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No Talking, Just Writing! Efficacy of an Internet-Based Cognitive Behavioral Therapy with Exposure and Response Prevention in Obsessive Compulsive Disorder

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Psychotherapy · Online therapy · Internet therapy · Telecare · Cognitive behavioral therapy

Abstract
Background: Many patients with obsessive-compulsive disorder (OCD) do not receive first-line treatment according to the current guidelines (cognitive behavioral therapy with exposure and response prevention, CBT with ERP) due to barriers to treatment. Internet-based therapy is designed to overcome these barriers. The present study evaluates the efficacy of an Internet-based writing therapy with therapeutic interaction based on the concept of CBT with ERP for patients with OCD. ***Methods:*** Thirty-four volunteers with OCD according to DSM-IV-criteria were included in the trial and randomized according to a waiting-list control design with follow-up measures at 8 weeks and 6 months. The intervention consisted of 14 sessions, either starting directly after randomization or with an 8-week delay. Main outcome measure was the change in the severity of OCD symptoms (Yale-Brown Obsessive Compulsive Scale Self-Rating, Y-BOCS SR, and Obsessive-Compulsive Inventory-Revised, OCI-R). ***Results:*** Obsessive-compulsive symptoms were significantly improved in the treatment group compared to the waiting-list control group with large effect sizes of Cohen's d = 0.82 (Y-BOCS SR) and d = 0.87 (OCI-R), using an intention-to-treat analysis. This effect remained stable at 6-month follow-up. Only 4 participants (12%) dropped out prematurely from the study. Of the 30 completers, 90% rated their condition as improved and would recommend the program to their friends. ***Conclusions:*** Internet-based writing therapy led to a significant improvement of obsessive-compulsive symptoms. Even though replications with larger sample sizes are needed, the results support the notion that Internet-based approaches have the potential for improving the treatment situation for patients with OCD.

Obsessive-compulsive disorder (OCD) is a severe mental disorder with an estimated lifetime prevalence of 2–3% [1, 2]. OCD is characterized by intrusive thoughts, images or impulses (obsessions), usually followed by ritualized repetitive behavior (compulsions; e.g. hand-washing or checking) that aim at neutralizing the obsessive content. OCD causes significant functional impairment and distress and substantially affects the social and work situation [3, 4]. If no adequate treatment is administered, OCD usually takes a relapsing course and becomes chronic [5–7].

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Cognitive-behavioral therapy (CBT) with stimulus exposure and response prevention (ERP) is the first-line treatment for OCD according to standard guidelines [8]. Response rates between 63 and 90% were reported [9]. However, about 30% of patients drop out of the treatment prematurely [10, 11]. Pre-post effect sizes, compared to a control group, range from d = 0.281 to d = 1.590 with a mean effect size of d = 0.998 [12]. A newer meta-analysis reported an even higher mean effect size of g = 1.39 [13]. Even though there is substantial evidence for its effectiveness [14, 15], many patients do not receive this treatment [16, 17].

Several barriers to treatment have been identified, including logistic and financial barriers, as well as shame and the fear of stigmatization or discrimination [18]. The resulting consequences reflect in the long delay from the onset of the disorder until the first treatment, on average 11 years [19]. Thus, there is a demand for new developments in the psychotherapeutic care of OCD. To bridge this gap, low-threshold options are needed that are time-efficient and can be integrated into the daily routine of the therapist and patient.

Telemental health (TMH) approaches have the potential to improve the insufficient treatment situation. Preliminary evidence suggests that these approaches represent a low-threshold, efficacious, time-effective and economic treatment for patients with OCD [20]. The different TMH approaches for the treatment of OCD range from unguided self-help through online interventions with minimal therapist involvement to video-based psychotherapy [for an overview see 20]. High dropout rates in studies on unguided self-help approaches [e.g. 21] suggest that the implementation of therapeutic interaction seems advisable.

Andersson et al. [22] applied a partly tailored, but otherwise standardized self-help manual in a pilot study and in a randomized controlled trial [23] and included e-mail contact with a therapist. This method comes close to the therapist-supported writing therapy, an approach that has been used in the treatment of various other disorders with good results (including posttraumatic stress disorder [24–26], complicated grief [27, 28], social phobia [29–31], panic disorder [32, 33], generalized anxiety disorder [34, 35], depression [36, 37] and burnout [38]). However, therapist-supported writing therapy goes beyond a self-help approach with therapist contact. As a half-standardized approach, it holds the possibility to individually adjust the tasks to the patient. Despite this promising prospect, Internet-based writing therapy with therapeutic interaction has not yet been investigated as a treatment for OCD [20].

The present study tested the hypotheses that (1) an Internet-based, therapist-guided writing therapy (CBT with ERP) will be accepted by participants with OCD (treatment satisfaction, rate of completers), (2) this treatment is efficient and leads to a significant reduction of OC symptoms in comparison to a waiting-list control group and (3) symptom reduction can be maintained for a period of 6 months.

Material and Method

Recruitment

The study was approved by the ethics committee in Freiburg and was registered in the German Clinical Trials Register (main ID: DRKS00004612). Written informed consent was obtained from all study participants. We recruited participants from May 2011 until April 2012 through public media and websites for OCD as well as through outpatient psychiatrists who recommended the treatment to their patients.

To be included in the study, participants had to undergo a four-step assessment. Inclusion criteria were a diagnosis of OCD according to DSM-IV criteria as their primary (most severe) disorder, fluency in written and spoken German, access to the Internet for the treatment period, age 18–65 years and an agreement by their outpatient psychiatrist for crisis intervention. We excluded participants who had another relevant current or past mental disorder, including a severe major depressive episode, an organic brain disorder, substance abuse or dependence, suicidal ideation, psychotic episode, psychotherapeutic treatment or an OCD-specific treatment with ERP in the last 5 years. Participants had to be free from or on a stable psychotropic medication for at least 3 months. The inclusion and exclusion criteria were assessed in an extensive telephone interview by an experienced clinical master-level psychologist according to DSM-IV criteria. Further, the assessment consisted of the completion of an online survey that included the below-described measures and additional demographic questions, the consultation of an outpatient psychiatrist who confirmed the diagnosis and a second telephone interview to assess symptom severity and clarify any ambiguities from the previous steps (fig. 1). In case participants did not meet the above criteria they received information about other treatment options. Consulting the psychiatrist was of special importance, since this confirmed the diagnosis and guaranteed a fallback crisis intervention (although it turned out not to be needed). Thereby, a high quality was ensured.

Study Design

The study followed a randomized, controlled, waiting-list control group (WLCG) design. Participants were randomized to one of the two experimental conditions (immediate therapy start group, ISG, vs. WLCG) using a block randomization with randomly permuted blocks. They received access to the secure web-based communication system. The WLCG started the treatment with a delay of 8 weeks (duration of the treatment). The outcome measures were assessed at five time points. The baseline measure (T_{-1}) was conducted during the screening process. The second as-

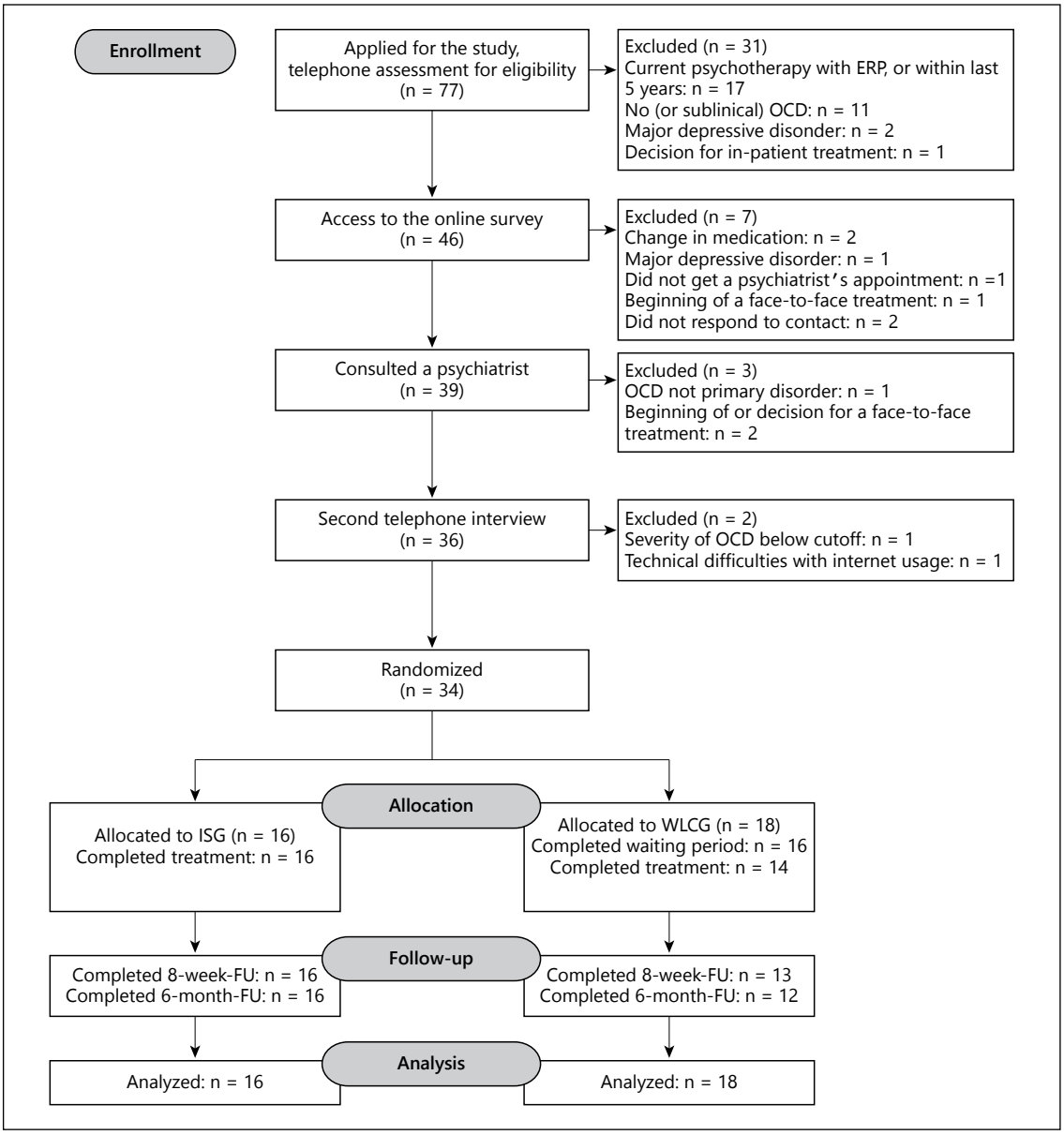

Fig. 1. CONSORT flow diagram of participants through the trial. FU = Follow-up.

sessment took place before the intervention (T_0), which was after the waiting period for those in the waiting-list condition. Both groups were assessed directly after the treatment (T_1), as well as 8 weeks (T_2) and 6 months (T_3) after the end of the treatment.

Outcome Measures

Yale-Brown Obsessive Compulsive Scale (Y-BOCS). The Y-BOCS [39] is a well-established semistructured interview that measures the severity of intrusive thoughts and compulsive behavior. It was used a single time in the screening process to assess the severity and also to verify the data of the self-report version of the Y-BOCS.

The self-report version of the Y-BOCS (Y-BOCS SR) [40] was used as the primary outcome criterion. The questionnaire consists of 10 questions. Each question is rated on a 5-point Likert scale, scoring between 0 (no symptoms) and 4 (severe symptoms), thereby allowing for a total score between 0 and 40. Subscores for obsessions (0–20) and for compulsions (0–20) can be calculated. The Y-BOCS has good psychometric characteristics [39]. The self-report version correlates highly with the original scale [41, 42], thus allowing a good assessment of the severity of OCD symptoms via the Internet.

Obsessive-Compulsive Inventory-Revised (OCI-R). The OCI-R [43] is a self-report measure for assessing symptoms of OCD. It

contains 18 items and 6 subscales and has good psychometric properties [43–45]. These also apply to the German version [46]. The following instruments were used to measure the general psychopathology. The Beck Depression Inventory-II (BDI-II) [47] assesses the severity of depression while the Brief Symptom Inventory (BSI) [48], as a short form of the Symptom Checklist 90-Revised (SCL-90R) [49], measures the subjectively perceived impairment of a person caused by physical and psychological symptoms over a period of 7 days.

Patient Global Impression of Improvement Scale (PGI-I). The PGI-I is a one-item scale for assessing the global improvement compared to the start of treatment. The 7-point item ranges from 'very much better' (+3) to 'no change' (0) to 'very much worse' (–3).

Internet-Specific Questions. In addition to the symptomatic instruments, self-constructed questions concerning participants' satisfaction with the Internet-based contact were asked (e.g. How did you experience being treated via the Internet instead of face-to-face?). They were constructed as multiple-choice questions allowing for additional open answers.

Internet-Based Therapy

The 8-week treatment was implemented as a half-standardized, Internet-based writing therapy with therapeutic interaction. All communication between the participant and therapist took place exclusively via the Internet. The treatment consisted of 14 sessions (twice a week with the exception of the first and the last week), which were based on established and evidence-based cognitive-behavioral manuals and methods [50]. The treatment was conducted by 3 experienced cognitive behavioral therapists, each with at least 4 years of therapeutic expertise. Every participant was assigned to one individual therapist for the treatment period. Therapists received supervision every fourth session. Treatment adherence was controlled by a licensed cognitive behavioral therapist specialized in the treatment of OCD. Participants received instructions or exercises for the respective sessions from their study therapists via a secure web-based communication system. After completing these tasks, they replied in written form and shared their experience with the therapist. The therapist then provided individual feedback and requests for the previous task, as well as the largely standardized instructions for the next task. The study protocol guaranteed the participants a reply of their therapist within one business day. To ensure this, the participants were asked to set themselves two deadlines a week for their work on the tasks and to communicate their deadlines to their therapist.

The overall emphasis was placed on the realization of ERP as recommended in guidelines as the treatment of first choice for OCD [51]. The content of the treatment was divided into three phases. The first phase served to identify relevant problem areas, to provide psychoeducation about OCD and to prepare for ERP. In the second phase, participants exposed themselves to the relevant stimuli, starting with an imaginary confrontation (exposure in sensu). This served to identify and anticipate potential difficulties. Afterwards, participants carried out three exposure sessions in vivo with each session increasing in difficulty. Participants were encouraged to generalize the newly acquired skills to different OCD-associated situations. The final phase centered on the identification and modification of precipitating and maintaining factors of the obsessive behavior, the development of strategies for relapse prevention as well as a review of the treatment. During the entire treatment phase, participants completed weekly adverse event questions as a safety measure. In case of a significant worsening, a telephone appointment was established.

Strategy of Data Analysis/Statistical Procedures (Analysis)

Data were analyzed using IBM SPSS Statistics for Windows (IBM Corp., Armonk, N.Y., USA). Participants who did not complete the intervention (treatment period for the ISG, waiting and treatment period for the WLCG) as well as the posttreatment measures were considered as dropouts. An intention-to-treat analysis was employed. Considering the rather stable nature of OCD, missing data were imputed by the Last-Observation-Carried-Forward method.

The equivalence of the randomized groups at baseline was evaluated by calculating independent sample t tests for continuous variables and Pearson's χ^2 for categorical variables. Following recommendations [52, 53], the inferential confidence interval method was used as a second test for equivalence.

To evaluate the efficacy of the intervention, data collected before and after the treatment (ISG) were compared to the data before and after the waiting period (WLCG) computing a two-way analysis of variance (ANOVA) with the repeated measures factor Time and the between-subject factor Group (ISG, WLCG).

In order to allow for statements on the stability of the therapeutic effect, the two groups were combined and pre-post intervention data were analyzed (within-subject measures without group comparison). Specifically, the data collected at T_0 (prior to the intervention phase in both groups), T_1, T_2 and T_3 were analyzed (i.e. the assessment T_{-1} prior to the waiting time of the WLCG was not included). A one-way ANOVA with the repeated measures factor Time and contrasts relative to the pre-measure (T_0) was calculated.

Clinical significance of change was defined according to the criteria by Jacobson and Truax [54]. Their method includes the calculation of (a) an index for a reliable symptom improvement (reliable change index, RCI) and (b) a cutoff for the symptom severity after the treatment. To apply these criteria to the Y-BOCS, the procedure of Fisher and Wells [55] with a cutoff of 14 points on the Y-BOCS SR was used. Finally, means and standard deviations were calculated for the global ratings of life and treatment satisfaction (PGI-I) as well as for the Internet-specific questions.

Due to the number of tests, the level of significance was set to $p \leq 0.01$ in order to counteract a potential α-error inflation. For a classification of the therapeutic success, effect sizes were derived by calculating Cohen's d based on the pooled standard deviation. To indicate the average time therapists spent for a treatment session means were calculated.

Results

Demographic Characteristics

Seventy-seven potential participants responded to the public notice of the study. A majority of 43 were excluded in the screening process due to various reasons (see fig. 1 for details), mostly (n = 17) because they met the

Table 1. Demographic description of the participants

Characteristic	ISG (n = 16)	WLCG (n = 18)	Statistics	p
Gender				
Women/men	11/5	11/7	$\chi^2(1) = 0.21$	0.642
Mean age ± SD, years	38.19±8.80	33.22±9.50	t(32) = 1.574	0.125
Min–max	28–59	19–55		
OCD duration				
Mean length ± SD, years	15.00±8.57	13.11±11.10	t(31) = 0.538	0.594
Mean age at onset ± SD, years	23.73±9.70	20.17±6.72		
Mean baseline scores ± SD				
Y-BOCS SR	20.25±6.71	20.00±5.40	t(32) = 0.120	0.905
OCI-R	26.00±10.03	25.89±10.00	t(32) = 0.032	0.974
BDI-II	13.75±9.11	13.22±8.36	t(32) = 0.176	0.861
Education				
Mean duration ± SD, years	15.56±3.69	17.72±5.99	t(32) = 1.247	0.222
Secondary education				
No educational qualifications	– (0)	– (0)		
Lower secondary education ('Hauptschule')	– (0)	– (0)		
High school diploma ('Realschule')	3 (19)	2 (11)		
International baccalaureate ('Abitur')	12 (75)	14 (78)		
Other	1 (6)	2 (11)		
Distribution of the qualifications above			Fisher-Yates	0.858
Employment				
Working full time	7 (44)	9 (50)		
Working part-time	4 (25)	4 (22)		
Not working	4 (25)	3 (17)		
Unemployed	1 (6)	2 (11)		
Distribution of the employments above			Fisher-Yates	0.957
Living situation				
Living with partner	12 (75)	11 (61)		
Living alone	1 (6)	3 (17)		
Other	3 (19)	4 (22)		
Distribution of the living situations above			Fisher-Yates	0.762
Family status				
Single	7 (44)	13 (72)		
Married	9 (56)	5 (28)		
Divorced	– (0)	– (0)		
Widowed	– (0)	– (0)		
Distribution of the family status above			Fisher-Yates	0.163

SD = Standard deviation. Figures in parentheses are percentages. In the statistics column, figures in parentheses are degrees of freedom.

exclusion criterion of a previous OCD-specific treatment in the last 5 years. Thirty-four participants met the inclusion criteria and entered the study. Following the CONSORT recommendations [56], the flow of participants through the trial is shown in figure 1. The mean age of the sample was 35.56 years (SD = 9.38, range = 19–59), 22 of the participants were female (65%), 12 were male (35%). Overall, 24 participants (71%) had a history of psychotherapeutic treatment with an average of 1.79 treatments (SD = 1.32). Only 3 of them reported to have experience with ERP. Most participants (n = 25) were free from psychotropic medication, only a minority of 9 participants were on a stable medication, mostly with selective serotonin reuptake inhibitors. The mean Y-BOCS SR total score was 20.12 (SD = 9.38), with 9.15 (SD = 3.70) for the obsessions and 10.97 (SD = 3.82) for the compulsions subscale. The clinician-administered version of the Y-BOCS showed a high correlation of 0.81 ($p < 0.001$) with the self-rating version, thereby indicating that the self-rating assessment is a valid measure of symptom severity. Table 1 provides an overview of the characteristics of both groups at baseline.

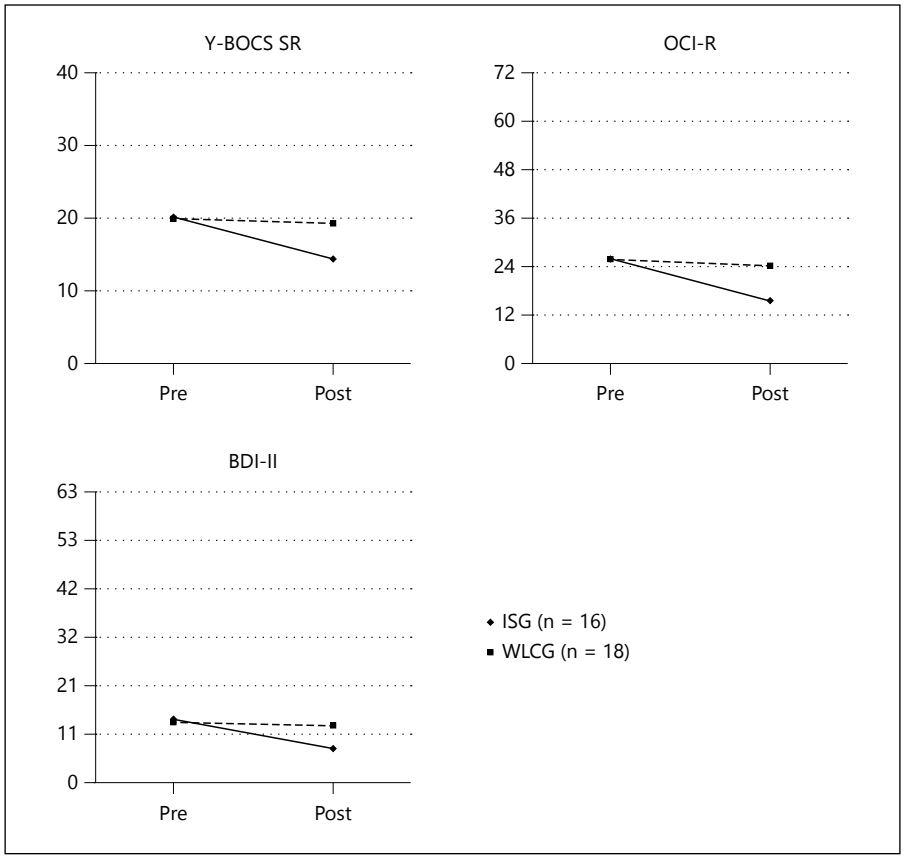

Fig. 2. Scores of the main outcome measures, contrasting the pre-post comparisons for both study conditions (i.e. Internet therapy and waiting period).

Dropout

Out of the 34 participants who started the treatment phase, 30 completed the protocol and the post-treatment survey. Only 4 participants (12%) dropped out prematurely and all of them had been allocated to the WLCG. Two left the study during the waiting period (1 found another treatment, another one's OCD symptoms subsided), the other 2 left in the treatment phase, immediately before the start of the ERP sessions. Twenty-nine participants completed the first follow-up assessment, 28 the final assessment after 6 months.

Treatment Efficacy

As a prerequisite for calculating group comparisons, the equivalence at baseline was tested. Both groups showed no significant differences regarding age, gender, education and symptom severity at baseline at a level of significance of 0.10, which should allow for a sensitive detection of differences (see table 1 for details). Even if the inferential confidence interval method was applied, no group differences emerged.

The comparison of the ISG with the WLCG revealed significant Group × Time interactions for the OCD symptoms both on the Y-BOCS SR [$F(1, 32) = 9.150$, $p = 0.005$] and on the OCI-R [$F(1, 32) = 18.803$, $p < 0.001$] as well as for the depressive symptoms on the BDI-II [$F(1, 32) = 14.710$, $p = 0.001$]. The main effect for both groups over time (pre-post) showed significant improvements for all three measures – Y-BOCS SR [$F(1, 32) = 14.506$, $p = 0.001$], OCI-R [$F(1, 32) = 37.413$, $p < 0.001$], and BDI-II [$F(1, 32) = 24.514$, $p < 0.001$]. In terms of the magnitude, the results showed only minimal mean improvements for the WLCG (Y-BOCS SR: 0.67, OCI-R: 1.78, BDI-II: 0.78) contrasting considerable improvements for the ISG (Y-BOCS SR: 5.81, OCI-R: 10.44, BDI-II: 6.13). The improvements on the OCD-related measures compared to the WLCG both yielded large effect sizes of $d = 0.82$ (Y-BOCS SR) and $d = 0.87$ (OCI-R). Those on the BDI-II reached a medium effect size with $d = 0.56$. Results also revealed larger improvements on the Y-BOCS compulsions subscale [$F(1, 32) = 19.689$, $p < 0.001$] than on the Y-BOCS obsessions subscale [$F(1, 32) = 5.516$, $p = 0.025$]. The results are presented in table 2 and figure 2.

Table 2. Main outcome measures for both study conditions before and after treatment/waiting period, as well as for all participants before and after treatment

Measure	Treatment effectiveness			Treatment stability	
	ISG (n = 16)	WLCG (n = 18)	ES	all participants after treatment (n = 34)	ES
Y-BOCS SR score					
Before treatment/waiting period	20.25±6.71	20.00±5.40			
After treatment/waiting period	14.44±5.90	19.33±6.46	0.82		
Y-BOCS SR obsessions score					
Before treatment/waiting period	9.19±4.26	9.11±3.25			
After treatment/waiting period	7.25±2.95	8.50±3.91	0.34		
Y-BOCS SR compulsions score					
Before treatment/waiting period	11.06±4.30	10.89±3.46			
After treatment/waiting period	7.19±3.65	10.83±3.73	0.95		
Y-BOCS SR score					
Before treatment				19.76±6.49	
Immediately after treatment				15.15±6.93	0.83
8 weeks after treatment				14.56±7.70	0.93
6 months after treatment				14.79±7.09	0.89
OCI-R score					
Before treatment/waiting period	26.00±10.03	25.89±9.99			
After treatment/waiting period	15.56±8.93	24.11±10.84	0.87		
Before treatment				25.00±10.35	
Immediately after treatment				17.76±10.62	0.83
8 weeks after treatment				16.41±11.01	0.97
6 months after treatment				17.44±10.54	0.86
BDI-II score					
Before treatment/waiting period	13.75±9.11	13.22±8.36			
After treatment/waiting period	7.62±7.54	12.44±8.61	0.56		
Before treatment				13.06±8.74	
Immediately after treatment				8.29±7.02	0.60
8 weeks after treatment				8.26±7.20	0.61
6 months after treatment				7.41±7.04	0.71

ES = Effect size (calculated as Cohen's d). Values are presented as mean ± SD.

Stability of the Treatment Effects

The analysis of all participants confirmed the highly significant symptom reduction on the Y-BOCS SR [$F(1, 33) = 16.626$, $p < 0.001$], on the OCI-R [$F(1, 33) = 22.471$, $p < 0.001$] and on the BDI-II [$F(1, 33) = 15.172$, $p < 0.001$]. The evaluation of the contrasts (T_1 vs. T_0, T_2 vs. T_0, T_3 vs. T_0) showed that all these scores differed significantly from the pretreatment score. The corresponding effect sizes even revealed a slight improvement at the 8-week and the 6-month follow-up with numbers up to d = 0.97 (table 2). This result indicates a stability of the achieved symptom reductions over 6 months after treatment (fig. 3). It bears mentioning that by analyzing the larger sample, both the Y-BOCS obsessions subscale [$F(1, 33) = 5.544$, $p = 0.007$] and the compulsions subscale [$F(1, 33) = 24.088$, $p < 0.001$] showed a highly significant reduction, which remains stable over time.

Clinical Significance

The comparison of the 16 participants of the ISG after the treatment with the 16 completers of the WLCG after the waiting period showed that in both groups participants scored equal or below a cutoff of 14 points on the Y-BOCS SR (ISG: 7, 44%; WLCG: 3, 19%), thereby fulfilling the cutoff criterion. However, the mean improvement these responders had on the Y-BOCS differed widely (ISG: 8.00 points, WLCG: 1.67 points). Four (25%) participants in the ISG had a symptom improvement of 10 or more

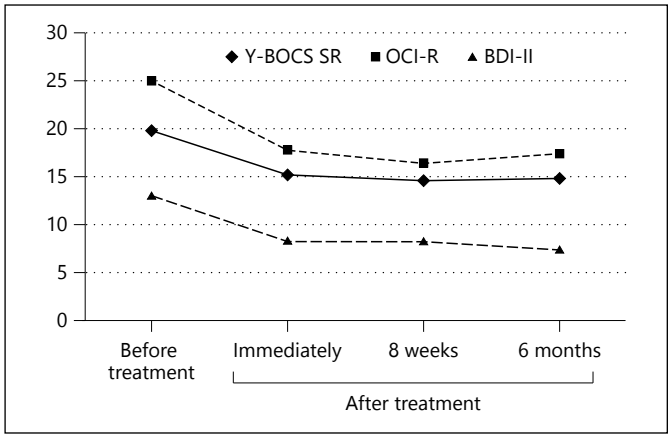

Fig. 3. Scores of the main outcome measures for all participants (n = 34) from before treatment until 6 months after.

points (i.e. fulfilled the RCI criterion), whereas no participant in the WLCG fulfilled this criterion. When considering all participants, 16 (53%) of the 30 completers scored equal or below the cutoff after the treatment, 5 (17%) fulfilled the RCI criterion. These scores slightly improved at the follow-up measures. After 8 weeks 17 of 29 (59%) scored below the cutoff and 7 of 29 (21%) fulfilled the RCI. After 6 months 16 of 28 (57%) scored below the cutoff and 6 of 28 (21%) fulfilled the RCI. The percentage of participants meeting the corresponding criteria of a ≥30% Y-BOCS reduction rose from 40% (12 of 30) after the treatment to 45% (13 of 29) after 8 weeks and cumulated in 54% (15 of 28) 6 months after the treatment.

Perceived Improvement

After the treatment, 90% (n = 27) of the 30 completers rated their condition on the PGI-I as improved, 14 (47%) of them as much improved and 2 (7%) as very much improved. Two (7%) reported no change, only 1 (3%) a worsening of symptoms.

Treatment Satisfaction and Adverse Events

Concerning the Internet-specific questions, 29 of the 30 completers (97%) described the contact with their therapist as personal. Only 17% missed face-to-face contact with a therapist. Eighty percent of the completers had a positive attitude towards a treatment via the Internet instead of face-to-face contact. As a rather indirect measure of treatment satisfaction, 90% would recommend the program to other persons with OCD.

No adverse events were reported during the treatment and in the ensuing 6 months.

Therapist Time

Looking at all treatment completers, therapists spent an average of 33 min (SD = 9.03) per treatment session. A separate analysis of both halves of the treatment showed that the mean therapist time per session dropped from 37 min (SD = 10.39) for the first half of the patients down to 29 min (SD = 5.07) for the second half.

Discussion and Conclusion

This study provides evidence for the feasibility and efficacy of an Internet-based, therapist-guided CBT with ERP for treating patients with OCD.

Consistent with our hypotheses, the approach proved to be effective for individuals suffering from OCD with significantly higher symptomatic improvements in the treatment group (ISG) compared to the WLCG. The treatment led to significant reductions of the main symptoms of OCD on both self-reported symptom scales, the Y-BOCS SR and OCI-R, and of depressive symptoms (BDI-II). The effect sizes of the treatment on the primary outcome measures were large and remained stable within the 6-month follow-up period after treatment. The d values of 0.82 and 0.87 after the treatment fell within the range reported by Rosa-Alcázar et al. [12] and Olatunji et al. [13] in their meta-analyses about studies on Cognitive Therapy with ERP, and paralleled those that Cuijpers et al. [57] described for TMH approaches for anxiety disorders. We cannot exclude the use of other therapies as an influencing factor for the maintenance of the successes in the follow-up period, but in the light of the results of other TMH approaches for OCD [20] the interpretation seems valid that the success is due to the present intervention. One important factor which probably contributed to the efficacy of the intervention is that ERP was implemented, since this seems to be of particular importance for TMH approaches for OCD [compare 20]. To put the effect sizes into perspective in the overall context, the low intensity of the treatment (i.e. 14 sessions, 8 weeks) has to be considered. Looking at research on the dose-effect in psychotherapy [8, 58, 59], it can be assumed that a prolongation of the treatment may lead to even better results with higher effect sizes.

Regarding the effects on obsessions and compulsions, closer examination revealed a greater improvement in compulsions than obsessions. This corresponds with the findings of other authors [60, 61]. A self-help program by Moritz et al. [62] aimed specifically at re-

ducing the obsessive thoughts and yielded good results. Therefore, for a subsequent research project, it is important to select single components of such a program in order to achieve a stronger improvement of obsessive thoughts.

While unguided self-help often struggles with extreme dropout rates (e.g. 74% of the participants in BT-Steps [21, 63]), TMH approaches with therapeutic interaction have higher acceptance rates [20, 64]. The present study confirms this result. The low dropout rate of 12% (all of them in the WLCG) demonstrates the high acceptance of the program. The dropout rate is comparable or even lower than those of traditional face-to-face treatments [10, 11]. Besides the intense therapeutic interaction, the specific selection criteria might provide an explanation not only for the surprisingly low number of participants fulfilling inclusion criteria and finally entering the study, but also for the low dropout rate. Likewise, the reported improvement rate of 90% among completers, as well as the equally high percentage of participants willing to recommend the program to others pointed to the high acceptance of the program. Together, we clearly corroborated our hypothesis concerning compliance and acceptance.

With regard to clinical significance, more than half of the completers had a Y-BOCS SR score equal or below 14 points on the Y-BOCS SR after the treatment. Yet, only 5 participants had a 10-point improvement. Together with the highly significant symptom improvement, the large effect sizes and the fact that 90% of the completers subjectively experienced an improvement, the results suggest the efficacy of the treatment. However, modification is required to obtain an even better response. In the present study, a Y-BOCS score of 8 points or less constituted an exclusion criterion. The overall Y-BOCS SR score of 20.12 was lower than in other studies [65–68]. Therefore, participants with a low level of suffering were included, which did not leave much room for improvement. As mentioned above, a prolongation of the treatment program would be a useful step. Some participants explicitly inquired at the end of treatment whether an extension was possible, since they wanted to build onto their successes.

Compared to a typical 50-min face-to-face therapy session, in the present study the mean therapists time was reduced by 17 min per session. Moreover, the data indicated a training effect over time. In the second half of the treatment, therapists needed only 29 min, that is 8 min less than in the first half. Overall, this leaves the therapist with more time for other patients.

The present study has several limitations. Most importantly, it did not include an active control group. Due to this lack, the findings must be considered preliminary and require replication with an active control group in a larger sample. To allow for a better grading of the effect sizes, it would be useful to compare the Internet-based treatment with a traditional face-to-face CBT. Likewise, the comparison with an unguided self-help approach with identical content would be needed to gauge the impact of the therapeutic contact on the therapy outcome. Furthermore, the fact that participants were recruited through public media, websites and outpatient psychiatrists, may have led to a wide heterogeneity of the sample. This could hamper the interpretability of the results. In order to make statements about the differential efficacy it would be desirable to calculate analyses regarding subgroups (e.g. self-selected participants vs. participants referred by the psychiatrist, participants with washing, checking or hoarding behavior). Due to the limited sample size no such analyses were possible.

Regarding clinical implications, the present study suggests a similar efficacy of an Internet-based treatment for OCD as with traditional face-to-face CBT. Even though the findings are of a preliminary nature, evidence suggests that Internet-based writing therapy is a treatment option for OCD. This offers the opportunity to overcome a number of treatment barriers, such as a poor infrastructure for psychotherapy in many areas of the world and limitations related to business hours. Since no direct therapist contact occurs, the approach opens a virtual space that might help overcome shame and the fear of stigmatization. All in all, Internet-based writing therapy offers a valuable addition to existing treatment options. It could be used in the context of a stepped care approach with a further need of identifying the best treatment allocation for patients with OCD.

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