

Internet-Based Brief Sex Therapy for Heterosexual Men with Sexual Dysfunctions: A Randomized Controlled Pilot Trial

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DOI: 10.1111/j.1743-6109.2009.01321.x

ABSTRACT

Introduction. Internet-based sex therapy for men with erectile dysfunction has been advocated as an easily accessible and cost-effective treatment.

Aim. To test whether Internet-based sex therapy is superior to waiting list.

Methods. Internet-based therapy was administered to heterosexual men with erectile dysfunction or premature ejaculation, without face-to-face contact, in a waiting-list controlled design, with pre-, post-, and follow-up measurements at 3 and 6 months posttreatment. Treatment was based on the sensate-focus model of Masters and Johnson, and supplemented with cognitive restructuring techniques.

Main Outcome Measures. Self-reported improvement of sexual functioning, erectile functioning (men with ED), premature ejaculation (men with PE), sexual desire, overall sexual satisfaction, and sexual self-confidence.

Results. Ninety-eight men participated (58 ED, 40 PE). Sexual functioning was much or somewhat improved in 40 participants (48%). In participants with ED, a near significant effect of treatment was found ($P = 0.065$), with higher levels of sexual desire ($P < 0.05$) and sexual self-confidence ($P = 0.05$) in treated men, in addition to improved erectile functioning ($P = 0.01$) and overall sexual satisfaction ($P < 0.001$) in both groups. In participants with PE, treatment was not superior to waiting list. In participants with ED, erectile functioning ($P < 0.05$) and overall sexual satisfaction ($P = 0.002$) improved significantly. In participants with PE, latency to ejaculation ($P < 0.001$), sexual desire ($P < 0.05$), and overall sexual satisfaction ($P < 0.05$) improved significantly from baseline to posttreatment, with no further changes at both follow-ups. Sexual self-confidence in men with PE remained unchanged during treatment until follow-up at 3 months posttreatment, and then was found to be improved at 6-months follow-up ($P < 0.05$).

Conclusion. Internet-based sex therapy for male erectile dysfunction was efficacious for male erectile disorder. For men with premature ejaculation, however, treatment was not superior to waiting list. **van Lankveld JJDM, Leusink P, van Diest S, Gijs L, and Slob AK. Internet-based brief sex therapy for heterosexual men with sexual dysfunctions: A randomized controlled pilot trial. J Sex Med 2009;6:2224–2236.**

Key Words. Internet-Based Sex Therapy; Erectile Dysfunction; Premature Ejaculation

Introduction

The Internet provides an interface in the delivery of health care as it constitutes a venue for communication with specific temporal and spatial opportunities and constraints [1]. For many users, anonymity and temporal accessibility around the clock without geographical constraints are important characteristics why they prefer and use the

Internet [1]. The Internet has also become an increasingly important platform for research purposes in the domain of sexuality. Next to the use of computers in diagnostic work, manualized treatments delivered through the computer were developed for a diversity of psychological problems, including sexual dysfunctions [2,3]. An example in the field of sexology is “Sexpert,” a Canadian program for practitioners and patients (see Marks

et al. [2] for a review). Although initial research showed promising positive effects of "Sexpert" use in changing sexual attitudes and behavior, no controlled outcome study was published about this computerized therapy for sexual dysfunctions [2], and as far as our knowledge goes, this system is now defunct [4].

Although the use of Internet therapy as a potential treatment for sexual dysfunctions has been advocated frequently [5-7], surprisingly little empirical research has been done. Hall described the results of online sex therapy, using e-mail correspondence, with nine patients with various sexual dysfunctions in an uncontrolled study [8]. Eight patients reported progress in self-awareness, three reported better insight in their relationship, and six reported enhanced sexual knowledge. Seven patients mentioned a small, substantial, or large improvement in their sexual problems. One patient reported no improvement. No validated instruments were used to evaluate the results. In another, uncontrolled, pilot study 39 men with erectile dysfunction or premature ejaculation were treated using a secure web server for therapist-client communication [9]. Sex therapy [10] was administered during 3 months, and was conducted entirely through e-mail. The exercises were preceded by psycho-education, were and supported by cognitive interventions and, if judged as necessary by both therapist and participant, pharmacological treatment [11]. The number (on average 3.69; SD = 3.97) and frequency of e-mail contacts was left to the judgment of the therapist and participant. Forty-six percent of the participants dropped out. Fourteen participants (67% of the treatment completers) reported an improvement of their sexual functioning. Seven (47%) participants reported that improvement had sustained at least for 1 month after termination, eight (53%) participants reported no further change. The patient-as-own-control design of this study, however, could not eliminate the possibility that the positive results at post treatment were caused by other factors than the treatment provided, because experimental controls were lacking.

In another uncontrolled study in The Netherlands, Leusink and Aarts found that men who participated in e-consultation experienced significant improvements in erectile function [12]. In addition, 81% of men indicated that their erections had improved after consulting the website.

Recently in an Australian study the effectiveness of an internet-based psychological intervention for the treatment of erectile dysfunction was evaluated

in a controlled trial [13]. In total 31 men (12 in the treatment group, 19 in a control group) completed the program. Upon the start of treatment, 50% of the participants were using pro-erectile medication, which was continued throughout treatment. The 10-week treatment program was comprised of modules that were accessed by participants through the Internet, including sensate focus, and communication exercises. Additionally, unlimited e-mail contact with a therapist was offered. The purpose of contact with the therapist was to resolve difficulties that participants encountered during their work on the exercises. The results showed that men who completed the program reported improved erectile functioning and increased satisfaction with their sexual relationship. Other aspects of sexual functioning were not found to be improved after treatment. Gains during the therapy period were shown to be largely maintained at follow-up. Probably reporting on the same study sample, McCabe and Price reported that participants who received Internet therapy combined with medication reported similar results as participants who received Internet therapy alone [14].

In the present study, the effects of Internet-based therapy for sexual dysfunctions in heterosexual men were investigated in a waiting-list controlled design, with pre-, post-, and two follow-up measurements, using validated assessment instruments. In the only previously published, controlled study, McCabe et al. studied the efficacy of a modular treatment program in which therapist contact was mainly adjunctive to a self-help approach [13]. The present study was designed to test the efficacy of the standard therapist-delivered approach of sex therapy without direct face-to-face contact between therapist and participant. In this approach, therapist and participant discuss which elements in sensate focus therapy are specifically suitable for the participant. Moreover, the therapist uses cognitive restructuring to overcome any difficulties the participant encounters during exercises with his partner. Building upon the uncontrolled pilot study [9], further aims of the present study were to expand the study group with men with premature ejaculation, and to enhance the external validity of findings by increasing the similarity of the study to real-life treatment [9]. This was accomplished by demanding a fee from participants for the treatment. Moreover, a longer follow-up period was included, because previous studies of a minimal intervention approach to the treatment of sexual

dysfunction demonstrated considerable relapse rates after treatment termination [15,16]. Finally, larger numbers of participants were included.

Selected endpoints were self-reported improvement of sexual functioning as a result of treatment, and self-reported levels of erectile functioning (men with ED), premature ejaculation (men with PE), sexual desire, overall sexual satisfaction, and sexual self-confidence as indices of sexual functioning. The main research questions addressed in the present study were:

1. Is Internet-based therapy for heterosexual men with sexual dysfunctions superior to waiting list? We expected outcome of treatment to be superior to waiting list.
2. What is the temporal stability of treatment results of this Internet-based therapy after treatment termination? We expected maintenance of treatment gains beyond treatment termination.

Methods

Participants

Eighty-nine men with ED or PE were randomly assigned to treatment or waiting list. As the aim of the present study was to investigate whether a standard approach to the treatment of sexual dysfunction would be efficacious when delivered through the Internet without personal, face-to-face contact, male dysfunction types were included for which regular sex therapy was shown to have either well-established or probable efficacy [17,18]. Only heterosexual men of 18 years and older with self-reported erectile dysfunction (ED) or premature ejaculation (PE) were included. Self-reported homosexual and bisexual men were not eligible, as were men with other sexual problems, such as hypoactive sexual desire disorder, sexual obsessions and compulsions, gender identity disorders, paraphilias, or problems with sexual orientation. Applicants with psychiatric disorders (depressive disorder, substance dependence disorder, or psychotic disorder, defined according to DSM-IV-TR [19] and diagnosed with the Mini Psychiatric Interview, MINI) were excluded because of the strong comorbidity of these disorders with sexual dysfunctions, both caused by the psychiatric disorder itself and by its pharmacological treatment [20–23]. Men with severe relational discord (MMQ score on the relationship dissatisfaction subscale >30 [24] were also excluded, because marital satisfaction is significantly associ-

ated with sexual dysfunction [25]. Applicants with physical conditions or illnesses (such as radical prostatectomy, spinal cord lesion, penile pain or curvature, multiple sclerosis, Parkinson's disease, penile or testicular cancer, status after radio or chemotherapy, diabetes mellitus with vascular complications) that would interfere with normal sexual functioning were excluded.

Study Design

Upon enrolment, participants were randomly allocated to treatment or waiting list. Randomization was performed in strata based on sexual dysfunction type (ED, PE). Block randomization was performed in blocks of 10 participants. After the treatment and waiting-list period (3 months), and following posttreatment assessment, waiting-list participants entered treatment. Assessment was performed according to the schedule shown in Figure 1. Pretreatment data of waiting list participants were carried forward and used as pretreatment data in the repeated-measures analysis, resulting in a time lag between pretreatment and posttreatment data of this subgroup of 6 months instead of the 3-month time lag in participants who were immediately allocated to the treatment group. In the latter group follow-up assessment was performed at 3 and 6 months upon treatment termination. In the waiting-list group, only one follow-up assessment was performed at 3 months posttreatment termination. Thus, the total duration of participation in the study of all participants was 9 months. Approval for the study was obtained from the Medical Ethics Committee of Erasmus Medical Centre Rotterdam.

Instruments

The Mini International Neuropsychiatric Interview (MINI) is a structured diagnostic interview, developed to assess the diagnoses of psychiatric patients according to DSM-IV and ICD-10 criteria [26]. The sections assessing alcohol addiction, depression, and psychotic symptoms were used. The MINI has not yet been validated in The Netherlands.

The Maudsley Marital questionnaire (MMQ) measures relational, sexual, and general dissatisfaction [27]. The Dutch version has shown good reliability and validity [24]. For this study the relationship dissatisfaction subscale was selected. The internal consistency of this subscale in the present study sample ($N = 314$) at pretreatment was large (Cronbach's $\alpha = 0.89$) according to Cohen's criteria [28].

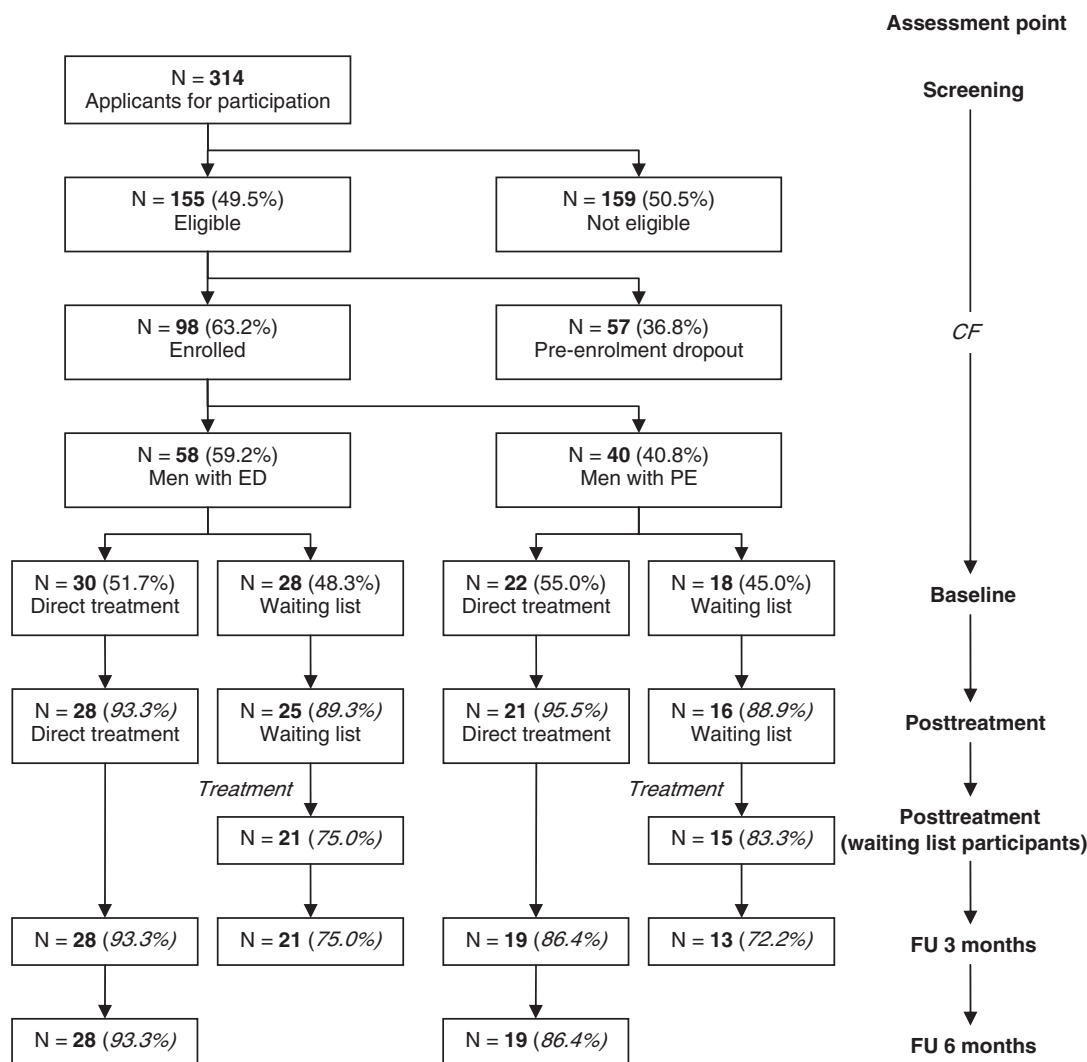


Figure 1 Participant flow. *Italic%*, Percentage based on participant number at baseline assessment; CF = Carry Forward of data from screening to baseline; *Treatment* = Waiting list participants receive treatment between these assessment points.

The International Index of Erectile Function (IIEF) is a frequently employed measure of various aspects of male sexual functioning [29]. It has thus far not been validated in The Netherlands. For this study, subscales measuring erectile functioning (IIEF-EF), level of sexual desire (IIEF-SD), and overall sexual satisfaction (IIEF-OS) were selected. The internal consistency of these subscales in the present study sample (N = 314) at pretreatment was large (respectively, Cronbach's $\alpha = 0.83, 0.87, \text{ and } 0.82$).

The Golombok Rust Inventory of Sexual Satisfaction (GRISS) measures sexual dissatisfaction and sexual dysfunctions of heterosexual individuals [30]. Versions for males and females are available. This questionnaire has good reliability and validity

and has been validated for Dutch populations [31,32]. For this study, the subscale measuring premature ejaculation (GRISS-PE) was used. The internal consistency of this subscale in the present study sample (N = 314) at pretreatment was medium to large (Cronbach's $\alpha = 0.77$).

The participants were asked to indicate level of improvement/impairment of their sexual functioning as a result of the treatment on a Global End-point Question (GEQ). The possible answers ranged from much worse (1), through not worse/not better (3), to much better (5).

The confidence subscale (four items) of the Self-Esteem and Relationship (SEAR-CONF) questionnaire measures sexual self-esteem and general satisfaction with the partner relationship

[33]. The internal consistency of this subscale in the present study sample ($N = 314$) at pretreatment was very good (Cronbach's $\alpha = 0.86$).

Internet Site

The password-protected Internet site (<http://www.sekstherapie.nl>) was specifically designed for this study by one of the investigators (PL). The site was freely accessible through the World Wide Web and could be easily identified by potential users, when Dutch-language key words referring to sex therapy and male sexual dysfunction were used in browser programs. Participants could apply for participation in the study by completing a screening questionnaire on the site. The therapists were presented on the homepage with a short biosketch and a photo. The goals and contents of the treatment that would be provided were also explained. The objectives, limitations, and all conditions for participation in the study were mentioned and endorsement of the informed consent statement was required before the answers on the screening questionnaire could be submitted for evaluation.

Treatment

The treatment was conducted by eight experienced and licensed sex therapists, four female and four male. Treatment duration was 3 months. The treatment elements were identical to those described in van Diest et al. [9] The approach was based on the model of Masters and Johnson [10], with a prominent role for the so called "sensate-focus exercises." The instructions for these exercises could be sent as text file attachments to therapist's messages. Inspired by Annon's PLISSIT model [34], the exercises were always accompanied by psycho-education and cognitive interventions. Pharmacological treatment was started if therapist and participant agreed that pharmacological support could support the psychological interventions. If the former was deemed potentially helpful, the participant received the advice to visit his own general practitioner to validate the indication and assess potential contraindications. Advice was also given regarding preferred type of medication; respectively, PDE-5 inhibitors or intracavernous injection therapy for participants with ED, and either clomipramine [35], SSRI-type antidepressant, or topical anesthetic cream [36] for participants with PE. The time limit for answering by the therapist was set at 5 days. The number and frequency of therapeutic contacts was left to the judgment of the therapist and the participant. When the therapist sent a

message, an e-mail was automatically sent to the participant as a notification to access this message on the Web server. The same procedure started when a participant submitted a message. Only the participant and his therapist had authorized access to the participant's full history and the messages they exchanged.

Procedure

After completion and submission of the screening questionnaire, which explicitly required giving informed consent, participants were screened for inclusion and exclusion criteria. Included applicants were enrolled after they paid a €100 fee. Of this fee, €55 was reimbursed upon completion of the last follow-up questionnaire. When the participant was assigned to the treatment condition, the name of the therapist was e-mailed to the participant. Subsequently, the therapist contacted the participant through the server to start treatment. If a participant was excluded from the study, the reason for exclusion was communicated together with an advice regarding the type of treatment that was thought to be suitable for his problem(s) and how this help could possibly be obtained.

Statistical Analysis

Demographic data and pretreatment, psychological, relational, and sexual-functioning data were analyzed using descriptive statistics. Sexual-functioning data of participants with, respectively, ED and PE, were compared to verify assignment to diagnostic group. The result of the randomization procedure was checked both with respect to demographic data and to pretreatment level of end-point variables. The efficacy of treatment, as compared with the waiting list group, was investigated in a mixed between-within statistical design, using repeated-measures analysis of variance, with baseline and posttreatment data as within-subjects repeated measures. The time course of sexual functioning from pretreatment through posttreatment to 3- and 6-month follow-up was investigated with repeated measures analysis using data from measurements at baseline, posttreatment, and follow-ups as within-subjects repeated measures. For this analysis, the data of waiting-list and treatment group participants were lumped together. Greenhouse-Geisser correction for violations of the sphericity assumption in repeated measures analyses was used when appropriate. All analyses were performed separately for men with ED and men with PE. Finally, data were compared of participants who actually started treatment (or waiting

Table 1 Demographic features and sexual characteristics of the primary applicant group and the group who was included and enrolled in the study

Variables	Categories	Applicants (N = 314)		Enrolled participants (N = 98)	
		%	M ± SD	%	M ± SD
Age of applicant (years)			41.4 ± 12.7		43.3 ± 12.3
Age of partner (years)			38.2 ± 12.7		40.1 ± 11.0
Length of relationship (years)			11.2 ± 11.5		12.1 ± 11.8
Lives in steady relationship	Yes	68		72	
Education level (highest achieved)	Elementary—lower secondary	14		6	
	Higher secondary—professional	31		19	
	College—university	55		75	
Self-reported sexual orientation	Heterosexual	92.4		100.0	
	Homosexual	1.9		0.0	
	Bisexual	5.7		0.0	
Has sought previous help for sexual problem	Yes	32.3		41.8	

list) vs. those who were found eligible but dropped out before treatment commenced. Effects were considered statistically significant when $P < 0.05$.

Results

Participants

In total, screening data of 314 applicants were filed within a recruitment period of 18 months. Table 1 shows demographic, psychological, and sexual characteristics of this applicant group and of the enrolled subsample. One hundred fifty-nine applicants (50.5%) were not eligible. Applicants were excluded with self-reported homosexual (3.8%) or bisexual orientation (11.3%), diagnoses of depression (33.3%), psychotic disorder (35.8%), substance-related disorder (22%), severe marital discordance (59.7%), or because they presented other sexual problem types than ED or PE (44.7%). Of the excluded applicants, 41.8% met one single exclusion criterion, 27.5% met two criteria, 15.7% met three, 11.8% met four, and 3.3% met five criteria.

Of the eligible participants, 57 dropped out before randomization because they did not pay the fee ($N = 46$), or withdrew ($N = 11$) for other reasons. Of the men who participated in the study ($N = 98$) and who were randomly allocated to the treatment or waiting list, those with PE ($M = 40.1 \pm 10.5$ years) were younger than those with ED ($M = 45.5 \pm 13.0$ years; $t(96) = 2.16$, $P < 0.05$). Participants with ED and PE did not differ regarding level of education, use of medication, daily number of cigarettes, daily alcohol consumption, or relationship status ($P > 0.05$). Dissatisfaction with the partner relationship (MMQ) was higher in PE men than in ED men ($t(96) = 2.9$, $P = 0.005$). More ED men (50%) than PE men (30%) had sought previous help for their sexual

problem ($\chi^2(1) = 4.2$, $P < 0.05$). The baseline levels of the study endpoints of participants with ED and PE were compared. MANOVA was performed with sexual dysfunction type (PE, ED) as between-group factor, and IIEF-EF, GRISS-PE, IIEF-SD, IIEF-OS, and SEAR-CONF as dependent variables. A main effect of sexual dysfunction type was found, $F(5,92) = 25.65$, $P < 0.001$. Post hoc univariate tests revealed that participants with PE ($M = 26.3 \pm 6.2$) reported a higher level of erectile function (IIEF-EF) than those with ED ($M = 18.7 \pm 6.5$; $F(1,96) = 33.21$, $P < 0.001$), and that participants with PE ($M = 15.1 \pm 2.2$) reported more symptoms of premature ejaculation (GRISS-PE) than those with ED ($M = 9.6 \pm 4.0$; $F(1,96) = 62.98$, $P < 0.001$). Both groups did not differ with regard to sexual desire, overall sexual satisfaction, and sexual confidence. These findings were considered to confirm the diagnostic classification of sexual dysfunction type. To examine the prevalence of comorbid sexual dysfunction, including both erectile dysfunction and premature ejaculation, baseline sexual function scores were evaluated. Using a score of 20 as cutoff point for the IIEF-EF subscale [29], 88% of the participants in the ED group scored lower. Thirty-five percent of the PE men scored lower, indicating the coexistence of erectile difficulties in this subsample. Using a score of 11 as cutoff point for the GRISS premature ejaculation subscale, all PE-participants scored higher. Of the ED men, 34% scored higher, indicating the coexistence of premature ejaculation.

Randomization Check

In participants with ED, MANOVA was performed with treatment vs. waiting list as between-group factor, and IIEF-EF, IIEF-SD, IIEF-OS, and SEAR-CONF as dependent variables. No multivariate ($F(4,53) = 0.54$, $P = 0.705$) or univariate

differences were revealed. Age was not different in both groups, $P > 0.05$. In participants with PE, MANOVA was performed with treatment vs. waiting list as between-group factor, and with GRISS-PE, IIEF-SD, IIEF-OS, and SEAR-CONF as dependent variables. No multivariate differences were found, $F(4,35) = 1.50$, $P = 0.223$, but univariate testing showed that treatment-group participants ($M = 5.1 \pm 2.3$) reported higher overall sexual satisfaction at baseline assessment than waiting-list participants ($M = 3.7 \pm 1.0$), $F(1,38) = 5.29$, $P < 0.05$. Age was not different in both groups, $P > 0.05$. These findings were considered to reflect successful randomization.

Treatment Characteristics

The number of messages exchanged between therapist and participant ranged from 2 to 28, ($M = 17.9 \pm 5.7$; median = 20). The number of text files sent to participants, describing how specific sensate focus exercises could be carried out, ranged from 0 to 6 ($M = 1.8 \pm 1.7$; median = 1). The length of messages varied widely, from single-sentence responses to lengthy stories in which participants described their experiences. The following quote is an example of a message from a participant in the active stage of treatment. It is not necessarily representative.

The last exercise that you suggested to us was pleasurable. The touching and massaging of each other without the pressure of having to perform was good for both of us. Now that we approach each other again, my wife is confronted with her strong blockade to have intimate contact and to try to have sex. In the last couple of years she has often felt disappointed when we tried to make love without me being able to change my problem. For my part, I feel again the uncertainty if my erection will last long enough, and the urge to perform. I keep wondering whether I will succeed and not have to disappoint her (and myself) again. So at this point we experience this critical point that we need to overcome. We do, however, talk a lot and I feel that we do this in a positive and constructive way. We now have four days off together, and we will make an effort to create a nice atmosphere so that we can be more close and intimate, as you suggested in your last message.

In 23% of participants, additional medication was advised by the therapist. The proportion of participants per therapist who received medication advice ranged from 0%–66.7%. In men with ED, PDE-5 inhibitors were advised in four cases and intracavernous injection therapy with papaverine in one case. In men with PE clomipramine was advised in six cases [35], paroxetine in one case, and topical anesthetic cream in two cases [36]. One participant was referred to a psychiatrist for antipsychotic medication. Medication use was followed up by the therapists.

Global Evaluation of Treatment Outcome (GEQ)

To assess participants' global evaluation of the efficacy of treatment with respect to their sexual functioning, posttreatment GEQ data of participants who were assigned to immediate treatment and those who were treated after their waiting list period were lumped together ($N = 83$). Sexual functioning was reported to be "much improved" by 10 (12%), "somewhat improved" by 30 (36%), "unchanged" by 36 (43%), "somewhat worse" by six (7%), and "much worse" by one participant (1%). Participants who were initially assigned to immediate treatment and those assigned to the waiting list, and participants with ED and PE did not differ in this respect ($P > 0.05$).

Is Internet-based Therapy for Men with Sexual Dysfunctions Superior to Waiting List?

In participants with ED, repeated-measures MANOVA was performed with *group* (treatment vs. waiting list) as between-subjects factor, with *time* (pretreatment, posttreatment) as within-subjects factor, and with erectile functioning, sexual desire, overall sexual satisfaction, and sexual self-confidence as dependent variables. A main effect was found of *time*, $F(4,48) = 5.10$, $P = 0.002$, partial $\eta^2 = 0.30$, and a near significant time \times group interaction effect, $F(4,48) = 2.37$, $P = 0.065$, partial $\eta^2 = 0.17$. Reporting of this latter finding is viewed as justified by the observed large effect size¹ (Cohen's $d = 0.91$) [28]. Post hoc univariate tests of the main effect of Time revealed that in both groups, erectile functioning ($F(1,51) = 7.05$, $P = 0.01$, partial $\eta^2 = 0.12$), and overall sexual satisfaction ($F(1,51) = 19.46$, $P < 0.001$, partial $\eta^2 = 0.28$) were improved from pretreatment to posttreatment. Post hoc univariate tests of the interaction effect revealed that sexual desire ($F(1,51) = 4.21$, $P < 0.05$, partial $\eta^2 = 0.08$) and sexual self-confidence ($F(1,51) = 3.98$, $P = 0.05$, partial $\eta^2 = 0.07$) were more improved in the treatment group compared to waiting list. A trend of improved overall sexual satisfaction in treatment over waiting list participants was found, $F(1,51) = 3.29$, $P = 0.076$, partial $\eta^2 = 0.06$, Cohen's $d = 0.51$. Group statistics are shown in Table 2.

In participants with PE, repeated-measures MANOVA was performed with *group* (treatment vs. waiting list) as between-subjects factor, *time* (pretreatment, posttreatment) as within-subjects factor, and premature ejaculation, sexual desire,

¹Effect size (Cohen's d) is calculated as $d = 2 \eta / (1 - \eta^2)^{1/2}$ [37].

Table 2 Sexual functioning (M ± SD) in treatment and waiting-list control conditions before and immediately after, respectively, Internet-based sex therapy and waiting list in men with ED and PE

Sexual dysfunction type Variables	Waiting list (N = 25)		Treatment (N = 28)		Total (N = 53)	
	Pretreatment	Posttreatment	Pretreatment	Posttreatment	Pretreatment	Posttreatment
Erectile dysfunction						
IIEF erectile function	19.0 ± 6.6	20.7 ± 7.5	18.7 ± 6.1	22.2 ± 7.5	18.8 ± 6.3	21.5 ± 7.5
GRISS premature ejaculation	9.6 ± 3.5	8.6 ± 3.1	9.2 ± 4.5	8.5 ± 3.6	9.4 ± 4.1	8.5 ± 3.3
IIEF sexual desire	7.0 ± 2.0	6.6 ± 2.0	7.1 ± 2.0	7.5 ± 1.4	7.0 ± 2.0	7.1 ± 1.8
IIEF overall satisfaction	5.2 ± 2.6	6.0 ± 2.4	4.5 ± 2.0	6.4 ± 2.4	4.8 ± 2.3	6.2 ± 2.4
SEAR self-confidence	21.9 ± 4.8	20.3 ± 2.6	20.3 ± 4.8	21.5 ± 5.4	21.1 ± 4.8	20.9 ± 4.3
<hr/>						
	Waiting list (N = 16)		Treatment (N = 21)		Total (N = 37)	
Premature ejaculation						
IIEF erectile function	25.9 ± 6.4	28.1 ± 7.9	27.1 ± 5.8	30.3 ± 6.6	26.6 ± 6.0	29.4 ± 7.2
GRISS premature ejaculation	14.9 ± 2.1	13.4 ± 2.3	15.5 ± 2.3	13.2 ± 2.5	15.2 ± 2.2	13.3 ± 2.3
IIEF sexual desire	7.5 ± 1.5	7.2 ± 1.6	7.2 ± 1.4	7.8 ± 1.0	7.3 ± 1.4	7.5 ± 1.3
IIEF overall satisfaction	3.6 ± 0.9	4.7 ± 1.5	5.2 ± 2.2	6.0 ± 2.2	4.5 ± 1.9	5.5 ± 2.1
SEAR self-confidence	21.5 ± 5.3	20.3 ± 1.5	22.0 ± 4.9	21.0 ± 4.7	21.8 ± 5.0	20.7 ± 3.6

overall sexual satisfaction, and sexual self-confidence as dependent variables. A main effect was found of *time*, $F(4,32) = 14.90$, $P < 0.001$, partial $\eta^2 = 0.65$. The *time* × *group* interaction was not significant ($F(4,32) = 1.76$, $P = 0.16$). Post hoc univariate tests of the main effect of *Time* revealed that premature ejaculation ($F(1,35) = 43.05$, $P < 0.001$, partial $\eta^2 = 0.55$), and overall sexual satisfaction ($F(1,35) = 8.77$, $P = 0.005$, partial $\eta^2 = 0.20$) were improved from pretreatment to posttreatment. Univariate comparison revealed that sexual desire ($F(1,35) = 5.11$, $P < 0.05$, partial $\eta^2 = 0.13$) was more improved in the treatment group compared to waiting list. Group statistics are shown in Table 2.

Are Treatment Results of Internet-Based Therapy Maintained after Treatment Termination?

In participants with ED, repeated measures MANOVA was performed with *time* (pretreatment,

posttreatment, follow-up 3 months, follow-up 6 months) as within-subjects factor, and erectile functioning, sexual desire, overall sexual satisfaction, and sexual self-confidence as dependent variables. A trend effect of *time* was found, $F(12,191) = 1.71$, $P = 0.067$, partial $\eta^2 = 0.09$, Cohen's $d = 0.63$. Post hoc univariate contrasts revealed that erectile functioning ($F(1,25) = 5.35$, $\epsilon = 0.822$; $P < 0.05$, partial $\eta^2 = 0.18$), and overall sexual satisfaction ($F(1,35) = 12.49$, $\epsilon = 0.774$; $P = 0.002$, partial $\eta^2 = 0.33$) improved significantly from pretreatment to posttreatment, while these aspects of sexual functioning remained unaltered at subsequent points in time. Group statistics are shown in Table 3 and in Figure 2.

In participants with PE, repeated measures MANOVA was performed with *time* (pretreatment, posttreatment, follow-up 3 months, follow-up 6 months) as within-subjects factor, and premature ejaculation, sexual desire, overall sexual satisfac-

Table 3 Sexual functioning (M ± SD) before and after Internet-based sex therapy and at follow-up assessment at 3 and 6 months post-treatment in men with ED and PE

Sexual dysfunction type Variables	Pretreatment	Posttreatment	FU 3 months	FU 6 months
Erectile dysfunction (N = 26)				
IIEF erectile function	19.0 ± 6.1	22.4 ± 7.3*	22.0 ± 8.0	22.2 ± 8.0
IIEF sexual desire	7.0 ± 2.1	7.6 ± 1.4	7.4 ± 1.7	7.7 ± 1.6
IIEF overall satisfaction	4.5 ± 2.0	6.3 ± 2.3**	6.4 ± 2.5	6.1 ± 2.2
SEAR self-confidence	20.5 ± 4.8	21.5 ± 5.5	21.9 ± 6.1	22.2 ± 5.5
Premature ejaculation (N = 18)				
GRISS premature ejaculation	15.4 ± 2.4	13.2 ± 2.6***	12.9 ± 3.2	13.4 ± 3.1
IIEF sexual desire	7.2 ± 1.5	7.9 ± 1.0*	7.4 ± 1.3	7.5 ± 0.9
IIEF overall satisfaction	4.9 ± 2.0	6.1 ± 2.3*	5.4 ± 2.0	5.7 ± 1.7
SEAR self-confidence	21.7 ± 4.9	20.9 ± 4.8	20.3 ± 4.7	21.3 ± 4.5*

Note: Univariate differences of score at time point vs. preceding time point; * $P < 0.05$; ** $P < 0.005$; *** $P < 0.001$.

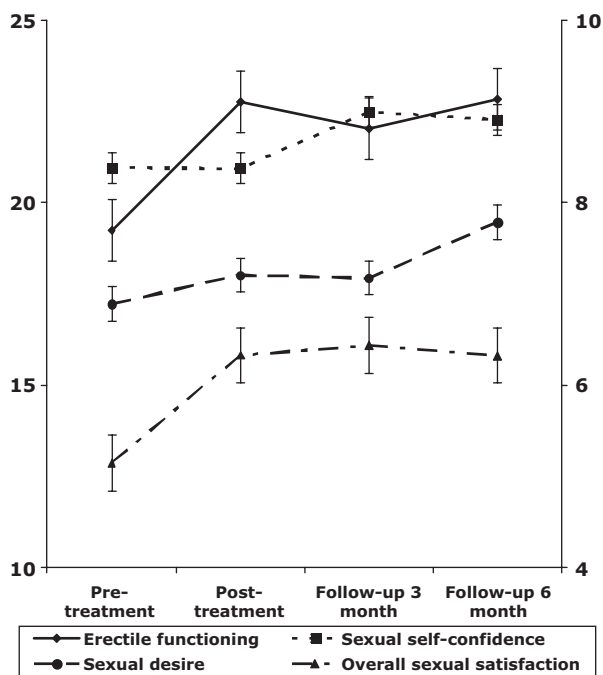


Figure 2 Sexual functioning at pretreatment, posttreatment, and follow-up assessment at 3 and 6 months posttreatment in participants with ED (Means \pm SEM). Note: Left y-axis: scores on subscales of Erectile function (IIEF) and sexual self-confidence (SEAR); Right y-axis: scores on subscales of Sexual desire (IIEF) and overall sexual satisfaction (IIEF).

tion, and sexual self-confidence as dependent variables. A significant *time* effect was found, $F(12,127) = 5.42$, $P < 0.001$, partial $\eta^2 = 0.31$. Post hoc univariate contrasts revealed that premature ejaculation ($F(1,17) = 22.98$, $\epsilon = 0.756$; $P < 0.001$, partial $\eta^2 = 0.58$), sexual desire ($F(1,17) = 6.23$, $P < 0.05$, $\epsilon = 0.791$; partial $\eta^2 = 0.27$), and overall sexual satisfaction ($F(1,17) = 6.66$, $P < 0.05$, $\epsilon = 0.839$; partial $\eta^2 = 0.28$) improved significantly from pretreatment to posttreatment, while these aspects of sexual functioning remained unaltered at subsequent points in time. Whereas sexual self-confidence did not improve from pretreatment through follow-up assessment at 3 months posttreatment, it was found to improve from this point onward to follow-up measurement at 6 months posttreatment, $F(1,17) = 5.10$, $P < 0.05$, $\epsilon = 0.765$; partial $\eta^2 = 0.23$. Group statistics are shown in Table 3 and in Figure 3.

Exploratory Analyses

The number of participants who started adjunctive pharmacological treatment was too small to allow for statistical testing. For exploratory purposes,

however, we compared participants who started medication treatment with those who did not. In men with ED who started medication ($N = 4$), higher posttreatment erectile function ($M_{\text{med}} = 26.3 \pm 6.4$ vs. $M_{\text{nonmed}} = 21.5 \pm 7.6$), higher posttreatment overall sexual satisfaction ($M_{\text{med}} = 8.3 \pm 1.7$ vs. $M_{\text{nonmed}} = 6.0 \pm 2.4$), and higher posttreatment sexual self-confidence ($M_{\text{med}} = 25.0 \pm 4.0$ vs. $M_{\text{nonmed}} = 21.0 \pm 5.5$) were found. Participants with ED who reported no improvement or worsening of their sexual functioning during treatment (posttreatment GEQ rating) did not differ from those who reported some or much improvement regarding with respect to whether or not medication advice during treatment was given ($P > 0.05$). In men with PE who started medication to delay ejaculation, no noteworthy differences were observed, compared with those who did not start pharmacological treatment.

Dropout Analysis

Reasons stated by participants for their withdrawal or for not paying the fee were, among others, "we decided to give it another try to use the stop-start

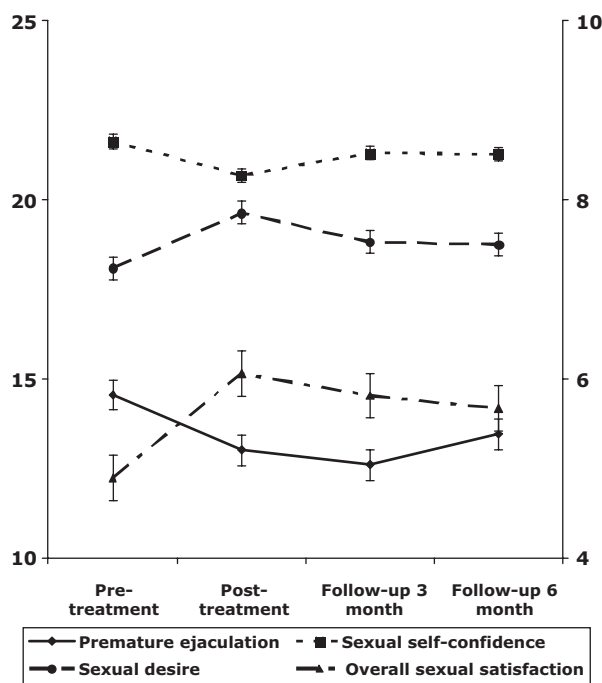


Figure 3 Sexual functioning at pretreatment, posttreatment, and follow-up assessment at 3 and 6 months posttreatment in participants with PE (Means \pm SEM). Note: Left y-axis: scores on subscales of Premature Ejaculation (GRIS) and sexual self-confidence (SEAR); Right y-axis: scores on subscales of sexual desire (IIEF) and overall sexual satisfaction (IIEF).

technique (for PE) that we were taught in previous treatment,” “completing these questionnaires lowered the threshold to consult our family doctor,” “my partner and I just broke up the relationship,” and “I don’t like the idea of a lottery deciding whether or not I can start with therapy immediately.” The applicants who dropped out ($M = 39.1 \pm 13.2$ years) were younger than participants who entered the study phase ($M = 43.3 \pm 12.3$ years; $t(153) = 2.02$, $P < 0.05$). They also reported lower levels of education ($\eta^2(6) = 14.5$, $P < 0.05$), and higher daily numbers of cigarettes smoked ($\eta^2(4) = 17.2$, $P < 0.005$). Dropouts did not differ from follow-through participants regarding sexual dysfunction type, the use of medication, level of daily alcohol consumption, relationship status, or previous help sought for sexual dysfunction ($P > 0.05$). Dropouts and follow-through participants were compared regarding baseline levels of the study endpoints, in separate analyses for participants with, respectively, ED and PE. In participants with ED, MANOVA was performed with dropout vs. follow-through as between-group factor, and erectile functioning, sexual desire, overall sexual satisfaction, and sexual self-confidence as dependent variables. No multivariate ($F(4,83) = 0.77$, $P = 0.547$) or univariate differences were revealed. In participants with PE, MANOVA was performed with dropout vs. follow-through as between-group factor, and premature ejaculation, sexual desire, overall sexual satisfaction, and sexual self-confidence as dependent variables. No multivariate ($F(4,62) = 1.17$, $P = 0.334$) or univariate differences were revealed.

Discussion

Of all participants who received sex therapy for ED or PE through the Internet, 48% reported that treatment had resulted in their sexual functioning being “improved” or “much improved.” No beneficial effect on their sexual functioning was reported by 43%, whereas 8% reported that their sexual functioning had become “worse” or “much worse.” In men with ED, Internet-based sex therapy was found to be superior to waiting list when the end-point variables representing erectile functioning, level of sexual desire, overall sexual satisfaction, and sexual self-confidence were simultaneously evaluated in a multivariate test. Whereas level of erectile functioning and overall sexual satisfaction improved from pretreatment to post-treatment assessment in both treatment and

waiting-list groups, level of sexual desire, and sexual self-confidence improved significantly more in the treated group. Furthermore, a trend toward greater improvement of overall sexual satisfaction in this group was revealed. In men with PE, when level of premature ejaculation, sexual desire, overall sexual satisfaction, and sexual self-confidence were evaluated in a multivariate test, treatment was not found to be superior to waiting list, although a trend in this direction was observed.

The time course of treatment effects was evaluated in a repeated-measures analysis of data at four assessment points: pretreatment, posttreatment, and follow-up at 3 and 6 months. In men with ED, improvements in erectile functioning and overall sexual satisfaction were found to occur during the treatment period, and to be largely maintained until 3 and 6 months after treatment termination. In men with PE, improvements with respect to their symptoms of premature ejaculation, sexual desire, and overall sexual satisfaction also occurred between pretreatment and posttreatment, and were maintained until 6 months follow-up. The only exception to this pattern was found with regard to sexual self-confidence, which first did not change, but improved only between the two follow-up assessments. In contrast, a gradually increasing level of sexual self-confidence was observed in participants with ED. The present data do not provide a clear explanation for the late onset of improvement of sexual self-confidence in men with PE. Speculatively, the initial absence of change might be associated with the lack of improvement during treatment regarding ejaculatory latency and sense of control. After termination of treatment, as the expectation of improvement lessened, the level of self-confidence could have improved synchronously with the reduction of the PE symptoms.

The effect of Internet-based sex therapy for male erectile dysfunction, as established in the present study, corroborates previous uncontrolled [9] and controlled research [13]. It confirms previous evidence that psychological treatments are efficacious for male erectile disorder [17] and extends this finding to treatment formats without direct client-therapist contact. This study was the first controlled trial in which the efficacy of Internet-based sex therapy was also investigated in men with premature ejaculation. For this diagnostic group, however, treatment was not found superior to waiting list. General patient characteristics cannot account for this lack of treatment success,

as the subsamples of men with PE and ED did not differ on demographic features and a number of aspects of sexual functioning, with the exception of their levels of, respectively, erectile functioning, and premature ejaculation. Experienced problem severity of men with ED in the study appears higher than of men with PE, as more men with ED had sought professional help before entering the present study. Relational factors, reflected in higher marital dissatisfaction in PE-men, compared with ED-men, might play a role. Previous reviews of sex therapy studies pointed out that psychological treatment for premature ejaculation has limited success, in the sense that treatment gains are often lost over time [38,39]. Moreover, the finding, that 50% of the ED-men and 30% of the PE-men in our sample had sought previous help, indicates that we attracted a population of help seekers with recurrent or treatment-resistant problems, which may have negatively impacted our treatment results.

Limitations and Future Research

Although the pattern of results supports the efficacy of this treatment format for men with ED, some effects attained only borderline statistical significance, pointing to a problem with statistical power. Future studies that aim to replicate and extend the present findings may need to increase power by including larger numbers of study participants. In this first study, a very selective sample was studied. As the study aimed to specifically evaluate the delivery format of sex therapy, only groups of patients were selected that could be presumed to be efficaciously treated by regular sex therapy in a face-to-face delivery format, both on the basis of sexual dysfunction type and the absence of comorbid conditions, known to interfere with sexual functioning. To increase the external validity of the study of Internet-based sex therapy, however, future research should include more heterogeneous samples. The same applies to the constraints on the duration of treatment, which was now set at 3 months, but which will, in many cases, extend over longer periods of time.

It appears also warranted to extend Internet-based sex therapy to the partner of the applicant since sexual dysfunctions are embedded in sexual relationship, and to compare the effects of Internet-based treatment in which the partner is involved to individual treatment without any partner involvement. Furthermore, Internet-based sex therapy for homosexual men and women should be investigated.

The reasons why individual therapists advised for medication and specific medication types were not recorded. An adequate account for the variation among therapists in their medication advice can therefore not be provided. One reason for the difference might be that nonmedically trained therapists in this study were less inclined to give medication advice than the two therapists with a medical/biological background. Recording therapist's motives to advise supplementary pharmacological treatment and recording the extent in which medication was used during the treatment, is recommended for follow-up studies.

Although the efficacy of Internet-based sex therapy for heterosexual men with sexual dysfunction, compared with waiting list, appears promising, direct comparison of Internet-based and face-to-face sex therapy with random assignment to treatment groups as well as the investigation of predictors of treatment success in both treatment types is required to develop appropriate matching strategies of the characteristics of men with sexual dysfunction with treatment delivery format. To perform a direct test of the use of Internet exchange of messages between therapist and participant, the use of Internet and communications through postal mail should be compared.

Acknowledgments

We want to thank the sex therapists who were involved in delivery of the Internet-based treatment in this study, next to two of the authors (AKS, PL): Maria Schopman, Aart Beekman, Ceryl Janssen, Djinnie van Delft, Vera Steenhart and Maartje Zandbergen.

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Conflict of Interest: This research project was supported by unrestricted grants from Eli Lilly and from the Amsterdam 1998 Foundation. A.K. Slob is member of the advisory board of Eli Lilly.

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