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The Bergen 4-day treatment for OCD: four years follow-up of concentrated ERP in a clinical mental health setting

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ABSTRACT

There are few long-term follow-up studies on psychological treatment of anxiety disorders carried out in clinical mental health settings, so called effectiveness studies. The present paper presents a four year follow-up of patients with obsessive-compulsive disorder treated by the Bergen 4-day treatment (B4DT), a concentrated form of exposure and response prevention (ERP). A total of 77 obsessive–compulsive disorder (OCD) patients received treatment during four consecutive days and were assessed with the Yale-Brown Obsessive Compulsive Scale (Y-BOCS) pre, post, and at follow-ups after 3 and 6 months, and 4 years post-treatment. The Y-BOCS mean score changed from 25.9 at pre- to 10.0 post-treatment and 9.9 at long-term follow-up. The proportion fulfilling the strict international consensus criteria for remission was 73% at post-treatment and 69% at follow-up. When taking declining rate, attrition rate, remission, relapse, and further improvement during the follow-up period into account, 72% were recovered on a long-term basis. A comparison with previously published effectiveness studies of ERP indicated that the 4-day treatment yielded significantly higher proportions of remission at post-treatment and recovery at follow-up, as well as within-group effect size on the Y-BOCS. The implications of these results are discussed.

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OCD; ERP; concentrated exposure treatment; Bergen 4-day treatment; group format; long-term follow up

Introduction

Obsessive–compulsive disorder (OCD) has a lifetime prevalence of 1.6% (Kessler, Berglund, Demler, Jin, & Walters, 2005) and affects many areas of functioning (Koran, Thienemann, & Davenport, 1996). OCD has been ranked by the WHO among the 10 most debilitating disorders (WHO, 1999) and untreated the disorder tends to be chronic (Koran et al., 1996).

Exposure and response prevention (ERP) is the form of psychotherapy that has the strongest research evidence (American Psychiatric Association, 2007; National Institute for Health and Clinical Excellence, 2006) for OCD. However, a recent meta-analysis by Öst, Havnen, Hansen, and Kvale (2015) found that there was no difference in effect size

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between ERP, cognitive therapy (CT), and the combination of ERP and CT. The overwhelming majority of randomized controlled studies (RCT) making up the evidence base is efficacy studies, which are carried out in university settings using well-trained therapists, and a rather large number of exclusion criteria to obtain relatively homogeneous samples of patients. The question has been raised whether the results from efficacy studies can be generalized to community mental health settings (e.g. Westen & Morrison, 2001). However, a meta-analysis by Hans and Hiller (2013) found that CBT for OCD was effective in routine clinical practice with a pre–post effect size of 1.46, and the effects were maintained at the 12 month follow-up assessment. Even if this ES is good, our meta-analysis (Öst et al., 2015) yielded higher within-group ES of efficacy studies (2.03 at post and 2.00 at follow-up).

In addition to yielding good treatment effects, the maintenance of these effects on a long-term basis is of utmost importance. To the best of our knowledge, there are only three effectiveness studies of ERP for OCD using the Y-BOCS and having follow-up data two years or more post treatment. All of these used completer analysis and disregarded the patients not participating in the follow-up assessment. Van Noppen, Pato, Marsland, and Rasmussen (1998) had lost 49% of the patients at 25 months follow-up, Himle et al. (2001) had lost 77% at 49 months, and Sunde et al. (2017) had lost 26% of the original patients at 96 month follow-up. Thus, the fact that the post-treatment Y-BOCS means were maintained in these studies must be regarded with caution.

In efficacy studies on anxiety disorders, there has become a custom to report clinically significant change using strict criteria. Jacobson and Truax (1991) described two criteria that had to be fulfilled simultaneously: (1) Reliable Change Index (RCI) means that the patient's change from pre to post (follow-up) must be statistically reliable, i.e. higher than the measurement error at *p*-level 0.05, and (2) The post (or follow-up) score must fulfill a cut-off score indicating that it most probably belongs to a normal group distribution or outside of an untreated patient group distribution. To the best of our knowledge, 10 effectiveness studies of ERP have applied these criteria using the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS), and report post- and follow-up data (Abramowitz et al., 2005; Belloch, Cabedo, & Carrió, 2008; Boschen & Drummond, 2012; Franklin, Abramowitz, Kozak, M, Levitt, & Foa, 2000; Håland et al., 2010; Rosqvist et al., 2001; Rothbaum & Shahar, 2000; Tolin, Maltby, Diefenbach, Hannan, & Worhunsky, 2004; Tolin et al., 2007; Van Noppen, Steketee, McCorkle, & Pato, 1997). On average, 41% of the patients were clinically significantly improved both at post-treatment and at follow-up on average 25 months later. Thus, more effectiveness studies using strict criteria of clinically significant improvement are warranted.

A recent review of predictors/moderators of outcome after CBT for OCD included 38 trials (Knopp, Knowles, Bee, Lovell, & Bower, 2013) that investigated predictors assessed at pre-treatment. The authors' analyses provided some support for the conclusion that the hoarding subtype of OCD, higher level of comorbid anxiety, higher OCD severity, being unemployed, and being single all were associated with worse outcome of CBT. However, only regarding hoarding, there was a consistency across trials, and for example OCD severity was a significant predictor in only four out of 11 trials. Regarding OCD severity, it should be pointed out that in our meta-analysis (Öst

et al., 2015) we found a significant slope in the meta-regression analysis indicating that the higher the pre-treatment Y-BOCS score the larger the within-group effect size.

Almost all of the studies included in the Knopp et al. (2013) review assessed prediction of outcome at post-treatment, which means that the question of what predicts long-term outcome is basically not investigated. In addition, few of the studies can be considered effectiveness studies; thus, we know even less about potential predictors of post-treatment and long-term outcome of CBT for OCD in community mental health settings.

The primary objective of the present study is to investigate the long-term outcome of two samples (Havnen, Hansen, Öst, & Kvale, 2014; 2017) of 77 consecutive OCD-patients receiving the concentrated B4DT. Based on the 6-month follow-up results in these studies, and the 1 year follow-up in a subsequent study (Hansen et al., 2018) we expected that the post-treatment effect would be maintained at a 4 year follow-up. The secondary objective was to use benchmarking to compare the outcome to the mean of published effectiveness studies of ERP (weekly or biweekly sessions) having long-term (≥1 year) follow-up assessment. The tertiary objective was to tentatively investigate potential pre-treatment predictors of long-term outcome. Based on the mixed results in the Knopp et al. (2013) review, it is difficult to specify any expectations.

Method

Participants

Referral procedures and diagnostics. The current study is part of a standard quality control performed at our outpatient OCD treatment unit, part of the ordinary specialist health care. Patients included in the study were first referred from their individual general practitioner to the local outpatient district psychiatric facility. If the OCD-problem was considered severe enough to grant public health care, patients were referred to the OCD-team. Patients were offered treatment from the OCD-team if a principal DSM-IV diagnosis of OCD (American Psychiatric Association, 1994) was established according to the administration of the Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998). As the OCD-team is part of the secondary mental health services, all patients with OCD referred to the clinic have to be offered treatment if the OCD-severity is ≥16 points on Y-BOCS, but treatment is not initiated if the patient is suicidal, psychotic, or actively abusing substances. In addition, ERP treatment in a group format is not offered if the patient is not speaking Norwegian.

A total of 79 patients who were consecutively referred to the OCD outpatient clinic were offered treatment. Two patients (females) did not want to participate in a group, and were offered individual treatment. Both were working with children and mainly had obsessions with sexual content, and the reason for declining was the fear of being recognized by other participants. The sample thus consisted of 77 individuals (54 females; 70.1%) between 19 and 70 years old (M = 32.5, SD = 10.3).

OCD severity, duration, and previous treatment. Mean Y-BOCS score pre-treatment was 25.9 (SD = 4.3), with 23 patients (30%) classified with *moderate* OCD (Y-BOCS scores from 16–23), and 54 patients (70%) with *severe/extreme* OCD (Y-BOCS scores

≥24; Marques et al., 2010). Mean duration of OCD problems was 15.7 years (SD = 10.1) and 57 (74%) had previously received psychological treatment. Of these, 14 (25%) reported having received ERP, and 43 (75%) had undergone other forms of therapy. Thirty-three patients had received 1 therapy course, 11 patients had 2 courses, 6 had 3 courses and 7 had 4 courses. The mean pre-treatment Y-BOCS scores for treatment naïve patients (M = 27.5, SD = 4.2) and patients with previous therapy trials (M = 25.2, SD = 4.2) did not differ significantly ($t(75) = 1.955$, $p = 0.054$).

Comorbidity. In total, 46 patients (59.7%) had comorbid disorders, which included generalized anxiety disorder ($n = 19$), panic disorder without agoraphobia ($n = 7$), hypochondriasis ($n = 2$), major depressive disorder ($n = 16$), social phobia ($n = 2$), and paranoid psychosis ($n = 1$). Patients with comorbidity (M = 24.48) differed significantly from patients without comorbid disorders (M = 26.87) on pretreatment Y-BOCS scores ($t(53) = 2.34$, $p = 0.023$).

Pharmacological treatment. Use of medication was registered at the initial interview. Thirty-two patients (41.6%) were at the start of treatment receiving selective serotonin reuptake inhibitors (SSRI) medication. Patients with (M = 26.0, SD = 4.2) and without SSRI (M = 25.9, SD = 4.4) did not differ on pre-treatment Y-BOCS scores ($t(75) = 0.10$, $p = 0.92$) or BDI scores ($t(75) = 1.19$, $p = 0.24$).

Procedure

Patients referred to the OCD-team met for an initial interview session for clinician administered MINI and the registration of anamnestic information, and when the OCD-diagnosis was established they came to an additional assessment session in which the severity of their OCD was assessed with the Yale-Brown Obsessive-Compulsive Scale (OCD; Goodman et al., 1989a, 1989b). A detailed registration of the patients' obsessions and compulsions was collected and the patients received an introductory psychoeducation, offering an explanation of how obsessions are maintained by the use of rituals. In addition, a presentation of the treatment rationale was offered. The patients' expectations of treatment outcome, as well as their evaluation of the treatment credibility, was assessed with an adapted version of the Borkovec and Nau (1972) *Reaction to treatment scale*, in which four aspects of expectancy and credibility were evaluated on a 0–100% scale, with higher values indicating more positive evaluations. If a patient reported an expectancy- or credibility score below 70%, this was taken as an opportunity to clarify possible misunderstandings regarding the treatment.

Prior to the first assessment session, patients were mailed a number of self-report questionnaires (see below) to be completed before the first visit at the clinic. These questionnaires were also completed at the end of the treatment, as well as at three and six months after treatment (mailed and to be returned in pre-paid envelopes). In addition, patients were telephoned 6 months after treatment to collect data concerning employment status to monitor any changes in rates of sick leave or whether the work related interference of obsessive–compulsive symptoms had changed.

All patients were informed that data were routinely collected as part of standard quality control procedures at the clinic. The MINI interviews were conducted by a psychiatrist or a clinical psychologist trained in the administration of this structured clinical interview. Patients granted specialist health care had to be offered treatment

within three months. As only a limited number of groups were initiated per semester at the OCD clinic, patients were offered individual treatment if group treatment was not available within the three months treatment deadline.

The Y-BOCS interviews at pre-treatment were conducted by one of the psychologists or psychiatrists in the OCD-team. Y-BOCS at post-treatment as well as at follow-ups were conducted by phone by an independent psychologist. The independent assessor was aware that the patients had received concentrated ERP treatment, but was not involved in the treatment and did not work at the clinic where the present study was carried out. All Y-BOCS interviews were conducted by clinicians with special training in performing the interview. Twenty percent of the patients at long-term follow-up were randomly selected to have a second Y-BOCS interview by another independent assessor. This yielded an intra class correlation (ICC) of 0.94, which is excellent.

Patients on SSRI were asked to keep medication doses unchanged four weeks prior to and during the four-day treatment period. The recommendation was, however, not followed by further assessment of medication use. No patients were started on SSRI between the assessment interviews (inclusion) and the treatment. Patients with prescribed sleep medication or anxiolytics were asked to discontinue these medications prior to and during treatment. Adherence to these instructions was urged by the therapists throughout the treatment period. Patients were asked not to seek concurrent treatment during the treatment period.

Assessments

Assessments were carried out pre- and post-treatment and at follow-ups 3 months, 6 months, and 4 years after the end of treatment. The long-term follow-up took place on average 48 months post-treatment (range 34–60 months).

The *Y-BOCS* interview consists of 10 items covering the severity of both obsessions and compulsions, and is frequently used to assess treatment response. The Y-BOCS has good reliability and validity characteristics (Goodman et al., 1989a, 1989b). A recent unpublished psychometric study of the Norwegian Y-BOCS found that the Norwegian version of the Y-BOCS showed good reliability and validity (Eilertsen et al., Forthcoming). This outcome measure, and others reported in the Havnen et al. (2014; 2017) original studies were part of the standard quality control instruments of the health services offered at the outpatient OCD clinic at Haukeland University Hospital.

The *Beck Depression Inventory* (BDI; Beck, Steer, & Brown, 1996) was applied to assess depressive symptoms pre- and post-treatment, and at 3- and 6 month follow-up. The Norwegian version of the BDI is validated, and found to have good psychometrical properties (Siqveland & Kornør, 2011). In this 21 item inventory patients self-rate depressive symptoms on a 4-point (0–3) scale. The BDI has very good psychometric characteristics (Beck et al., 1996).

Treatment response, remission, and recovery

Treatment response was calculated based on the *international consensus criteria* (Mataix-Cols et al., 2016), which requires a ≥35% reduction of the individual patient's pre-treatment YBOCS score in order to be classified as a clinically relevant response. To

be classified as remitted, a patient has to have a response and the post-treatment Y-BOCS score is ≤12 points. Recovery is defined by meeting the remission criterion at 4 year follow-up. This is a modification of the consensus criteria that also requires a CGI-Improvement rating of 1 or 2.

Therapists

The individualized group treatment was always led by one out of three experienced psychologists in the team. Lead therapists were licensed clinical psychologists with extensive training and practice in cognitive behavioral therapy of anxiety disorders. Two of the lead therapists were authorized supervisors in cognitive behavioral therapy (CBT), the other had more than 15 years of experience in delivering cognitive behavioral treatment. Co-therapists were 12 licensed clinical psychologists or a psychiatrist, all with some basic training in ERP and CBT.

Therapists had been trained as part of a national program where 30 specialized OCD-teams were established during 2011–2015 (Kvale & Hansen, 2014). In this program, all therapists received extensive training and supervision, and basic OCD competencies were evaluated using a modified version of the Steketee, Kozak, and Foa CORE-competencies scale (Kozak & Foa, 1997; Steketee, 1993). In the 4-day format, the group of therapists basically work as a team where all use the same rethorics presented to the group as a whole during the psychoeducation the first day. As the therapists work as a team, a given therapist does most often not work with the same patient the two days of ERP. This means that the way that each therapist works, becomes very transperent. In addition, each day there are a number of very brief meetings for the therapists (5–10 min), lead by the group leader, where each therapist reports on progress and challenges for a given patient. If there are any challenges, the most experienced therapist steps in and works with that patient.

Treatment

Treatment was delivered as part of the standard mental health care provided by the OCD team and was conducted in groups of 3–6 participants with a 1:1 therapist–patient ratio. This means that each therapist was able to deliver full treatment for one patient during less than a week. A full manual has been developed and is translated to Icelandic and is currently being translated to Swedish.

The main feature of our 4-day treatment is to teach the patients to approach whatever elicits the relevant anxiety or discomfort, and to help them systematically learn how to "**LE**an into **T**he anxiety" (LET-technique) instead of employing obvious or subtle avoidance. Their task is to demonstrate clearly through their behavior that they disregard the anxiety and discomfort that is elicited. Often, this is combined with loop tapes that focus on the uncertainty of the situation (e.g. "I cannot be certain whether I got contaminated by touching all these objects"). This is done in numerous relevant situations with a therapist as a coach. During two consecutive days, the therapists assist each patient to practice the LET-technique consistently whenever anxiety or discomfort is elicited, and the patient is encouraged to approach as many anxiety- or discomfort eliciting situations, contexts, and thoughts as possible. To ensure that therapist assisted

exposure to the most context-relevant cues and situations are included, it is a prerequisite that the patient lives within a 1 h travel distance to the clinic.

The first day (approximately 3 h) was allocated to psychoeducation and, in the group setting, to prepare individual exposure tasks. The two middle days were dedicated to individually tailored and therapist assisted exposure (8–10 h each day) in a wide range of OCD-relevant settings. The exposures were interspaced with brief group meetings where each participant reported on how they were doing, especially on how they were practicing the LET intervention. When they reported on their own exposure-performance, they used a scale from 1 to 6, where 6 indicated that they were leaning fully into the exposures. If they rated themselves less than 6, they were asked in which situations they were holding back, and what the "holding back" consisted of (e.g. hesitant exposures instead of starting right off), and they were encouraged to correct this during the next exposure. The last day was used to summarize "lessons learnt" and preparing for the next 3 weeks of self-administered exposure. Relatives and friends were invited to a psycho-educative meeting in the afternoon of day 3.

On the last of the 4 days, strategies for maintaining the change and principles for how to be their own therapist were focused. The next three weeks, the patients were encouraged to register each day how they were practicing the ERP, and these registration sheets were mailed to the clinic weekly. The clinicians read the reports, but there was no contact with the patients. On day 4 of the treatment, the patients were informed orally and in writing how to contact the health care if an emergency situation should occur.

Three months after treatment, patients were invited to an individual session (0.5 h) where their experiences in the period following treatment were discussed. The principles of ERP were repeated and emphasis was put on how the patients could practice the method on their own in the best way possible. No exposure work was conducted in this session.

Statistical analyses

Statistical analyses were performed with SPSS version 25.0. Repeated measures ANOVA were conducted with Greenhouse-Geisser correction. Effect sizes were calculated with Cohen's *d*, correcting for related means. In order to allow participants with missing data to be included in the analyses, missing data were replaced using the expectation-maximization method of SPSS, version 25. When less than 25% of a data set is missing and the data is missing at random, which was the case for this data set, the expectation-maximization algorithm can be an efficient method of replacing data, as it requires no simulation of data sets (Schafer, 1997). We therefore chose the EM algorithm over multiple imputations, as it is suitable for conducting repeated measure ANOVA-analysis. For imputing the four-year Y-BOCS, all covariates and outcome variables at each time point were included to impute missing data points, as suggested by Schafer (1997).

Prediction analysis was carried out with logistic regression analysis using the following independent pre-treatment variables: OCD severity (Y-BOCS), depression severity (BDI), duration of OCD, comorbidity (yes/no), employment status (yes/no), marital status (single or married/cohabiting), and previous treatment for OCD (yes/no).

Classification as recovered (yes/no) based on Y-BOCS score at long-term follow-up was used as the dependent variable.

Results

Adherence and attrition

One patient (1.3%) dropped out of treatment prematurely. The patient displayed a lack of motivation for adhering to the treatment principles of exposure and response prevention. This was addressed by the therapist, and it was agreed that the patient terminated treatment prematurely and could reapply for treatment at a later stage if experiencing a higher degree of treatment motivation. The patient expressed satisfaction with this solution. A total of 76 patients completed treatment and were available for Y-BOCS interviews at post-treatment and 3 months follow-up. At 6 months and 4 year follow-up, 60 and 58 patients, respectively, were available for Y-BOCS interviews.

Outcome

Table 1 displays means, standard deviations, and within-group effect sizes for Y-BOCS. We first compared the subgroups of patients available for the 4 year follow-up interview and those not available, at each time point. The independent samples *t*-tests showed that the two groups did not differ significantly at any occasion (p = 0.22–0.84), indicating that the patients not being interviewed at long-term follow-up was not an unrepresentative subgroup of the sample.

Then, we examined Y-BOCS scores using repeated measures ANOVA with Greenhouse-Geisser correction. The results showed a significant change on Y-BOCS ($F(3.22, 244.36) = 130.20$, $p < .0001$). Subsequent paired sample *t*-tests showed that the change from pre (M = 25.9) to post (M = 10.0) was significant ($t(76) = 22.22$, $p < 0.0001$); whereas, the changes from post to 3-month (M = 10.7), to 6-month (M = 10.3), or to 4-year follow-up (M = 9.9) were not.

Table 1 also displays the within-group effect size (Cohen's *d*) at the different assessments post-treatment. The effect sizes were very large (2.69–3.65), which means that the mean for treated patients is basically outside of the untreated patients' distribution of Y-BOCS scores.

Moreover, SSRI-treated patients (M = 10.2, SD = 7.0) did not differ in outcome from patients not on SSRI (M = 9.5, *SD* = 8.1), and treatment naïve patients (M = 11.2, SD = 7.8) did not differ from patients with previous therapy trials (M = 9.4, SD = 7.3). In addition, pre-treatment OCD-severity was not related to outcome (r = 0.11, p = 0.34).

Response, remission, and recovery

Table 2 displays the clinical improvement at post-treatment and long-term follow-up. None of the patients had deteriorated at post-treatment or at long-term follow-up. At post-treatment, 56 of the 77 patients (72.7%) were remitted and at long-term follow-up 53 (68.8%) were recovered. Looking at the post-treatment remitters 41 of the 56 (73%) patients were recovered at follow-up, 5 (9%) had a response, and 10 (18%) had no

Table 1. Y-BOCS scores (M and SD) for the subgroups that participated and not participated in the Y-BOCS interview at the 4 year follow-up, and total sample, at the different time points.

	Participated				
Time point	Yes (N = 58)	No (N = 19)	*t*-value (*p*-value)	Total sample (N = 77)	ES (*d*) within-group
Pre-treatment	26.3 (4.1)	24.8 (4.7)	1.25 (0.22)	25.9 (4.3)	
Post-treatment	9.8 (4.2)	10.6 (4.8)	0.70 (0.49)	10.0 (4.4)	3.65
3 months follow-up	10.4 (5.9)	11.8 (7.4)	0.83 (0.41)	10.7 (6.3)	2.73
6-months follow-up	11.2 (6.1)	11.6 (6.4)	0.21 (0.84)	11.3 (6.1)	2.69

Note: ES (Cohen's *d*) was calculated using the formula $(M_{pre}—M_{post})/SD_{pooled}$.

Table 2. Clinical improvement at post and at long-term follow-up according to the international consensus criteria.

	Status at long-term follow-up				
Status at post-treatment	Recovery	Response	No change	Deterioration	Total
Remission	41	5	10	0	56 (72.7%)
Response	9	3	5	0	17 (22.1%)
No change	3	1	0	0	4 (5.2%)
Deterioration	0	0	0	0	0
Total	53 (68.8%)	9 (11.7%)	15 (19.5%)	0	77

change compared to pre-treatment. Among the 17 responders at post-treatment, 9 (53%) were recovered at long-term follow-up, 3 remained responders, and 5 had no change at follow-up. Finally, 3 of the 4 post-treatment non-changers (75%) were recovered a follow-up, and 1 had achieved response status.

The data in Table 2 indicate that 12 of the 21 patients (57%) who were not remitted at post-treatment had become recovered at long-term follow-up. What about the other side of the coin, relapse? Simpson, Franklin, Cheng, Foa, and Liebowitz (2005) recommended *return to pre-treatment severity* as criterion for relapse. This could mean (1) Return to the pre-treatment Y-BOCS score, or (2) Loss of responder status. Table 2 shows that 5 patients went from remission to response and another 10 from remission to no change. None of these 15 patients returned to their respective pre-treatment Y-BOCS score but 2 and 8, respectively, worsened at least as much as their individual response criterion on Y-BOCS. This means that 10 of the 56 post-treatment remitters (17.9%) had relapsed at long-term follow-up.

Clinical response was also calculated for the subgroups *moderate* and *severe/extreme* OCD severity as assessed at pre-treatment. For the *moderate* subgroup (n = 22), 82% were in remission at post-treatment and 68% recovered at long-term follow-up. For the *severe/extreme* subgroup (n = 55), 69% were in remission at post-treatment and 69% recovered at follow-up. Fisher's exact probability test (two-tailed) indicated no significant difference post (p = 0.40) or at follow-up (p = 1.00).

Additional treatment

Since their post-treatment assessment, six patients needed more treatment and participated in a second 4-day group. For all of these, the second participation was more than 18 months prior to the follow-up assessment (M = 21.0 months). At

4-year follow-up, two of these patients were recovered (Y-BOCS = 6 and 10), one had a clinical response (Y-BOCS = 14), and three were unchanged (Y-BOCS = 20, 22, and 26). The mean for the subgroup that received additional treatment was 16.3 (SD 7.6), significantly higher ($t(75) = 2.27$, $p = 0.026$) than the mean of 9.3 (SD 7.2) for the 71 patients not receiving additional treatment.

Benchmarking

To obtain a perspective of the outcome of the B4DT, we compared it to ERP (weekly or biweekly sessions) from published effectiveness studies that had long-term follow-up (≥1 year) and used the Y-BOCS as primary outcome measure. There are six such studies: Belloch et al. (2008), Himle et al. (2001), Håland et al. (2010), Rosqvist et al. (2001), Van Noppen et al. (1997), and Van Noppen et al. (1998).

Initially, we compared the B4DT-sample with the combined data from the effectiveness studies on background data. The upper part of Table 3 shows that the B4DT-sample was significantly younger but had significantly longer duration of their OCD. They had significantly higher proportions of females and patients being single/not married. There was no difference regarding comorbidity but ERP had a significantly higher proportion of patients on SSRI medication. As these differences on background variables are unsystematic, we can compare the samples on clinical outcome.

The lower part of Table 3 shows that the B4DT had a significantly higher Y-BOCS mean than ERP at pre-treatment and significantly lower means both at post-treatment and long-term follow-up, which on average was after 48 months for the 4-day treatment and 30 months for the effectiveness studies. The proportion of remission at post-

Table 3. Comparison between the Bergen 4-day treatment and ERP in effectiveness studies.

	Bergen 4-day		*ERP*		
	N	M (SD)	N	M (SD)	*t*-value
Age	77	32.5 (10.3)	235	35.6 (12.0)	2.69[a]
Duration	77	15.7 (10.1)	69	11.5 (8.7)	2.60[a]
Proportions	N	%	N	%	Fisher's test
Females	77	70.1	313	46.0	0.0002
Not married	77	57.1	172	37.8	0.0056
Comorbidity	77	59.7	74	51.4	0.3285
SSRI	77	41.6	176	56.3	0.0401
Y-BOCS	N	M (SD)	N	M (SD)	*t*-value
Pre	77	25.9 (4.3)	317	23.0 (5.6)	4.25[b]
Post	77	10.0 (4.4)	300	15.4 (6.6)	6.80[b]
LTFU	77	9.9 (7.4)	166	14.8 (7.2)	4.89[b]
Percent remission/recovery (≥35% reduction and ≤12 on Y-BOCS)					Fisher's test
Post	77	72.7	103	39.8	0.0001
LTFU	77	68.8	86	45.5	0.0028
Within-group effect size (Cohen's d)					
Post	77	3.65	300	1.23	
LTFU	77	2.49	166	1.25	

Note: Only effectiveness studies with ≥12 months (mean 30.4) follow-up assessment were included (see text). Independent *t*-test and Fisher's exact probability test are two-tailed.
[a] $p < 0.01$
[b] $p < 0.0001$.

assessment and recovery at long-term follow-up was significantly higher for the 4-day treatment than for the effectiveness studies. However, it should be emphasized that the Y-BOCS criterion for remission/recovery used in the effectiveness studies varied across studies; one used 12, one 14, and two applied 15 points. This fact most probably leads to an overestimation of the remission/recovery rates compared to the international consensus criterion of 12, which was used in the present study. Finally, the within-group effect size was 2–3 times as large in the 4-day treatment compared to the effectiveness studies, but these cannot be compared statistically since the 4-day treatment only has one value.

A comparison on treatment variables shows that the ERP in the effectiveness studies were carried out over an average of 13 (SD = 5.3) weeks, 13.8 (SD = 5.3) sessions, and a total treatment time of 23.0 (SD = 7.3) h. The B4DT was done over four days and four sessions with a total treatment time of 22–24 h.

A new model for clinical evaluation of long-term outcome

In Table 4, a model that does not only take post-treatment outcome of completers into account is presented. In this model, declining and attrition rates are included as well as strict criteria for remission, recovery, relapse and "new recovery" among those not remitted at post-treatment. As can be seen, a small proportion declined treatment and even fewer dropped out of it. It is also obvious that clinical change occurred during the follow-up period; 18% of remitters had relapsed at follow-up but this is offset by 57% of non-remitters who had recovered at follow-up. The bottom line is that 72% of OCD-patients who go through the B4DT will have a good long-term outcome. When the corresponding data for ERP in effectiveness studies are entered into the model, 29% obtained a good long-term outcome. Fisher's exact probability test was significant (two-tailed $p < 0.0001$).

Employment status

At pre-treatment assessment, 27 of the 77 patients (35.1%) did not work or study. However, at long-term follow-up, 20 of the 27 (74.1%) were working or studying. Among the 50 patients who were working/studying at pre-treatment, 48 (96%) were continuing to do so at follow-up and only 2 had discontinued working. One of these was remitted at post and recovered at follow-up; whereas, the other barely achieved response on Y-BOCS but not until follow-up. McNemar's test showed that the change in employment from pre to follow-up was statistically significant ($p = 0.001$).

Among the 68 patients who were working or studying at follow-up, 46 (67.7%) did it 100%, 17 (25%) worked/studied 60–90%, and 5 (7.4%) worked/studied 50% or less.

Prediction of long-term outcome

A binominal logistic regression analysis was conducted to examine possible predictors of recovery at 4 year follow-up. Linearity of the continuous variables with respect to the logit of the dependent variable was assessed via the Box and Tidwell (1962) procedure. A Bonferroni correction was applied using all 10 terms in the model resulting in

statistical significance being accepted when $p < 0.005$ (Tabachnick & Fidell, 2014). Based on this assessment, all continuous independent variables were found to be linearly related to the logit of the dependent variable. There were two studentized residuals with values of 2.72 and 2.80 standard deviations, which were kept in the analysis. The binary dependent variable was recovery (coded 1) vs. non-recovery (coded 0), and the independent variables were baseline symptom severity of OCD symptoms (Y-BOCS) and depression (BDI), duration of OCD (years), use of SSRI pre-treatment (yes/no), work status pre-treatment (student or paid work/no work), marital status (married or cohabiting/single), and previous OCD treatment (yes/no). The logistic regression model was statistically significant $\chi^2(8) = 16.60$, $p < 0.04$. The model explained 27.3% (Nagelkerke R^2) of the variance in recovery and correctly classified 74.0% of the cases. Among the seven predictor variables, only two were significant: depressive symptoms pre-treatment (BDI) and duration of OCD (years). Depressive symptoms before treatment were related to reduction in the likelihood of being recovered at 4-year follow-up (OR 0.93 [95% CI, 0.86–1.00]; $p = 0.04$) and longer duration of OCD (OR 1.07 [95% CI, 1.01–1.15]; $p = 0.03$) was related to an increased likelihood of being recovered at 4 year follow-up.

Discussion

The primary objective of the present study was to investigate the long-term outcome of two samples (Havnen et al., 2014; 2017) of 77 consecutive OCD-patients receiving the concentrated B4DT. These had shown good outcomes, which were maintained at the 6-month follow-up. The results of the present study clearly show that the mean Y-BOCS score was maintained as long as four years post-treatment, and there was only a small reduction (4 percentage points) in recovery rate compared to remission rate.

Another variable that is important in the overall evaluation of the 4-day treatment's effectiveness is the effect on the patients' work ability. This improved significantly in the present study and at the long-term follow-up 88% of the patients were working/studying compared to 65% pre-treatment, and of those working 68% worked full-time. Unfortunately, this variable is very rarely reported in CBT-studies for OCD and a comparison with previous research is not possible.

The secondary objective was to use benchmarking to compare the outcome to the mean of published effectiveness studies of ERP (weekly or biweekly sessions) having long-term (≥1 year) follow-up assessment. The analysis of background variables showed that there were significant but inconsistent differences between the B4DT-sample and the ERP-sample. In order to evaluate these we can look at the review of OCD-predictor studies published by Knopp et al. (2013). They reported that "Potential associations emerged between worse OCD treatment outcome and the following factors: hoarding pathology, increased anxiety and OCD symptom severity, certain OCD symptom subtypes, unemployment, and being single/not married." (p. 1067). We are limited to the data provided in the ERP-studies and can compare the two samples only on OCD-severity and being single/not married. The B4DT sample had significantly higher OCD-severity and proportion being single than the ERP sample, which would indicate a higher risk for worse outcome. As the B4DT sample does not differ significantly from

the ERP sample on any variable predicting a better outcome, we think that a comparison between these two samples is warranted.

When comparing our results with that of previously published effectiveness studies of ERP using the Y-BOCS as primary outcome measure, we find that the B4DT yields significantly better effect both post-treatment and at long-term follow-up (see Table 3). The same picture is evident when using remission at post and recovery at follow-up as the outcome measure. Despite the fact that three quarters of the effectiveness studies reporting these data used a more lenient criterion (≤14–16 on Y-BOCS) than the international consensus criteria (≤12), the B4DT yielded significantly higher proportions of remission at post and recovery at follow-up.

The most stringent evaluation of the 4-day treatment was done when using the new model for clinical presentation of the outcome. When taking all the important rates into consideration: declining, attrition, remission at post, relapsing, and non-remitters recovering during follow-up, we find that 72% of the patients being offered the B4DT have a good long-term outcome compared to 29% for the ERP treatment in effectiveness studies (see Table 4), a significant difference. Unfortunately, it is very difficult to compare these proportions to other treatments since declining rate is rarely reported, remission criteria vary to a large extent (see Öst et al., 2015), and follow-up studies infrequently report relapse rate and non-remitters recovering. We hope that this paper might inspire more detailed follow-up studies in the future.

The tertiary objective of this study was to tentatively investigate potential pre-treatment predictors of the long-term outcome. The result of the predictor analysis showed that pre-treatment levels of depression (BDI) and duration of OCD symptoms were associated with the odds for recovery at follow-up. Higher BDI-score predicted lower odds of recovery; whereas, longer duration predicted higher odds of recovery. The large review of Knopp et al. (2013) indicated that depression predicted OCD-severity at post-treatment in 1 out of 11 trials (9%); whereas, OCD-duration was a significant predictor in 1 of 13 trials (8%). However, we cannot do a direct comparison because the Knopp et al. review almost exclusively had efficacy studies and studied prediction at post-treatment; whereas, we report an effectiveness study and analyzed prediction at long-term follow-up. Further research on predictors of immediate and long-term outcome is needed both for effectiveness and efficacy studies.

Table 4. A new model for clinical presentation of treatment outcome comparing the Bergen 4-day treatment with ERP in effectiveness studies.

	B4DT		ERP	
1. Number fulfilling DSM-criteria and *offered* treatment	**100**	i.e.	**100**	i.e.
2. Proportion *declining* treatment	3%	−3	15%*	−15
3. Number *starting* treatment		97		85
4. Proportion *dropping out of treatment*	1%	−1	10%	−9
5. Number *completing* treatment		96		76
6. Proportion *remitted* at post-assessment	73%	70	40%	30
7. Proportion *not remitted* at post-assessment	27%	−26	60%	46
8. Proportion *relapsing* (of remitters post) to follow-up	18%	−13	11%	−3
9. Proportion *recovered* (of non-remitters post)	57%	+15	4%	+2
10. Number *with a good long-term outcome*		**72**		**29**

Note: For ease of calculation, we start with 100 patients. * From the meta-analysis by Öst et al. (2015).

The present study has both strengths and limitations. It is the first long-term follow-up of the 4-day treatment, and the outcome was evaluated by independent assessors displaying excellent inter-rater reliability using the Y-BOCS. In addition, it is one of few effectiveness studies assessing the patients' work ability on a long-term basis. The most obvious limitation is the lack of an untreated control group. However, there is little reason to believe that the obtained results of the 4-day treatment are solely due to the passage of time and re-assessment. The meta-analysis by Öst et al. (2015) showed that untreated waitlist conditions had a non-significant within-group effect size of 0.10 at post-assessment, which should be compared to 3.65 for the 4-day treatment. As it is unethical to keep patients with severe disorders without treatment on a long-term basis, we cannot compare our 4-year effect size of 2.49 with an untreated sample. It should also be pointed out that Hofmann and Smits (2008) published a meta-analysis of placebo-controlled RCTs of CBT for anxiety disorders. They found that OCD had the highest effect size of all anxiety disorders, 1.37, and an Odds ratio for a good outcome of 12.24. This means that the difference between active treatment and placebo was largest for OCD and that the patients receiving active treatment had a 12 times higher chance of a good outcome than placebo-treated patients had. Thus, we consider it unlikely that for the OCD-patients in this study, with a mean duration of their OCD-symptoms of 15.7 years, the large and maintained improvement should be solely owing to factors other than the treatment. A second limitation is the estimation of Y-BOCS scores for those patients not showing up for the long-term assessment. There are various alternatives in this situation. One is to use the last observation carried forward, which, however, would mean that relapse is not a possibility for the non-assessed patients. A second alternative is to simply disregard this subgroup, a strategy used by all effectiveness studies included in the benchmarking sample. A third alternative is to estimate the missing values using the expectation-maximization method of SPSS, version 25, which we chose to do in this study.

Thus, the conclusions that can be drawn is that the effect of the B4DT for OCD is maintained after four years. Furthermore, this treatment seems to yield better effects than ERP carried out with sessions on a weekly or biweekly basis, despite the same total hours of therapy time. However, it would take a RCT directly comparing the 4-day treatment and once weekly ERP to definitely answer this question. We are only aware of two non-randomized trials comparing a concentrated (daily sessions) with a standard treatment (weekly sessions). Abramowitz, Foa, and Franklin (2003) compared 15 sessions over 3 weeks (concentrated) with 15 sessions over 8 weeks (twice weekly) and found that the concentrated treatment yielded a significantly higher proportion of recovered patients post-treatment but not at 3-month follow-up. Storch et al. (2008) compared 14 sessions over 3 weeks with 14 weekly sessions and found no significant differences at post- or at 3-month follow-up assessment. The B4DT also has the potential of being cost-effective but such an analysis remains to be done.

Disclosure statement

No potential conflict of interest was reported by the authors. The current paper is based on information that is routinely collected from patients who receive treatment at Haukeland University Hospital. The project was first approved by the Personvernombud 15 May 2012, and the latest renewal of the approval was made on July 15th, 2016. Written consent is not required for this study.

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