening followed by an in-depth telephone interview with a clinical psychologist. A structured clinical interview was conducted to verify women's diagnosis of HSDD based on *ICD*-11 criteria. To increase comparability to studies relying on the *Diagnostic and Statistical Manual of Mental Disorders, fifth edition, presence of a SIAD* diagnosis (e.g., Brotto et al., 2021), was determined as part of this interview as well.

Following this interview, eligible women received an invitation to an online questionnaire. Women who completed this baseline assessment and who provided informed consent electronically were enrolled in the study. Enrolled participants were randomly assigned to one of three conditions. Per protocol, quotas were applied to allocate 40% of participants to each of the active treatments (i.e., iCBST and iMBST) and 20% to the control condition. A stratification procedure was applied to balance relationship status (partner vs. no partner) and age (younger than 30 years vs. 31 years and older), as these variables are known correlates of sexual desire and potential confounding factors (Graham et al., 2017; Gunst et al., 2017; Hayes et al., 2007). A trained research assistant not involved in recruitment, screening, or treatment of participants conducted the randomization procedure with Study Randomizer (2017), a web-based randomization tool. Block randomization with varying block sizes was applied. Following randomization, participants were informed about their assigned condition, and participants in the active conditions gained immediate access to the respective program. Participants assigned to the waitlist condition received access to a program of their choice (i.e., iCBST or iMBST) 6 months after randomization. Online data assessments were conducted at baseline (T1), 5 weeks (active conditions only; data presented elsewhere), 3 months (T2), 6 months (T3), and 12 months after enrollment (T4; active conditions only). Participants were

Table 1
Sociodemographic Variables

Variable	Total (N = 266)	iCBST (n = 106)	iMBST (n = 106)	Control (n = 54)	Group difference
Age in years, *M (SD)*	36.4 (10.4)	36.11 (10.3)	36.41 (10.2)	36.74 (11.0)	$F(2) = 0.07$, $p = .935$
Range	20–69	21–69	20–64	21–61	
Partnership duration in years, *M (SD)*	9.3 (8.5)	8.75 (7.8)	9.75 (8.9)	9.33 (9.2)	$F(2) = 0.37$, $p = .688$
Partnership status, *n* (%)					$\chi^2(6) = 3.43$, $p = .754$
Monogamous partnership	227 (85.3)	92 (86.8)	90 (84.9)	45 (83.3)	
Open relationship	9 (3.4)	4 (3.8)	4 (3.8)	1 (1.9)	
Single	20 (7.5)	8 (7.5)	8 (7.5)	4 (7.4)	
Other	10 (3.8)	2. (1.9)	4 (3.8)	4 (7.4)	
Marital status, *n* (%)					$\chi^2(4) = 0.91$, $p = .923$
Married	116 (43.6)	45 (42.5)	48 (45.3)	23 (42.6)	
Never married	139 (52.3)	56 (52.8)	55 (51.9)	28 (51.9)	
Divorced	11 (4.1)	5 (4.7)	3 (2.8)	3 (5.6)	
Number of children, *n* (%)					$\chi^2(4) = 1.72$, p = .788
No children	159 (59.8)	64 (60.4)	61 (57.5)	34 (63.0)	
One child	11 (16.5)	19 (17.9)	19 (17.9)	6 (11.1)	
Two or more children	63 (23.7)	23 (21.7)	26 (24.5)	15 (25.9)	
Sexual orientation, *n* (%)					$\chi^2(8) = 10.28$, $p = .246$
Exclusively heterosexual	201 (75.6)	77 (72.6)	82 (77.4)	42 (77.8)	
Predominantly heterosexual	53 (19.9)	28 (26.4)	18 (17.0)	7 (13.0)	
Bisexual	4 (1.5)	0	2 (1.9)	2 (3.7)	
Exclusively or prominently homosexual	5 (1.9)	1 (0.9)	3 (2.8)	1 (1.9)	
Other	3 (1.1)	0	1 (0.9)	2 (3.7)	
Menopause status, *n* (%)					$\chi^2(4) = 2.22$, $p = .696$
Premenopausal	216 (81.2)	88 (83.0)	86 (81.1)	42 (77.8)	
Perimenopausal	32 (12.0)	12 (11.3)	13 (13.2)	6 (11.1)	
Postmenopausal	18 (6.8)	6 (5.7)	6 (5.7)	6 (11.1)	
Hormonal contraception (*n*, %)	73 (28.6)	33 (31.3)	30 (28.3)	13 (24.1)	$\chi^2(2) = 0.88$, $p = .644$

Note. iCBST = internet-based cognitive behavioral sex therapy; iMBST = internet-based mindfulness-based sex therapy.

reimbursed with an equivalent of $10 for the completion of each follow-up assessment, resulting in a maximum of $50 for the completion of all online questionnaires as well as an experimental paradigm presented via Inquisit 5 Web (data presented elsewhere) and an optional telephone-based semistructured qualitative interview that was conducted by a subsample of women at T2 (Meyers et al., 2022, 2023).

Measures

Demographic and Clinical Characteristics

At baseline, we assessed a variety of demographic (e.g., age, education, employment, sexual orientation, relationship status, and duration) and clinical variables (e.g., symptom duration, past treatments, and menopause status) to characterize the sample and to test participant equivalence in the three conditions. Further, a short version of the Childhood Trauma Questionnaire was used to inquire about sexual abuse in childhood (Bernstein et al., 2003), a potential predictor of treatment acceptance (Brotto et al., 2012; Stephenson et al., 2023).

Sexual Desire

Sexual desire as a primary outcome was measured by the self-report version of the Sexual Interest and Desire Inventory–Female (SIDI-F; Clayton et al., 2006; Velten et al., 2021). The SIDI-F is a 13-item assessment tool validated for use with clinical populations (Clayton et al., 2010) whose item domains assess frequency and intensity of sexual desire along with other clinically relevant aspects of sexual functioning (e.g., affection, sexual arousal, orgasm) over the past month. The SIDI-F self-report scale has been used in studies of women with distressing low sexual desire (Brotto & Basson, 2014; Brotto et al., 2021; Paterson et al., 2017) and was found to have good internal consistency. It has shown high agreement with the clinician-administered version (intraclass correlation 0.86) in a subsample (n = 170) of this study (Velten et al., 2021). In this study, internal consistency at baseline was good (α = .82).

Sexual Distress

Sexual distress as a secondary outcome was assessed with the Female Sexual Distress Scale–Revised (FSDS-R; DeRogatis et al., 2008), a 13-item self-report measure used extensively in treatment outcome studies for sexual dysfunctions. The FSDS-R covers the frequency of negative cognitions or emotions (e.g., anger, frustration, guilt) that people may experience regarding their sexual life overall, sexual problems, or sexual relationships. Items are rated on a 5-point Likert-scale from 0 (*never*) to 4 (*always*), resulting in a total score ranging from 0 to 52. Higher scores indicate higher levels of distress. Further, the FSDS-R has displayed good discriminant validity and high test–retest reliability (DeRogatis et al., 2008). In this study, internal consistency at baseline was excellent (α = .93).

Treatment Satisfaction and Negative Effects

To assess participants' overall satisfaction with their program, the eight-item Client Satisfaction Questionnaire adapted to internet-based interventions (CSQ-I) was used (Boß et al., 2016). Items are

rated on a scale from 1 (*does not apply to me*) to 8 (*does totally apply to me*), resulting in a total score ranging from 8 to 32, with a higher score indicating higher treatment satisfaction. Psychometric properties of the CSQ-I are good, and the scale has been used in studies on internet-based treatments for depression, stress, and genitopelvic pain/penetration disorder (Boß et al., 2016; Zarski et al., 2021). At the 3-month assessment, internal consistency of the CSQ-I was excellent ($\alpha = .90$).

Satisfaction with the relationship to their e-coaches was assessed with a six-item subscale of the Helping Alliance Questionnaire (Nübling et al., 2017). Items are rated on a 6-point scale from 1 (*very inaccurate*) to 6 (*very accurate*), with a total score ranging from 1 to 36. The Helping Alliance Questionnaire subscale has good psychometric properties (Nübling et al., 2017), and studies support its usefulness for internet-based care settings (Eichenberg et al., 2022). At the 3-month assessment, internal consistency was excellent ($\alpha = .93$).

To assess benefits and negative effects of treatments, the 15-item Inventory for the Assessment of Negative Effects of Psychotherapy (Ladwig et al., 2014) was administered. The Inventory for the Assessment of Negative Effects of Psychotherapy (INEP) assesses negative effects and benefits across the following areas: stigmatization, symptoms, partnership, family and friends, intrapersonal changes, dependence, and financial consequences. Items are rated on scales ranging from −3 (*worsened*) to 3 (*better/improved*), or from 0 (*disagree*) to 3 (*fully agree*; Ladwig et al., 2014). The INEP has been used in other internet-based treatment studies for sexual dysfunctions in women to describe both positive and negative treatment effects (Zarski et al., 2021) Participants who indicated that they had not completed all eight treatment modules were presented with a checklist of seven possible reasons (i.e., content of the online program was not useful, lack of personal contact, sufficient progress made, technical problems, lack of motivation, lack of time, participation was too demanding).

Content and Structure of Interventions

Both interventions consisted of eight modules and an optional booster module available 4 weeks after completion of the eights' module. Participants were asked to complete one module per week. To increase adherence and engagement with the programs, treatments were administered as guided interventions (Baumeister et al., 2014; Pihlaja et al., 2018), with participants receiving text based, asynchronous feedback for each completed module by clinical psychology students who identified as cisgender women, who had received extensive training for this study, and who were continuously supervised by a licensed clinical psychologist. Feedback was designed to include empathetic reassurance, unconditional positive regard, guidance on exercises, as well as encouragement of engaging with the at-home exercises (Meyers et al., 2020). Qualitative data indicated that a subsample of participants perceived this feedback as helpful and supportive (Meyers et al., 2022). Interventions included educational material as well as instructions for at-home exercises to be completed between modules presented via text, videos, and graphic illustrations. While about half of the content of each intervention followed either CBT or MBT rationale, both interventions included elements of sex education and sex therapy (Brotto, 2017; Brotto & Velten, 2020) and incorporated Basson's circular model of sexual response as an organizing element. Table 2 provides an overview of each module's content. Treatment manuals are available on request from the first author.

Data Analysis

Sample size was determined based on an a priori power analysis and practical considerations. A medium effect of $d = 0.6$ was expected for both active conditions compared to the waitlist (unpaired t test two-sided, $\alpha = .025$, $1 - \beta = 80\%$, allocation rate 2/1). As internet-based interventions commonly suffer from relatively high attrition rates, a 30% loss at T2 was expected. Based on these considerations, a total of 266 women were enrolled in the study. Per protocol, data were analyzed using an intention-to-treat approach. Treatment effects for primary and secondary outcomes were analyzed using linear mixed models including time, group, and Time × Group interaction as fixed effects as well as random intercepts using restricted maximum likelihood estimation. Within this model, T1, T2, and T3 were included as assessment points, and the control condition was selected as a reference category. While there was substantial loss of data at each of the follow-up assessments (see Figure 1), no systematic differences in the missingness between the groups regarding sociodemographic or sexuality-related variables as tested with chi-square and t tests were observed (see Supplemental Material S1 for more information). As using linear mixed models is considered state-of-the-art in dealing with missing data, missing data were not imputed for the main analysis (Sullivan et al., 2018; Twisk et al., 2013). For comparison, treatment effects were also analyzed using multiple imputation and repeated measurement analysis of variance. Per protocol, primary and secondary outcomes were also analyzed using intervention completers only (i.e., participants who completed all eight treatment modules).

Further, we scrutinized the clinical significance of the changes in primary and secondary outcomes at an individual level in the two active conditions using the methodology developed by Jacobson and Truax (1991). Toward this goal, we calculated the reliable change index (Jacobson & Truax, 1991) between T1 and T2, T1 and T3, and T1 and T4 and combined this measure with the established clinical cutoffs, which are ≤34 for the SIDI-F (Clayton et al., 2010) and ≥10 for the FSDS-R (DeRogatis et al., 2008). These two variables were then combined to create the following categories: (a) Clinically significant improvement: Reliable improvement (reliable change index >1.96) with follow-up scores in the healthy range; (b) Reliable but not clinically significant improvement: Reliable improvement but follow-up scores still in the clinical range; (c) No change, unproblematic: No reliable change and baseline scores in the healthy range; (d) No change, problematic: No reliable change and baseline scores in the clinical range; and (e) Reliable deterioration: Any reliable deterioration (reliable change index <−1.95).

Several indicators were considered to assess the number of adverse events or negative effects of the interventions or the study procedures. First, all concerns or negative effects mentioned by participants via email or as part of the online modules that could not be resolved in the e-coaching process were systematically recorded. Second, deterioration of symptoms was considered as part of the assessment of clinically significant change. To assess the number of reported negative effects at T2, negative responses (i.e., −3, −2, and −1) on INEP Items 1–6 and endorsement (i.e., mostly agree and fully agree) of INEP Items 7–15 were considered as negative effects. To assess potential benefits of treatment, positive responses (i.e., 1, 2, and 3) on INEP Items 1–6 were considered. Only effects attributed to the treatment itself, not circumstantial factors, were reported. Further, descriptive information on treatment adherence, utilization of other

Table 2
Content of the Interventions

Module	Cognitive behavioral therapy	Mindfulness-based therapy	Sex therapy (both interventions)
1	Introduction to the cognitive behavioral model	Introduction to the concept of mindfulness, raisin exercise, body scan exercise	Psychoeducation on low sexual desire symptoms and prevalence rates of sexual dysfunctions, involving a partner in treatment
2	Understanding the effects of sexual myths	Formal and informal mindfulness, staying present during mindfulness practice, body scan exercise	Circular model of sexual response (e.g., reasons for sex, situational factors), body image exercise
3	Identifying cognitive biases and developing helpful, alternative thoughts	Incorporate mindfulness into day-to-day life, mindful stretching exercise	Circular model of sexual response (e.g., sexual arousal, responsive desire), self-exploration exercise with a handheld mirror
4	Introduction to situational analysis	Mindfulness toward thoughts, dealing with distractions, sitting mediation exercise, short breathing meditation exercise	Circular model of sexual response (e.g., processing of sexual stimuli), information on sexual tools (e.g., vibrators, lubricants), exercises for effective self-stimulation, communicating with a partner about low sexual desire
5	Using situational analysis to develop helpful thoughts, identifying core beliefs via vertical arrow technique	Being present during sexual activity, walking meditation exercise	Circular model of sexual response (e.g., changing sexual behavior), exercises for effective self-stimulation
6	Using situational analysis to achieve interpersonal goals, identifying maladaptive schemas	Information on letting go during meditation, couples' meditation exercise	Introduction to partnered sensate focus exercises
7	Developing helpful thought patterns, weighing pros and cons of maladaptive versus helpful interpretations of sexual situations	Information on dealing with pain and aversive experiences during meditation, information on mindfulness resources (e.g., apps, books)	Information on the sexual response cycle (i.e., outcomes of sexual situations), more information on partnered sensate focus exercises
8	Summary of content	Working with detached awareness, dealing with difficulties in establishing a mindfulness practice	Information on the sexual response cycle (i.e., comparing old to new cycle), setting goals for the future, dealing with a recurrence of symptoms
Booster (optional)	Evaluating goal attainment Summary of previous modules	Evaluating goal attainment Summary of previous modules	Exploring personal sexual resources

treatment resources, and reasons for discontinuing treatment was described. Descriptive values of treatment satisfaction as measured via CSQ-I and the therapeutic relationship between participants and their e-coaches as measured via the Helping Alliance Questionnaire were reported. Data analysis was conducted using Statistical Package für Social Sciences 29 (IBM Corp., 2012) and R packages lmer Test (Kuznetsova et al., 2017) and mice (van Buuren & Groothuis-Oudshoorn, 2011). Data can be accessed here at https://osf.io/ej5hq/?view_only=1f6d0988a66943f7a91065ed22f53442

Results

Participant Characteristics

Table 3 shows participants' levels of sexual desire and sexual distress at all assessment points. As assessed with a structured interview, all participants met diagnostic criteria for HSDD (*ICD*-11) and SIAD (*Diagnostic and Statistical Manual of Mental Disorders, fifth edition*).

Across all conditions, 19.2% ($n = 50$) women indicated having experienced moderate to severe levels of sexual abuse in childhood, $F(2) = 2.18$, $p = .115$. About half of the women ($n = 134$, 50.4%) reported not having sought other treatment resources before enrolling in this study. However, 47.4% ($n = 126$) women had looked up information on low sexual desire on the internet before, 38.0% ($n = 101$) had talked to a friend, 25.9% ($n = 69$) had read self-help books, 13.2% had consulted their gynecologist, and 6.0% ($n = 16$) had tried some type of medication (e.g., testosterone gel, natural, or homeopathic medications). None of these variables differed between groups (all $ps > .161$).

Primary and Secondary Outcome

As shown in Table 4, both treatments yielded significant increases in sexual desire compared to the control group, with large effects at T2 ($d = 1.14$ for iCBST and $d = 1.11$ for iMBST) and medium effects at T3 ($d = 0.75$ for iCBST and $d = 0.74$ for iMBST).

Concerning sexual distress, both treatments led to significant decreases over time as compared to the control group, with large effects at T2 ($d = -1.14$ for iCBST and $d = -0.98$ for iMBST), which were sustained at T3 ($d = -1.18$ for iCBST and $d = -1.00$ for iMBST). Per protocol, the same analyses were conducted comparing participants who completed all eight modules of the treatment with the control group. Using only intervention completers, both treatments yielded significant improvements in sexual desire compared to the control group, with large effects at T2 ($d = 1.22$ for iCBST and $d = 1.28$ for iMBST) and large effects at T3 ($d = 0.80$ for iCBST and $d = 0.91$ for iMBST). Further, as compared with the control group, intervention completers showed significant greater decreases in sexual distress, with large effects at T2 ($d = -1.16$ for iCBST and $d = -1.33$ for iMBST) which were sustained at T3 ($d = -1.33$ for iCBST and $d = -1.31$ for iMBST). Please see Supplemental Table S2 for the complete models. For comparison, repeated measures analysis of variance yielded comparable patterns of results while yielding somewhat smaller effect sizes (see Supplemental Material S3).

Clinical Significance

Figure 2 shows the percentage of participants meeting criteria for the different clinical significance categories comparing baseline levels of sexual desire and sexual distress to T2, T3, and T4.

Across both treatments and all follow-up assessments, the number of participants showing clinically significant change ranged from 36% to 41% for sexual distress and 12% to 24% for sexual desire. Reliable change that was not clinically significant (i.e., large improvements still falling in the clinical range at follow-up) was equally likely for primary and secondary outcomes, with 30%–49% of participants falling into this category. For sexual desire, 35%–52% of women fell into the "no change, problematic" category, suggesting that they did not show substantial improvements with postscores still in the clinical range. For sexual distress, this category was met by 12%–30% of women. While a minority of women (up to 2%) fell in the "no change, unproblematic" category, no participant showed a reliable deterioration of symptoms.

Treatment Adherence and Help-Seeking Behavior

Out of the 212 women enrolled in the active conditions, 104 women (98.1%) in the iCBST group and 94 women (88.7%) in the iMBST group started treatment by completing the first module of

Table 3
Sexual Desire and Sexual Distress by Assessment Point and Treatment Group

Outcome and assessment	Total *M (SD)*	iCBST *M (SD)*	iMBST *M (SD)*	Control *M (SD)*
Primary outcome: Sexual Interest and Desire Inventory–Female				
Baseline assessment (T1)	17.6 (6.1)	17.6 (6.2)	17.6 (5.8)	17.4 (6.4)
3-month assessment (T2)	23.7 (8.9)	25.4 (9.2)	25.6 (7.8)	17.6 (7.3)
6-month assessment (T3)	23.8 (8.8)	24.6 (9.5)	26.2 (8.3)	19.8 (7.3)
12-month assessment (T4)	24.9 (9.5)	24.2 (10.3)	26.5 (9.0)	
Secondary outcome: Female Sexual Distress Scale–Revised				
Baseline assessment (T1)	30.1 (8.7)	30.8 (8.4)	30.1 (8.9)	28.7 (8.7)
3-month assessment (T2)	19.3 (12.3)	16.4 (11.7)	18.2 (12.9)	26.2 (9.6)
6-month assessment (T3)	18.4 (11.7)	15.1 (10.4)	16.6 (12.0)	25.0 (10.4)
12-month assessment (T4)	15.0 (9.9)	14.6 (9.7)	15.0 (10.8)	

Note. iCBST = internet-based cognitive behavioral sex therapy; iMBST = internet-based mindfulness-based sex therapy; T = time.

Table 4

Linear Mixed Models Comparing iCBST and iMBST With a Waitlist Control at Baseline (T1), 3-Month (T2), and 6-Month Follow-Up (T3)

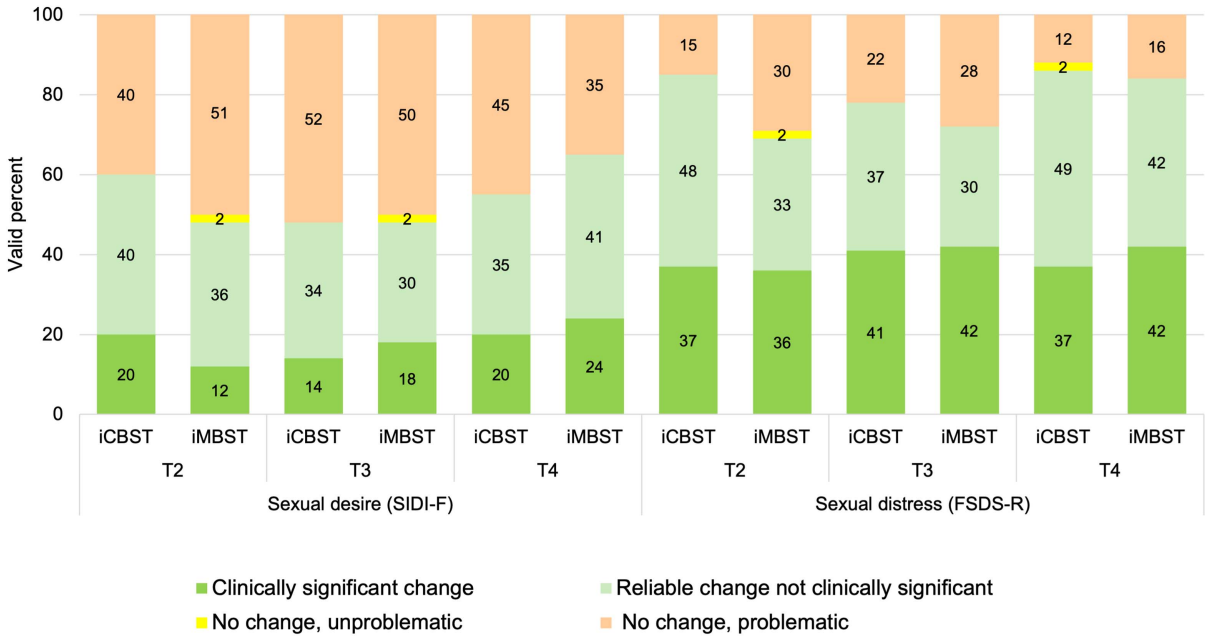
Variable	*b*	*SE*	*df*	*t*	*p*	*d*	95% CI for *b*
Primary outcome: Sexual Interest and Desire Inventory–Female							
Intercept	17.44	0.99	436	17.63	<.001		[15.50, 19.39]
Time (T2–T1)	−0.10	1.18	351	−0.08	.935	−0.01	[−2.41, 2.22]
Time (T3–T1)	2.00	1.14	348	1.75	.081	0.28	[−0.24, 4.25]
iCBST	0.14	1.22	436	0.12	.908	0.02	[−2.25, 2.53]
iMBST	0.14	1.22	436	0.12	.908	0.02	[−2.25, 2.53]
Time (T2–T1) × iCBST	8.31	1.47	356	5.64	<.001	1.14	[5.41, 11.20]
Time (T3–T1) × iCBST	5.42	1.49	358	3.64	<.001	0.75	[2.49, 8.35]
Time (T2–T1) × iMBST	8.08	1.47	357	5.49	<.001	1.11	[5.19, 10.98]
Time (T3–T1) × iMBST	5.37	1.51	359	3.54	<.001	0.74	[2.39, 8.35]
Secondary outcome: Female Sexual Distress Scale–Revised							
Intercept	28.74	1.37	416	21.01	<.001		[26.04, 31.43]
Time (T2–T1)	−2.61	1.56	340	−1.67	.095	−0.23	[−5.68, 0.46]
Time (T3–T1)	−3.31	1.52	338	−2.19	.029	−0.33	[−6.29, −0.33]
iCBST	2.04	1.68	416	1.20	.232	0.20	[−1.29, 5.32]
iMBST	1.33	1.68	417	0.73	.428	0.13	[−1.97, 4.64]
Time (T2–T1) × iCBST	−11.31	1.96	346	−5.78	<.001	−1.12	[−15.16, −7.46]
Time (T3–T1) × iCBST	−11.86	1.98	347	−6.00	<.001	−1.18	[−15.74, −7.97]
Time (T2–T1) × iMBST	−9.87	1.96	347	−5.04	<.001	−0.98	[−13.73, −6.02]
Time (T3–T1) × iMBST	−10.04	2.03	350	−4.96	<.001	−1.00	[−14.02, −9.06]

Note. iCBST = internet-based cognitive behavioral sex therapy; iMBST = internet-based mindfulness-based sex therapy; T = time; *SE* = standard error; CI = confidence interval.

the program. In other words, significantly more women in the iMBST versus iCBST condition did not begin their treatment, $t(210) = -2.80$, $p = .006$. Participants in the iCBST condition completed on average 6.33 ($SD = 2.25$) out of eight treatment modules as compared to 5.13 ($SD = 5.13$) in the iMBST condition, $t(210) = 3.32$, $p < .001$. More iCBST ($n = 60$, 56.6%) versus iMBST participants ($n = 41$, 38.9%) completed all eight treatment modules. It took intervention completers on average 12.99 weeks ($SD = 6.14$) to complete the

Figure 2

Clinical Significance of Change in Sexual Desire and Sexual Distress From Baseline (T1) to 3-Month (T2), 6-Month (T3), and 12-Month (T4) Assessment



Note. T = time; iCBST = internet-based cognitive behavioral sex therapy; iMBST = internet-based mindfulness-based sex therapy; SIDI-F = Sexual Interest and Desire Inventory–Female; FSDS-R = Female Sexual Distress Scale–Revised. See the online article for the color version of this figure.

iCBST program, and 14.43 weeks (SD = 7.28) to complete the iMBST program, $t(99) = -1.11$, $p = .142$. The optional booster module, which was made available to intervention completers 4 weeks after Module 8, was completed by 32 participants (30.2%) in the iCBST and iMBST conditions, respectively. Twenty-three and 30 women in the iCBST and iMBST conditions, respectively, reported on their reasons for not having completed their treatment. Lack of time was given as the most frequent reason, endorsed by 81.1% of women ($n_{iCBST} = 20$, $n_{iMBST} = 30$), followed by a lack of motivation with 35.8% ($n_{iCBST} = 7$, $n_{iMBST} = 12$), the content of the intervention not being useful with 13.2% ($n_{iCBST} = 2$, $n_{iMBST} = 5$), a lack of personal contact with 5.7% ($n_{iMBST} = 3$), technical problems with 1.9% ($n_{iMBST} = 1$). No significant group differences emerged concerning the reasons for not completing the program (all ps > .118).

While 72.0% of participants indicated at T2 not having sought additional help since enrolling in the study ($n_{iCBST} = 45$, $n_{iMBST} = 47$, $n_{control} = 24$), some participants reported having talked to friends ($n_{iCBST} = 17$, $n_{iMBST} = 18$, $n_{control} = 6$), or having read self-help books ($n_{iCBST} = 1$, $n_{iMBST} = 4$, $n_{control} = 2$). While no significant group differences emerged for these variables (all ps > .199), fewer women in the iCBST condition indicated having looked up information on the internet, $n_{iCBST} = 5$, $n_{iMBST} = 10$, $n_{control} = 10$, $\chi^2(2) = 6.76$, $p = .034$.

Treatment Satisfaction and Benefits of Treatment

At T2, satisfaction with the interventions was high and comparable across groups, iCBST: $M = 26.87$, $SD = 4.49$, iMBST: $M = 26.33$, $SD = 5.45$, $t(121) = 0.60$, $p = .547$. In total, 90.3% ($n = 56$) and 86.9% ($n = 53$) of participants who answered the CSQ-I were satisfied with iCBST and iMBST, respectively. Further, 93.6% ($n = 58$) and 88.6% ($n = 54$) stated that they would recommend their iCBST or iMBST program to a friend in need. Participants' satisfaction with the therapeutic relationship to their e-coach was satisfactory, iCBST: $M = 27.21$, $SD = 7.22$, iMBST: $M = 28.02$, $SD = 7.54$, and did not differ between groups, $t(121) = -0.61$, $p = .546$. A total of 74.8% of participants completing the INEP indicated at least one treatment benefit effect ($n_{iCBST} = 47$, $n_{iMBST} = 45$). Among the treatment benefits were feeling better since the end of treatment ($n_{iCBST} = 37$, $n_{iMBST} = 37$), having fewer conflicts with their partner ($n_{iCBST} = 31$, $n_{iMBST} = 23$), feeling less troubled by their past ($n_{iCBST} = 19$, $n_{iMBST} = 23$), and finding it easier to trust others ($n_{iCBST} = 18$, $n_{iMBST} = 7$). Reported treatment benefits did not differ between conditions (all ps > .330).

Negative Effects

During the complete study period, no adverse events that required intervention from a clinical psychologist (i.e., from the study coordinator) were registered. In other words, all negative experiences noted by participants as part of the treatment modules or other correspondence with their e-coach (e.g., problems with certain at-home exercises, relationship discord with their partner) could be resolved via the regular e-coaching process. Further, no serious adverse events were registered. At T2, 16.3% of participants completing the INEP indicated at least one negative effect ($n_{iCBST} = 11$, $n_{iMBST} = 9$). Among these were feeling anxious about friends or colleagues finding out about treatment ($n_{iCBST} = 2$, $n_{iMBST} = 3$), feeling more troubled by their past ($n_{iCBST} = 2$, $n_{iMBST} = 2$), feeling worse ($n_{iCBST} = 3$, $n_{iMBST} = 1$), having more conflict with their partner ($n_{iCBST} = 3$, $n_{iMBST} = 1$), feeling more "down" than usual ($n_{iCBST} = 2$, $n_{iMBST} = 1$), and experiencing trouble making decisions on their own ($n_{iCBST} = 1$), with no significant group differences (all ps > .315). It is also worth noting that one participant (iCBST) reported experiencing suicidal thoughts for the first time in their life, which she attributed to circumstantial factors, not the treatment or research study.

Discussion

This study evaluated the efficacy of two guided iCBST and iMBST interventions for the treatment of HSDD in women. To this end, a randomized-controlled trial was conducted, and sexual desire and sexual distress were assessed at baseline, 3 months, 6 months, and, for the active conditions only, 12 months. Compared with the waitlist control, both treatments produced significant improvements in sexual desire and sexual distress, with large effects at 3 months that were sustained at 6 months, supporting the efficacy of both treatment approaches.

Efficacy and Clinical Significance

This is the first randomized-controlled trial showing that both iCBST and iMBST lead to lasting improvements of low sexual desire symptoms in women diagnosed with HSDD. Treatment effects were comparable to those found in uncontrolled studies using pre–post comparisons (Brotto & Basson, 2014; Paterson et al., 2017; Stephenson et al., 2021) as well as a randomized-controlled study comparing eight face-to-face group sessions of sex education and therapy group versus MBST for women with SIAD (Brotto et al., 2021). While the scientific debate on the usefulness of pharmacological versus psychological treatments of low desire is ongoing (Brotto, 2015; Brotto et al., 2017), the effects of iCBST and iMBST are comparable to pre- to postchanges in sexual desire and distress over up to 24 weeks shown by flibanserin (desire: $d = 1.00–1.43$; distress: $d = 0.83–1.04$) and bremelanotide (desire: $d = 0.77–1.11$; distress: $d = 0.89–0.92$) while demonstrating a particularly positive risk profile (see below; Pyke & Clayton, 2018). Head-to-head trials are needed to fully compare psychological and pharmacological treatments for HSDS. Further, as shown in this study and others (Brotto et al., 2021), a key advantage of psychological treatments is the relative sustainability of effects. Our data showed that improvements in sexual desire and sexual distress were still present at 12-month follow-up, underscoring evidence that psychological treatments of HSDD can cause longer term change that is sustained after the end of treatment, something that has yet to be shown for any pharmacological treatment of HSDD.

This is the first study to report a comprehensive analysis of the clinical significance of symptom improvement from psychological treatments for HSDD. The results are promising with 55%–64% and 84%–86% of women experiencing reliable improvements of sexual desire and sexual distress, respectively, 12 months after the start of treatment. The findings for sexual distress are especially noteworthy as clinically significant distress is a key criterion for both HSDD (World Health Organization, 2018) and SIAD (American Psychiatric Association, 2013) and women who do not experience distress concerning their sexuality do not qualify for a sexual dysfunction diagnosis. This result also suggests that women may consider factors

beyond sexual desire (e.g., experience of arousal or intimacy with their partner) in the overall cognitive-emotional evaluation of their sexual lives (Hendrickx et al., 2016). It is possible that the elements of sex therapy presented in both iCBST and iMBST, such as information on the importance of responsive versus spontaneous sexual desire (Basson, 2001a) or sensate focus exercises, led to increases in self-acceptance that may have reduced feelings of distress (Binder et al., 2010) without automatically increasing women's motivation to engage in sex.

Risk and Benefits

The risk–benefit ratio of both interventions was positive, as the benefits of iCBST and iMBST outweighed the small number of negative effects (e.g., feeling anxious about other people finding out about treatment, feeling worse or having a low mood, more conflicts with a close partner). Also, no serious adverse events were recorded. This constitutes a major advantage over pharmacological treatments of HSDD using flibanserin, whose side effects can include dizziness, somnolence, nausea, and fatigue (Jaspers et al., 2016) and bremelanotide, whose side effects can include nausea, flushing, and headache (Simon et al., 2019; Spielmans & Ellefson, 2024).

The results support the safety of guided iCBST and iMBST for HSDD and are consistent with another internet-based treatment for genitopelvic pain/penetration disorder, which also reported few adverse effects unrelated to treatment efficacy (Zarski et al., 2021). To inquire about women's individual experiences, we also conducted semistructured, qualitative interviews with a subsample of participants aiming to assess (strengths and) weaknesses of the interventions as well as potential negative effects (Meyers et al., 2022, 2023). While no negative effects were described directly, some participants mentioned the relatively high burden and time commitment as weaknesses of the intervention (Meyers et al., 2022), something that studies on similar internet treatments for low sexual desire in women found as well (Stephenson et al., 2021).

Strengths and Limitations

The successful randomization of participants, which resulted in neither clinical nor sociodemographic baseline variables differing between the three conditions, is a particular strength of this study, especially as research on psychological treatments for sexual dysfunctions is largely characterized by small-scale, uncontrolled pilot studies (Frühauf et al., 2013; Zarski et al., 2022). While this study was powered to compare active treatments with the control condition, the sample size was not sufficient to reliably detect small-to-medium differences between active conditions that have been reported in studies comparing a sex education and therapy program with CBT elements with an MBST treatment (Brotto et al., 2021). This problem was exacerbated by the fact that many participants did not complete follow-up assessments, that is, about 60% of participants did not provide data at the 12-month follow-up, which is higher than reported in other recent online studies of sexual dysfunctions where 42% of 6-month follow-up data were missing (Zarski et al., 2021). Although we identified no predictors of selective dropout (see Supplemental Material 1), these high rates might have caused a systematic over- or underestimation of the true treatment effect in the data. While multiple imputation has been shown to yield unbiased estimates of treatment effects with even higher levels of missing data (Madley-Dowd et al., 2019), multiple imputations further decrease the power and thus prohibit studying moderating variables, which could be used to identify subsets of women who may benefit from one or the other approach (Brotto et al., 2020; Stephenson et al., 2023). Thus, maximum likelihood estimation for mixed models was used for the main analysis.

Our recruitment strategies were successful in that women of varying education levels and age ranges participated in our study. However, there was a lack of diversity concerning, for example, sexual minority women, with especially lesbian women being underrepresented. This finding is in correspondence with earlier studies on low sexual desire (Brotto & Basson, 2014; Brotto et al., 2021) suggesting that women who are partnered with men are particularly distressed by low desire, resulting in a sexual desire discrepancy in mixed sex/gender couples (Dewitte et al., 2020; Mark & Murray, 2012).

Clinical Implications

Both iCBST or iMBST can be recommended for use in women with HSDD (Brotto et al., 2021; Frühauf et al., 2013; Zarski et al., 2022). As differences in efficacy between iCBST and iMBST were small and nonsignificant, women's preferences should be considered as part of a person-centered treatment approach. In fact, the relatively higher number of women in this study who chose not to begin MBST could indicate that, for some women, learning and practicing mindfulness is considered too challenging or esoteric (Meyers et al., 2022), adding to emerging evidence that mindfulness-based approaches may not be appropriate for everyone, especially psychologically vulnerable populations (Kaufmann et al., 2021). The available evidence suggests that treatment efficacy does not depend on the mode of delivery, as shown in the comparable effect sizes of face-to-face versus internet-based treatments (Frühauf et al., 2013; Zarski et al., 2022). Thus, depending on availability, patients and care providers can choose the format that best meets their needs. As time constraints were a significant factor limiting women's adherence to treatment, women may select either an in-person treatment with, for example, a fixed weekly session, or choose a more flexible online-format. Psychological internet interventions for sexual concerns can be especially suitable for women living in rural areas or areas where access to qualified sexual health care providers is limited (Andersson & Titov, 2014; Velten & Margraf, 2023). In terms of future directions, there are significant challenges in making effective internet interventions available to patients in clinical practice (e.g., ensuring health insurance coverage), so a systematic implementation plan should be developed to integrate iCBST and iMBST programs for HSDD into complex, country-specific health care settings (Ross et al., 2018).

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